

APPROVED

Feb 20 2025

BOARD OF RECREATION AND PARK COMMISSIONERS

BOARD REPORT

NO. 25-025

DATE February 20, 2025

C.D. 9

BOARD OF RECREATION AND PARK COMMISSIONERS

SUBJECT: SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION (PRJ21068) (W.O. #E1908366) PROJECT – APPROVAL OF FINAL PLANS AND CALL FOR BIDS; CATEGORICAL EXEMPTION FROM THE PROVISIONS OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) PURSUANT TO ARTICLE 19, SECTION 15301(l)(4) [DEMOLITION AND REMOVAL OF INDIVIDUAL SMALL STRUCTURES SUCH AS ACCESSORY (APPURTENANT) STRUCTURES INCLUDING GARAGES, CARPORTS, PATIOS, SWIMMING POOLS, AND FENCES], SECTION 15302 [RECONSTRUCTION OF EXISTING STRUCTURES WHERE THE NEW STRUCTURE WILL BE LOCATED ON THE SAME SITE AS THE STRUCTURE REPLACED AND HAVE SUBSTANTIALLY THE SAME PURPOSE AND CAPACITY] AND SECTION 15303(e) [CONSTRUCTION OF ACCESSORY (APPURTENANT) STRUCTURES INCLUDING GARAGES, CARPORTS, PATIOS, SWIMMING POOLS, AND FENCES] OF CALIFORNIA CEQA GUIDELINES AND ARTICLE III, SECTION 1, CLASS 1(11)(d), CLASS 2 AND CLASS 3(6) OF CITY CEQA GUIDELINES

B. Aguirre	_____	M. Rudnick	_____
B. Jones	_____	for *C. Santo Domingo	<u>DF</u>
C. Stoneham	_____	N. Williams	_____

General Manager

Approved X Disapproved _____ Withdrawn _____

RECOMMENDATIONS

1. Approve final plans and specifications, substantially in the form on file with the Board of Recreation and Park Commissioners (Board) Office and attached to this Report, for the South Park Renovation – Public Restroom Renovation (PRJ21068) (W.O. #E1908366) Project (Project);
2. Approve the date to be advertised for receipt of bids as Tuesday, March 25, 2025 at 2:00 P.M. electronically to the Board Office;
3. Determine that the proposed Project is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Article 19, Section 15301(l)(4) [Demolition and removal of individual small structures such as accessory (appurtenant) structures including garages, carports, patios, swimming pools, and fences],

BOARD REPORT

PG. 2 NO. 25-025

Section 15302 [Reconstruction of existing structures where the new structure will be located on the same site as the structure replaced and have substantially the same purpose and capacity] and Section 15303(e) [Construction of accessory (appurtenant) structures including garages, carports, patios, swimming pools, and fences] of California CEQA Guidelines and Article III, Section 1, Class 1(11)(d), Class 2 and Class 3(6) of City CEQA Guidelines, and direct staff to file a Notice of Exemption (NOE) with the Los Angeles County Clerk and the Governor's Office of Land Use and Climate Innovation;

4. Authorize RAP's Chief Accounting Employee or designee to prepare a check to the Los Angeles County Clerk in the amount of \$75.00 for the purpose of filing an NOE; and,
5. Authorize RAP's Chief Accounting Employee or Designee to make technical corrections as necessary to carry out the intent of this Report.

SUMMARY

The South Park Recreation Center (aka South Park) is an 18.25-acre park which features a gymnasium, swimming pool, basketball and tennis courts, a baseball diamond and turf field, an outdoor stage, outdoor fitness area, picnic tables, and children's play areas. An estimated 21,527 City residents live within a one-half mile walking distance of South Park Recreation Center. Due to the facilities, features, programs, and services it provides, South Park Recreation Center meets the standard for a Community Park, as defined in the City's Public Recreation Plan.

In coordination with the Office of Council District 9 (CD 9) and Recreation and Park (RAP), the Department of Public Works, Bureau of Engineering (BOE) developed a Vision Plan for South Park (Attachment No. 1) that upgrades and reorganizes various park amenities as listed below, in order to improve the park's functionalities, operations and maintenance, and enhance the overall user experience:

- Northwest Area Synthetic Soccer Field (completed in 2017)
- East Historic Area (completed in 2019)
- Sports Field Lighting Upgrade (in construction)
- Public Restroom Renovation
- New Maintenance Yard (design completed)
- Northeast Area with Palm Walkway (future project)
- Southeast Area with Synthetic Meadow and Basketball Courts (future project)
- Building Promenade (future project)
- West Parking Lot (future project)
- Baseball Field Renovations (future project)

The South Park Vision Plan has been presented to the community on a number of occasions and is fully supported by CD 9 and the community.

BOARD REPORT

PG. 3 NO. 25-025

PROJECT SCOPE

Submitted for the Board’s approval are the final plans and specifications (Attachment No. 2), prepared by BOE’s Architectural Division, with support from design consultant IBI Group/Arcadis. The restroom renovation scope includes:

1. Demolition of the existing 431-square-foot public restrooms and the adjacent concrete walkway and landscaping.
2. Construction of a new 365-square-foot restroom addition at the southeast corner of the existing pool building. The new public restroom will include three ADA unisex stalls, two non-ADA stalls, three accessible lavatories, one accessible hand dryer, janitor closet, and plumbing chase.
3. Construction of new ADA concrete walkways adjacent to the new restroom addition.

BOE will provide project management and construction management services during construction.

The City Engineer’s estimate of the Project’s construction cost is \$1,200,000. The budgeted amount for construction contingency is \$100,000.

PROJECT FUNDING

Funds are currently available from the following funds and accounts:

Funding Source	Fund/Dept./Acct. No.	Amount
Measure A (Annual Allocation Grant – Cat 1, 2)	63T/89/89YHLI	\$795,800
Proposition 40 Youth Soccer	205/89/89PYBM	\$504,200
	Total	\$1,300,000

TREES AND SHADE

The South Park Recreation Center has established trees within and around the park. No trees will be removed or planted, and therefore no increase or decrease of shade areas, as a result of the Project.

ENVIRONMENTAL IMPACT

The proposed Project consists of demolition and removal of accessory structures, reconstruction of existing structures where the new structure will be located on the same site as the structure replaced and have substantially the same purpose and capacity and installation of new accessory structures.

BOARD REPORT

PG. 4 NO. 25-025

According to the parcel profile report retrieved on January 24, 2025, the proposed Project is not in a liquefaction a methane or a coastal zone so there is no reasonable possibility that the proposed Project may impact an environmental resource of hazardous or critical concern or have a significant effect due to unusual circumstances. No other known projects would involve cumulatively significant impacts, and no future projects would result from the proposed Project. As of January 24, 2025, the State Department of Toxic Substances Control (CTSC) (Envirostor at www.envirostor.dtsc.ca.gov) and the State Water Resources Control Board (SWCB) (Geotracker at www.geotracker.waterboards.ca.gov) have not listed any site on the Project area or within 1,000 feet of the Project area. According to the Caltrans Scenic Highway Map there is no scenic highway located within, or adjacent to, the proposed Project or within its site. The proposed Project is located within South Park, which – according to a 2012 historic structures report (HSR) – is ineligible for listing on the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR), or designation as a Los Angeles Historic-Cultural Monument, despite being one of the oldest parks in Los Angeles. The HSR did not assess the historical significance of the bathhouse, the building where the proposed Project is situated. A 2025 historic memo noted that, although the bathhouse conserves some historic significance, the proposed Project would not result in a further loss of integrity; it exists on a side of the building that has already been altered and is not visible from the west façade that most clearly conveys the building’s significance. Therefore, alteration to the restrooms will not affect the eligibility of the building.

Based in this information, RAP staff recommends that the Board determines that the proposed Project is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Article 19, Sections 15301(l)(4), 15302, and 15303(e) of California CEQA Guidelines as well as to Article III, Section 1, Class 1(11)(d), Class 2 and Class 3(6) of City CEQA Guidelines. Staff will file a Notice of Exemption with the Los Angeles County Clerk and the Governor’s Office of Land Use and Climate Innovation upon Board’s approval.

FISCAL IMPACT

The Project will be funded by a combination of the aforementioned funding sources. There is no immediate fiscal impact to RAP’s General Fund.

STRATEGIC PLAN INITIATIVES AND GOALS

Approval of this Board Report advances RAP’s Strategic Plan by supporting:

Goal No. 3: Create & Maintain World Class Parks and Facilities

Outcome No. 1: Newly developed open space park projects and redesign of signature City parks

Key Milestone: Number of major park projects completed

Target: Six (6) by 2022

BOARD REPORT

PG. 5 NO. 25-025

This Report was prepared by Wayne Chow, Project Manager, BOE Architectural Division; reviewed by Ohaji Abdallah, Proposition K Program Manager, BOE Architectural Division; and Gary Lam and Darryl Ford, Superintendent, Planning, Construction and Maintenance Branch.

LIST OF ATTACHMENTS

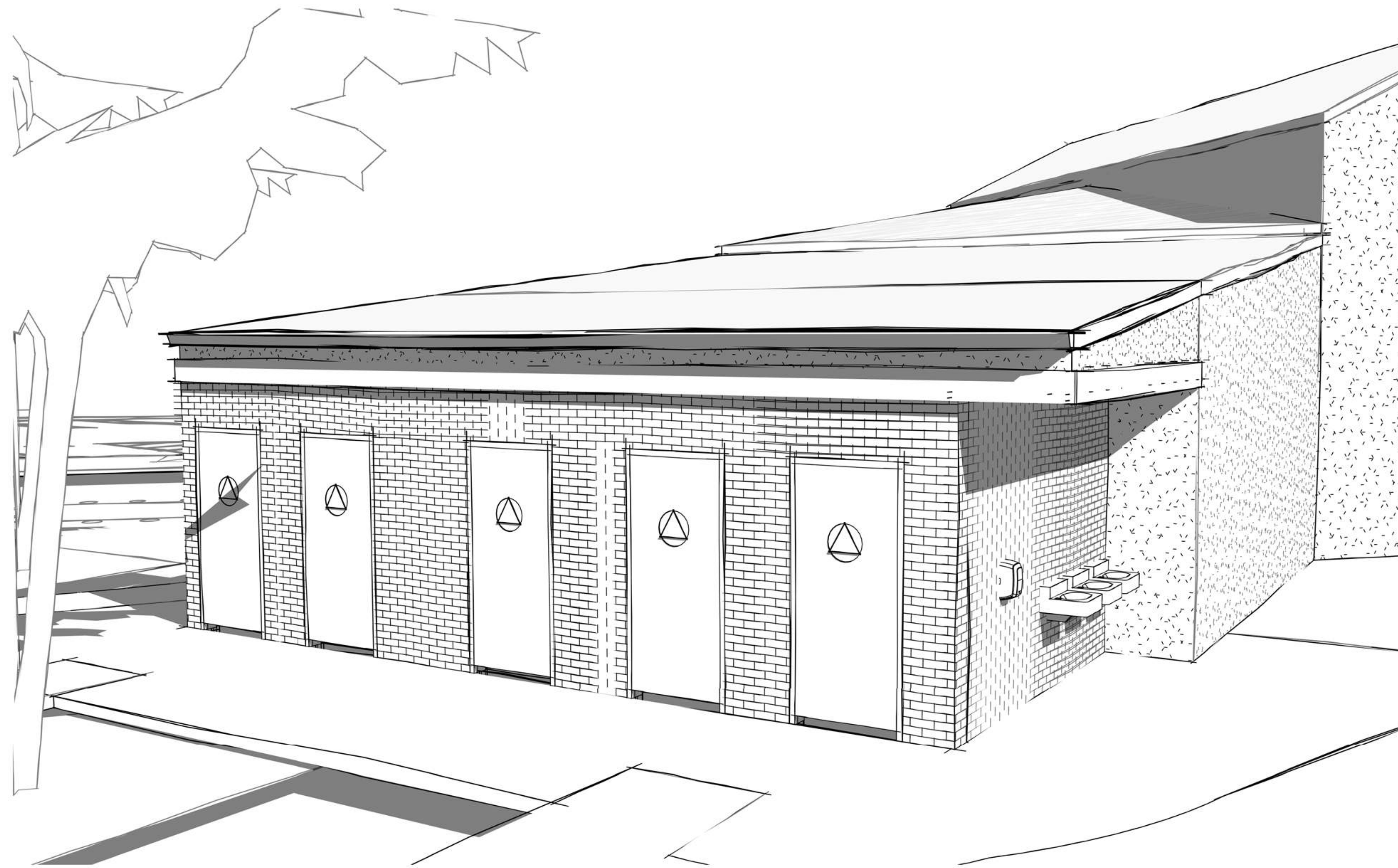
Attachment No. 1 – South Park Vision Plan

Attachment No. 2 – Final Plans

Attachment No. 3 – Specifications

Attachment No. 4 – Notice of Exemption

CITY OF LOS ANGELES
 DEPARTMENT OF RECREATION AND PARKS
SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
BID SET



THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN

FILE PATH: C:\Users\365281\Documents\SouthPark_Public Restroom Renovation_CENTRAL_365281.rvt

TTLB TEMPLATE REVISION DATE: 02/09/10

SHEET ISSUE

REVISIONS/ISSUES (DESIGN STAGE)

PROJECT TEAM

CLIENT: **DEPARTMENT OF RECREATION AND PARKS**
 MICHAEL A. SHULL
 GENERAL MANAGER
 221 NORTH FIGUEROA, SUITE 350
 LOS ANGELES, CA 90012

PROJECT MANAGEMENT: **ARCHITECTURAL DIVISION**
 NEIL DRUCKER
 INTERIM DIVISION HEAD / PROGRAM MANAGER
 1149 S. BROADWAY, SUITE 830
 LOS ANGELES, CA 90015
 OFFICE: (213) 485-4000
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CONTACT - IOANA JUNE
 PROJECT MANAGER

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BID AND AWARD: **QUALITY AND STANDARD GROUP**
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 DIVISION ENGINEER
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ARCHITECTURAL: **ARCHITECTURAL DIVISION**
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 ELECTRICAL ENGINEER
 SHAHRAM FARZAN, PE
 MECHANICAL ENGINEER
 BRANDON MCKNIGHT
 MECHANICAL ASSOCIATE
 RICHARD FISHER
 LANDSCAPE ARCHITECT
 GREG MOESER
 LANDSCAPE ASSOCIATE

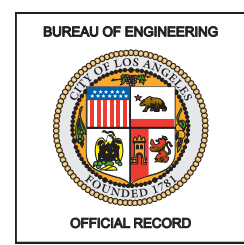
STRUCTURAL: **STRUCTURAL ENGINEERING DIVISION**
 SHAILESH PATEL
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 1149 S. BROADWAY, SUITE 740
 LOS ANGELES, CA 90015

CONTACT - MANAN BHALJA, SE
 STRUCTURAL ENGINEER
 QUYNH HO, MS, PE
 STRUCTURAL ENGINEER ASSOCIATE

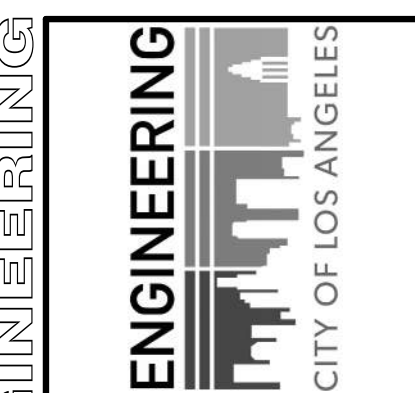
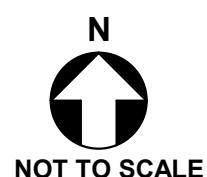
SURVEY: **SURVEY DIVISION**
 BOB NIELSEN, PLS
 CHIEF SURVEYOR
 201 NORTH FIGUEROA STREET
 LOS ANGELES, CA 90012

CONSULTANT: **PACIFIC ENGINEERS GROUP**
 2740 W. MAGNOLIA BLVD, SUITE 205
 BURBANK, CA 91505

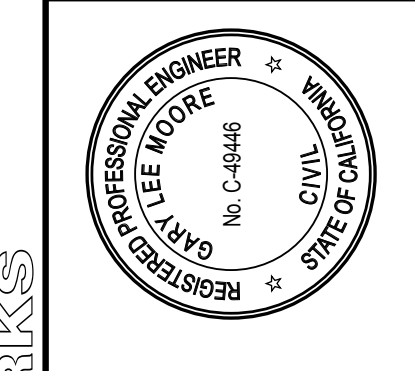
CONTACT - PETER MARZO
 (818) 748-1758



(THOMAS GUIDE PAGE 674, GRID D4)
VICINITY MAP



NO.	REVISION DESCRIPTION	DATE	BY
WORK INDEX	SERIAL	BUILDING	
			RP-300113



DEPARTMENT OF PUBLIC WORKS
 CITY ENGINEER
GARY LEE MOORE, PE, ENV SP
 ACCEPTED

DATE: 01/22/2020
 DATE: 01/22/2020

DEPUTY CITY ENGINEER PROGRAM
Amy Lee Moore
 CITY ENGINEER

CITY OF LOS ANGELES
 CLIENT: RECREATION AND PARKS
 GENERAL MANAGER: MICHAEL A. SHULL

SHEET COVER SHEET
 PROJECT SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
 ADDRESS 345 EAST 51ST STREET
 LOS ANGELES, CA 90011

WORK ORDER
 E1908366
 PLAN FILE

DRAWING
G001
 SHEET 1 OF 45

PLOTTED: 1/14/2019 3:03:15 PM

Storm Water Pollution Control Requirements for Construction Activities
Minimum Water Quality Protection Requirements for All Construction Projects

The following notes shall be incorporated in the approved set of construction/grading plans and represents the minimum standards of good housekeeping which must be implemented on all construction projects.

Construction means constructing, cleaning, grading or excavation that result in soil disturbance. Construction includes structure teardown (demolition). It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, emergency construction activities required to immediately protect public health and safety, interior remodeling with no outside exposure of construction material or construction waste to storm water, mechanical permit work, or sign permit work. (Order No. 01-182, NPDES Permit No. CAS004001 - Part 5 Definitions)

- Eroded sediments and pollutants shall be retained on site and shall not be transported from the site via sheet flow, swales, area drains, natural drainage or wind.
- Stockpiles of earth and other construction-related materials shall be covered and/or protected from being transported from the site by wind or water.
- Fuels, oils, solvents and other toxic materials must be stored in accordance with their listing and shall not contaminate the soil nor the surface waters. All approved toxic storage containers are to be protected from the weather. Spills must be cleaned up immediately and disposed of properly and shall not be washed into the drainage system.
- Non-storm water runoff from equipment and vehicle washing and any other activity shall be contained on the project site.
- Excess or waste concrete may not be washed into the public way or any drainage system. Provisions shall be made to retain concrete waste on-site until it can be appropriately disposed of or recycled.
- Trash and construction-related solid wastes must be deposited into a covered receptacle to prevent contamination of storm water and dispersal by wind.
- Sediments and other materials shall not be tracked from the site by vehicle traffic. The construction entrance roadways must be stabilized so as to inhibit sediments from being deposited into the street/public ways. Accidental depositions must be swept up immediately and may not be washed down by rain or by any other means.
- Retention basins of sufficient size shall be provided to retain storm water runoff on-site and shall be properly located to collect all tributary site runoff.
- Where retention of storm water runoff on-site is not feasible due to site constraints, runoff may be conveyed to the street and the storm drain system provided that an approved filtering system is installed and maintained on-site during the construction duration.

As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities.

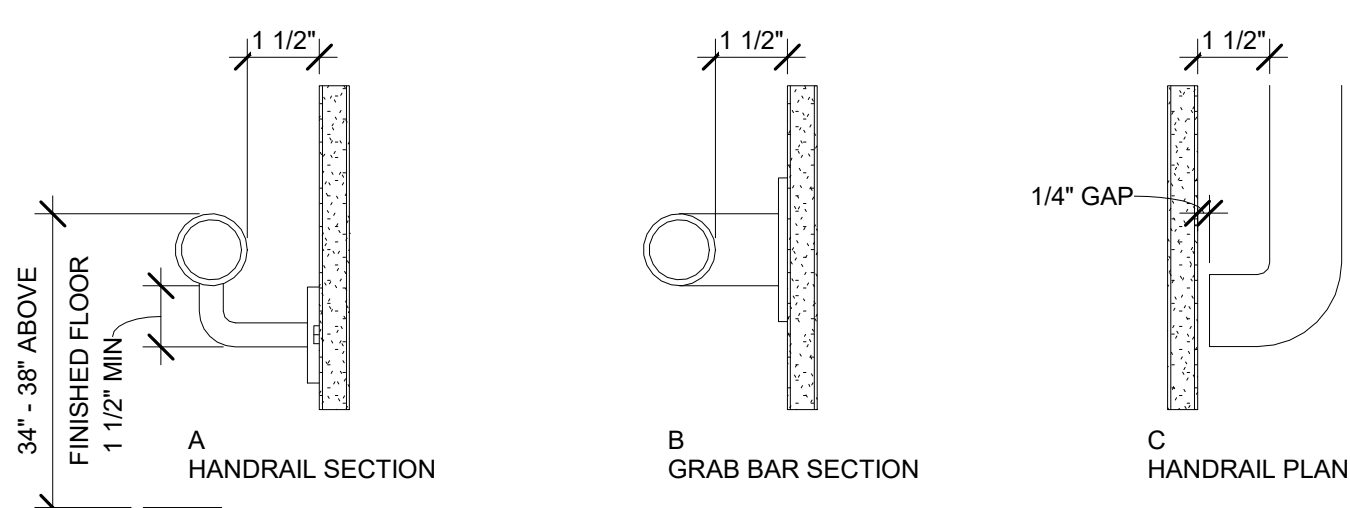
MANDATORY REQUIREMENTS CHECKLIST
ADDITIONS AND ALTERATIONS TO NON-RESIDENTIAL BUILDINGS
 (COMPLETE AND INCORPORATE THIS FORM INTO THE PLANS)

ITEM #	CODE SECTION	REQUIREMENT	REFERENCE SHEET (Sheet # or N/A)	COMMENTS (e.g. note #, detail # or reason for N/A)
PLANNING AND DESIGN				
1	5.106.1	Storm water drainage and retention during construction	G003	GRN 1
2	5.106.4.1.1	Short-term bicycle parking (≥ 10 vehicular parking spaces)	N/A	NO NEW PARKING PROVIDED
3	5.106.4.1.2	Long-term bicycle parking (≥ 10 vehicular parking spaces)	N/A	NO NEW PARKING PROVIDED
4	5.106.5.2	Designated parking (≥ 10 vehicular parking spaces)	N/A	NO NEW PARKING PROVIDED
5	5.106.10	Grading and Paving	A100	
WATER EFFICIENCY & CONSERVATION				
6	5.303.1.1	Additions in excess of 50,000 sq ft	N/A	LESS THAN 50,000sf
7	5.303.1.2	Excess consumption	N/A	LESS THAN 50,000sf
8	5.303.2	Water reduction	---	GRN 17
9	5.303.3	Water conserving plumbing fixtures and fittings	---	GRN 15, NOTE #3
10	5.303.3.3	Showerheads	N/A	
11	5.304.1	Outdoor water use in landscape areas	N/A	
12	5.304.3	Irrigation controller and sensor application	N/A	
13	5.304.4	Outdoor water use meters	N/A	
14	5.304.5	Exterior faucets	N/A	
15	5.305.1	Graywater ready	N/A	
16	5.305.2	Recycled water supply to fixtures	N/A	
MATERIAL CONSERVATION & RESOURCE EFFICIENCY				
17	5.407.1	Weather protection	A503 & A320	
18	5.407.2.1	Sprinklers	N/A	
19	5.407.2.2.1	Nonabsorbent floor and wall finishes	A600	FINISH SCHEDULE
20	5.407.2.2.2	Exterior door protection	A600	DOOR SCHEDULE
21	5.407.2.2.2	Flashing	A503 & A610	DTL 19 & 110 ON 2003
22	5.408.1	Construction waste diversion	G003	GENERAL NOTES #26
23	5.408.2	Universal Waste	G003	GENERAL NOTES #27
24	5.408.3	Excavated soil and land clearing debris	N/A	

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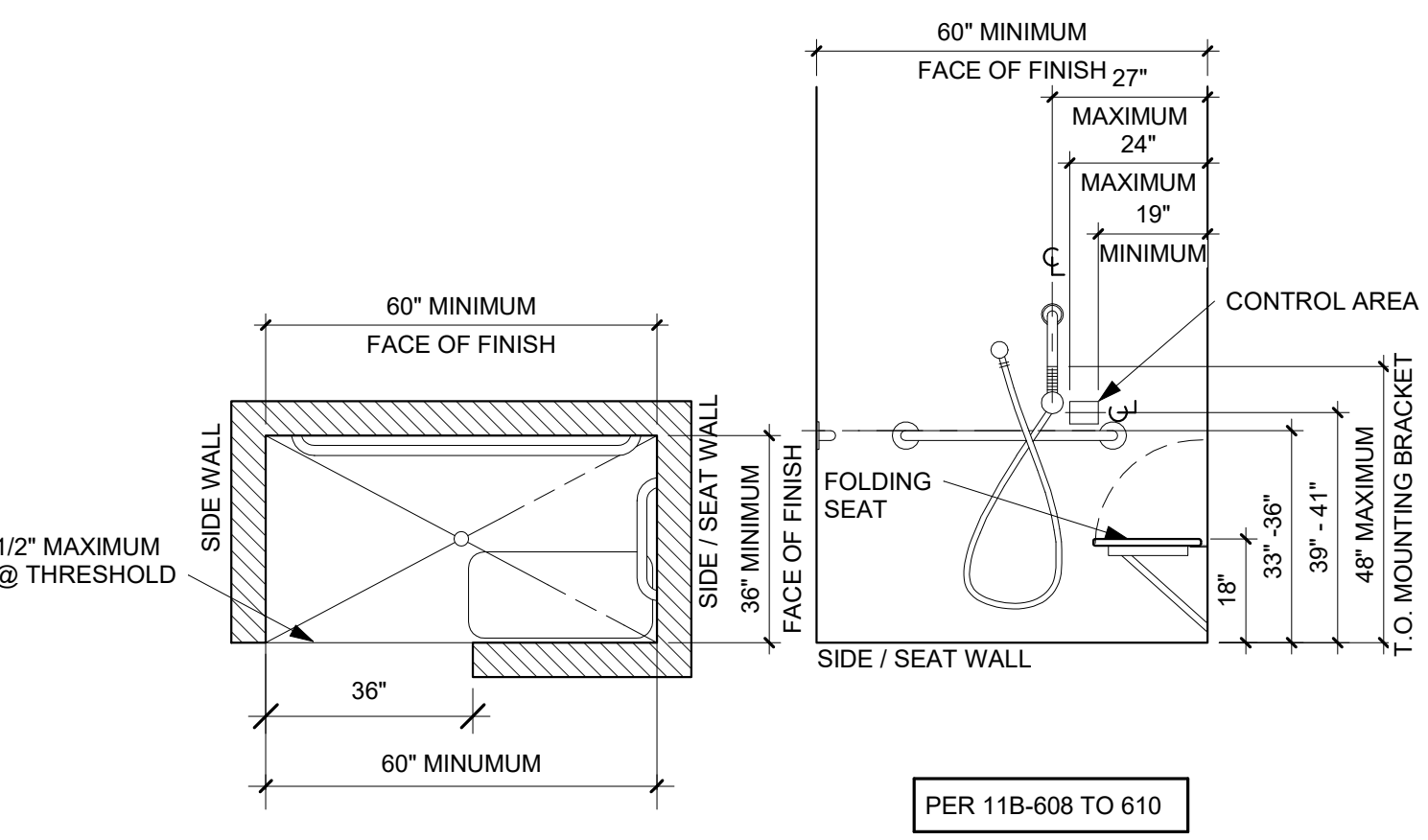
The tables below are taken from the 2017 Los Angeles Green Building Code Tables 5.504.1, 5.504.2, 5.504.3, 5.504.4, 5.504.5, 5.504.6, 5.504.7, 5.504.8, 5.504.9, 5.504.10, 5.504.11, 5.504.12, 5.504.13, 5.504.14, 5.504.15, 5.504.16, 5.504.17, 5.504.18, 5.504.19, 5.504.20, 5.504.21, 5.504.22, 5.504.23, 5.504.24, 5.504.25, 5.504.26, 5.504.27, 5.504.28, 5.504.29, 5.504.30, 5.504.31, 5.504.32, 5.504.33, 5.504.34, 5.504.35, 5.504.36, 5.504.37, 5.504.38, 5.504.39, 5.504.40, 5.504.41, 5.504.42, 5.504.43, 5.504.44, 5.504.45, 5.504.46, 5.504.47, 5.504.48, 5.504.49, 5.504.50, 5.504.51, 5.504.52, 5.504.53, 5.504.54, 5.504.55, 5.504.56, 5.504.57, 5.504.58, 5.504.59, 5.504.60, 5.504.61, 5.504.62, 5.504.63, 5.504.64, 5.504.65, 5.504.66, 5.504.67, 5.504.68, 5.504.69, 5.504.70, 5.504.71, 5.504.72, 5.504.73, 5.504.74, 5.504.75, 5.504.76, 5.504.77, 5.504.78, 5.504.79, 5.504.80, 5.504.81, 5.504.82, 5.504.83, 5.504.84, 5.504.85, 5.504.86, 5.504.87, 5.504.88, 5.504.89, 5.504.90, 5.504.91, 5.504.92, 5.504.93, 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 THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN
 TTBL TEMPLATE REVISION DATE: 01/31/18
 SHEET ISSUE

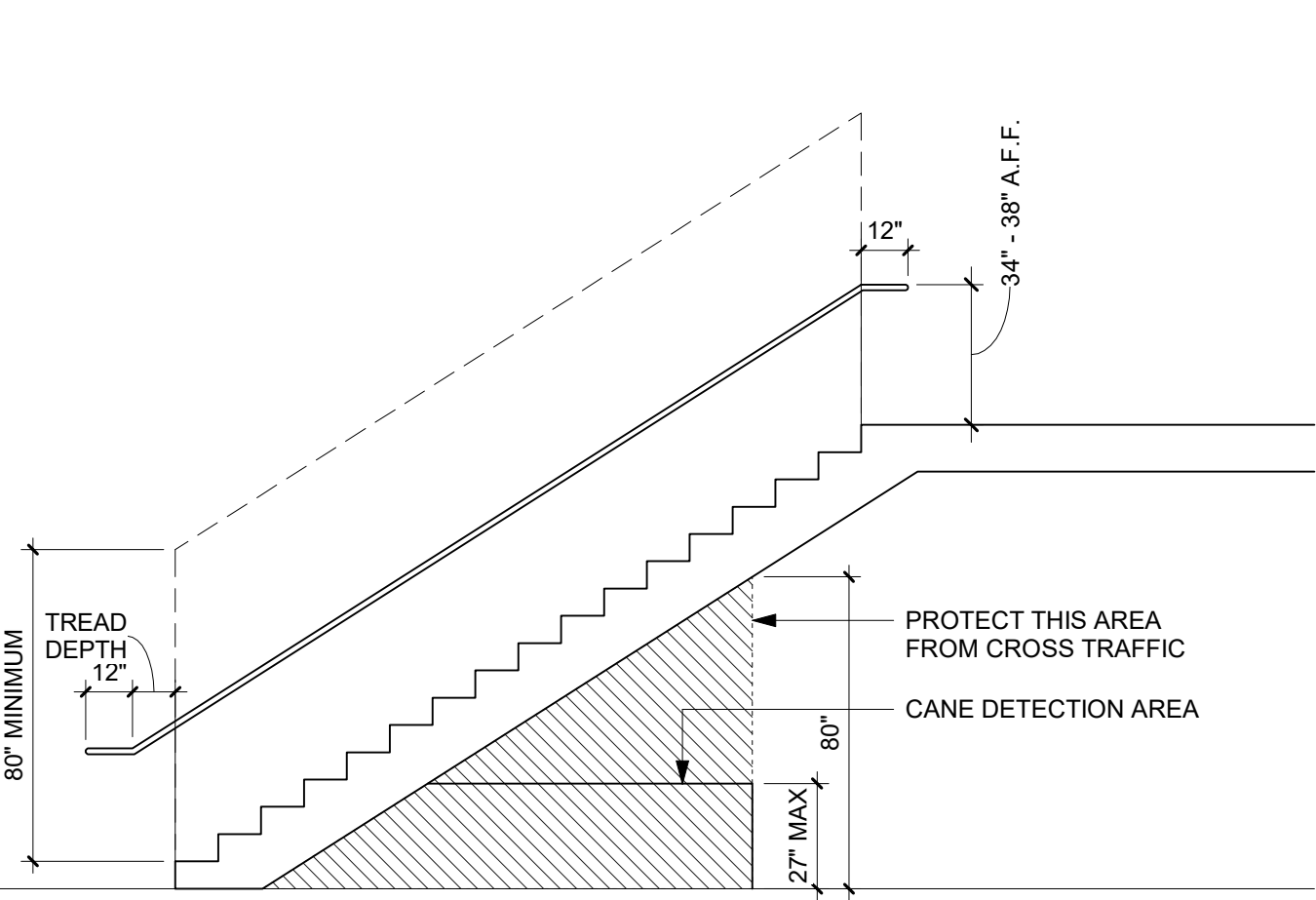


- NOTES**
- HANDRAILS SHALL RETURN TO WALL OR FLOOR AS INDICATED IN DRAWINGS
 - HANDRAILS SHALL BE DESIGNED FOR 20 OR 50 POUNDS / FOOT LATERAL LOAD
 - PROVIDE AND INSTALL STRUCTURAL BACKING IN WALL FOR ALL HANDRAILS AND GRAB BARS
 - PIPE SUPPORT HANDRAIL AND GUARDRAIL CONNECTIONS SHALL HAVE EASED / SMOOTH TRANSITIONS. ELIMINATE ALL SHARP EDGES & PROTRUSIONS
 - HANDRAILS SHALL NOT ROTATE WITHIN THEIR FITTINGS
 - GRIPPING SURFACE SHALL BE UNINTERRUPTED AND THE END OF HANDRAILS SHALL BE EITHER ROUNDED OR RETURN SMOOTHLY TO THE FLOOR, WALL OR POST
 - HANDRAILS SHALL EXTEND 12" BEYOND THE TOP AND BOTTOM RISER

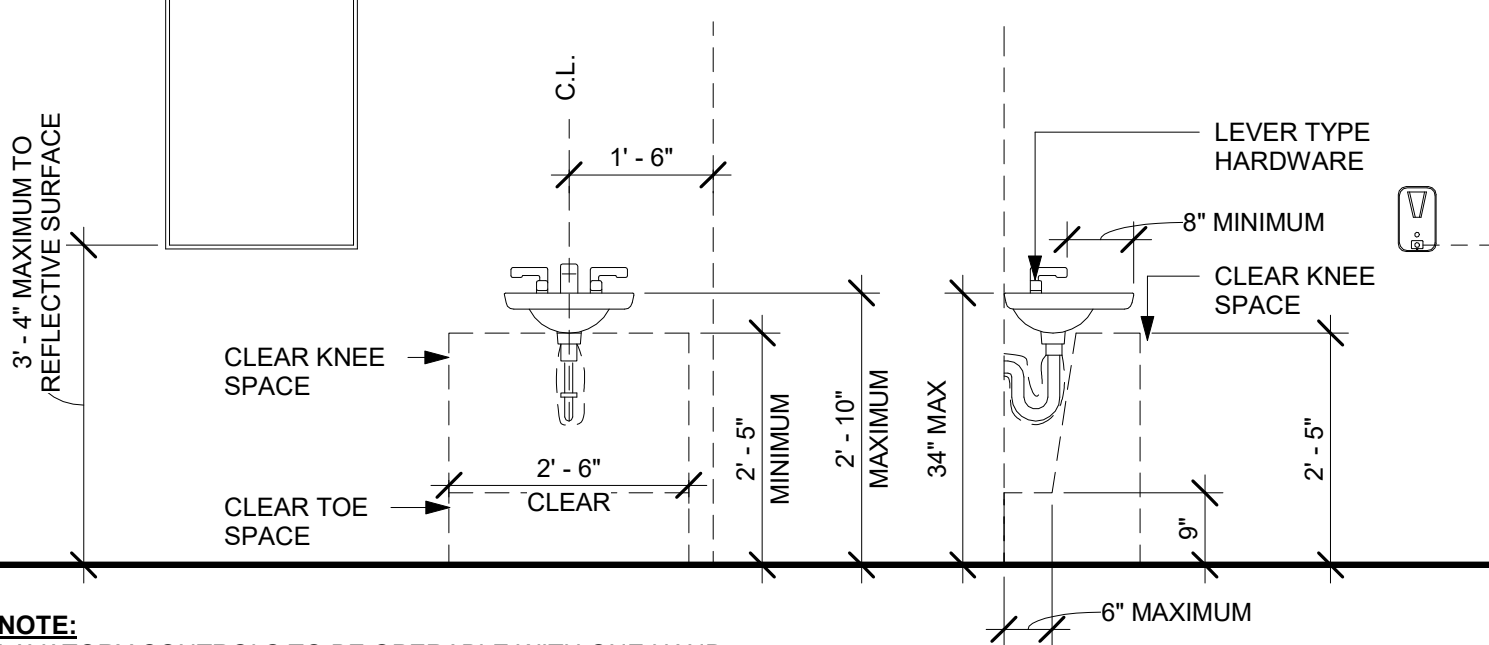
ADA - HANDRAIL
 3" = 1'-0"



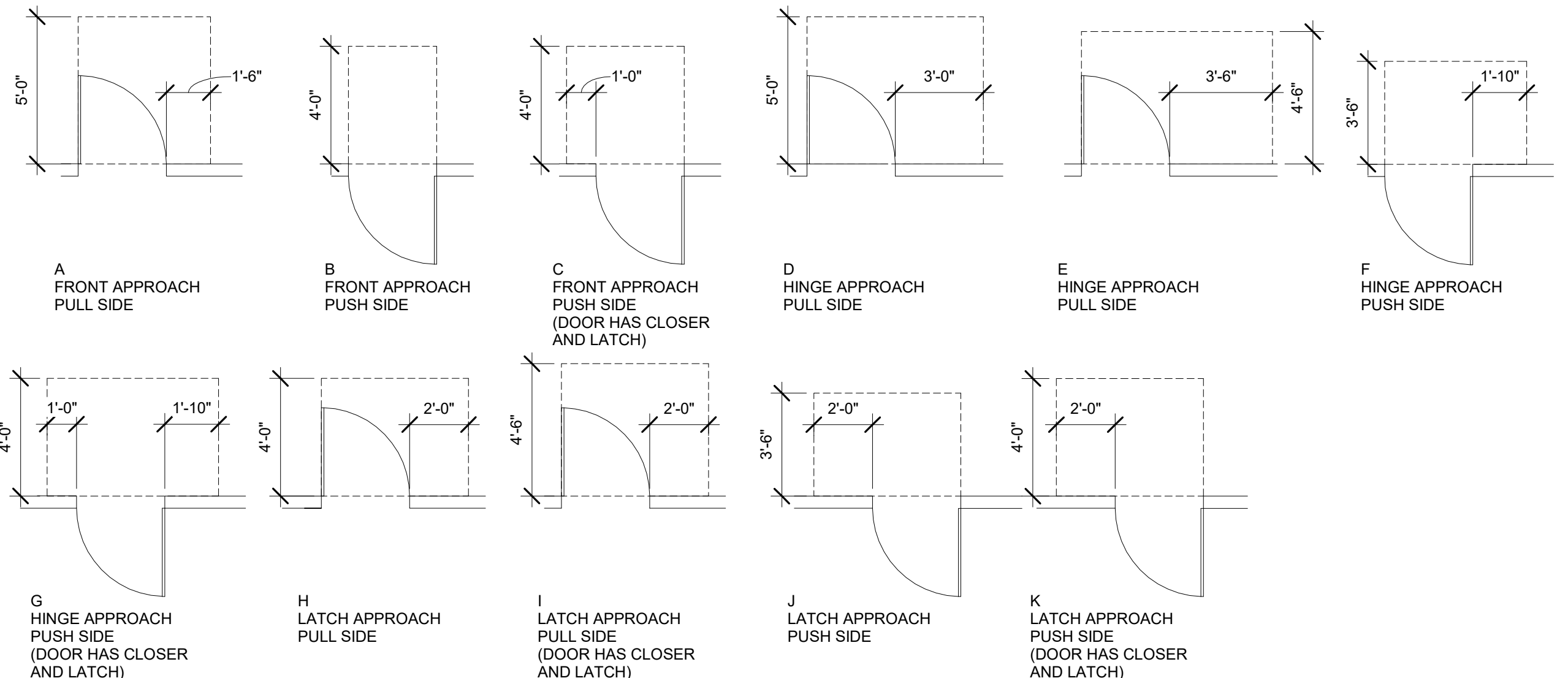
ADA - PUBLIC ACCESSIBLE SHOWER STALL
 3/8" = 1'-0"



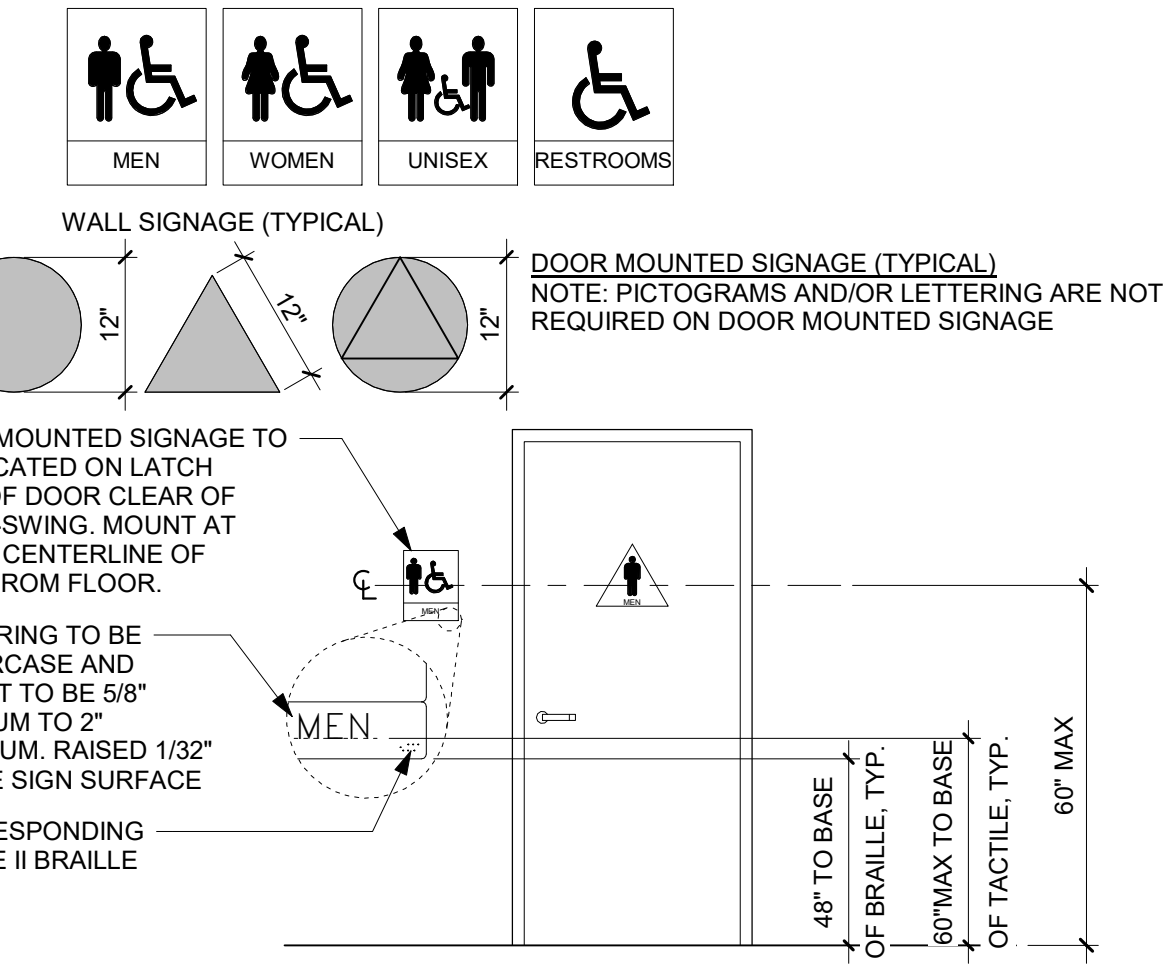
ADA - OVERHEAD CLEARANCE
 1/4" = 1'-0"



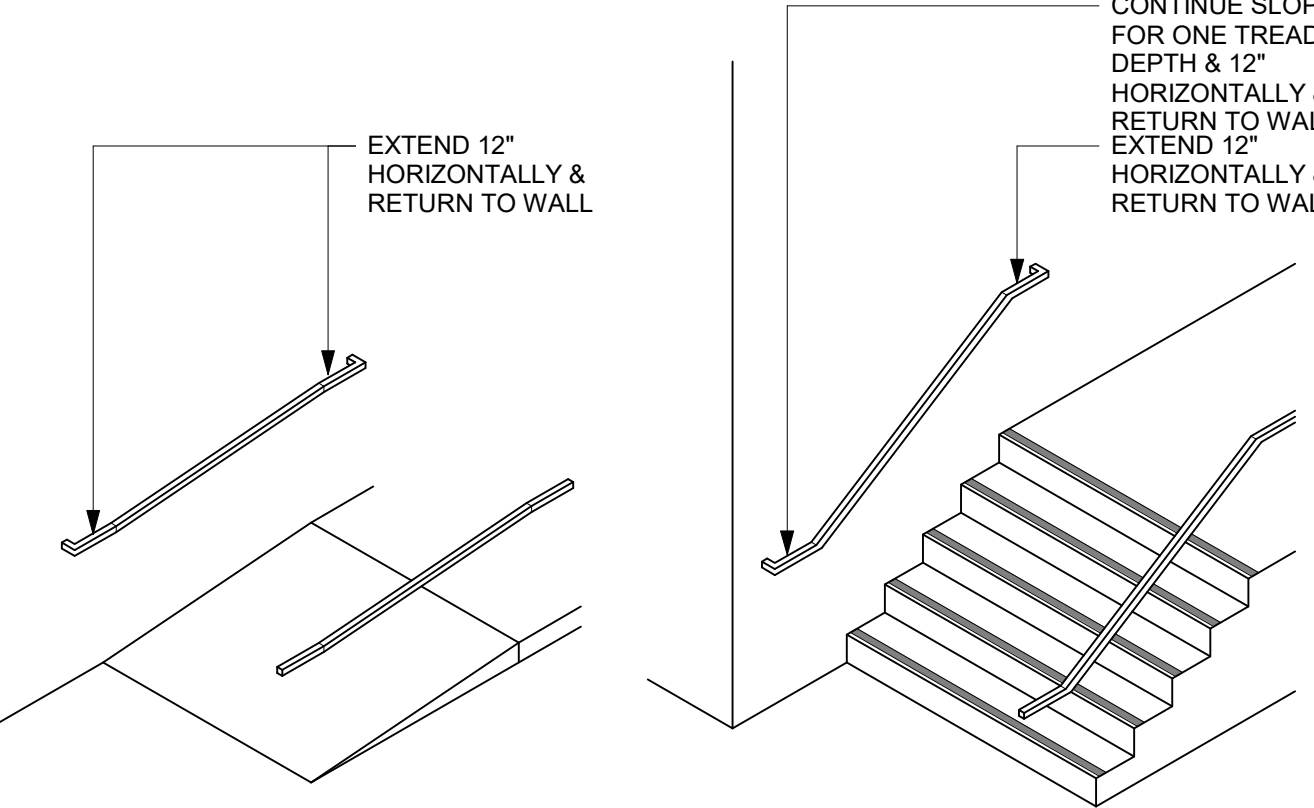
ADA - ACCESSIBILITY
 1/2" = 1'-0"



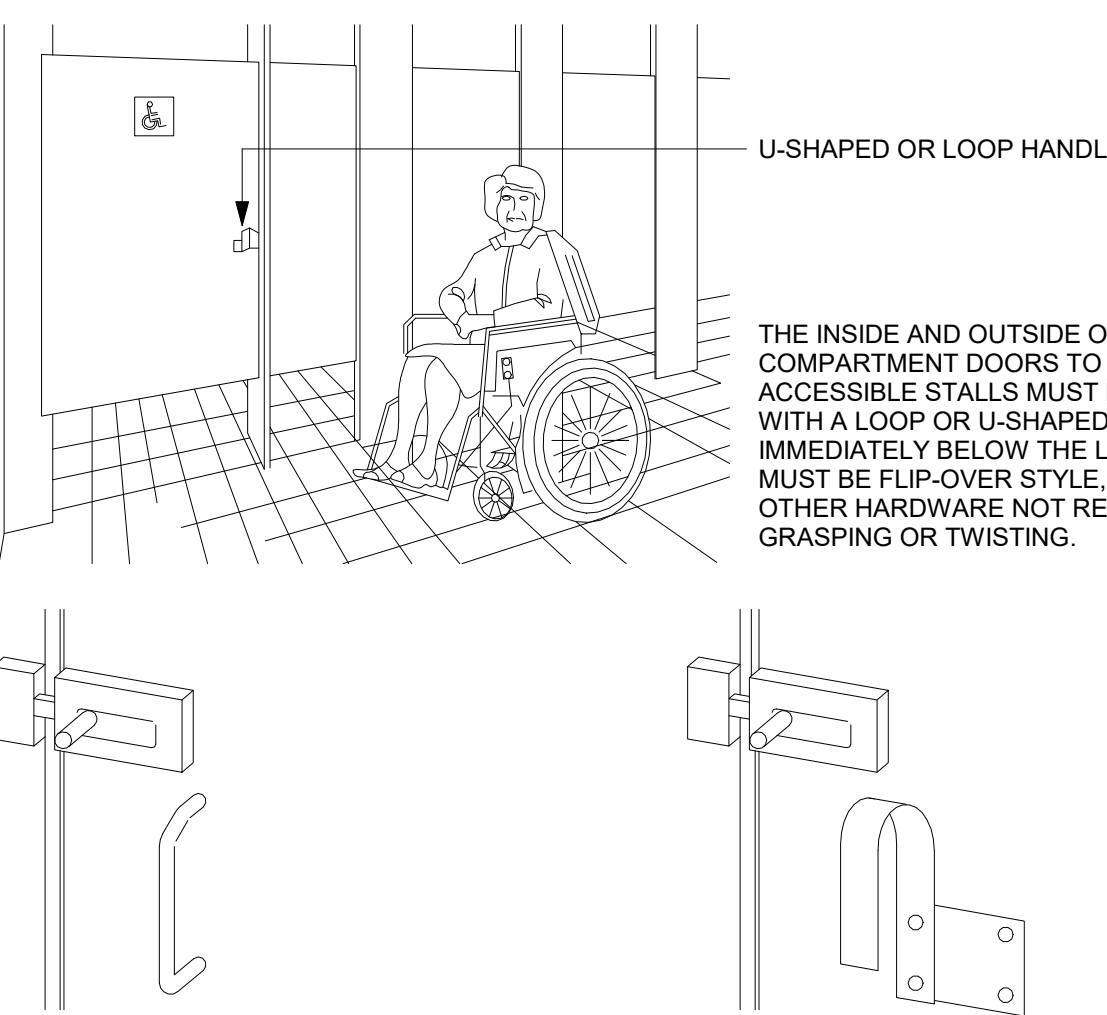
ADA - CLEAR FLOOR AREA REQUIRED AT DOORS AND GATES
 1/4" = 1'-0"



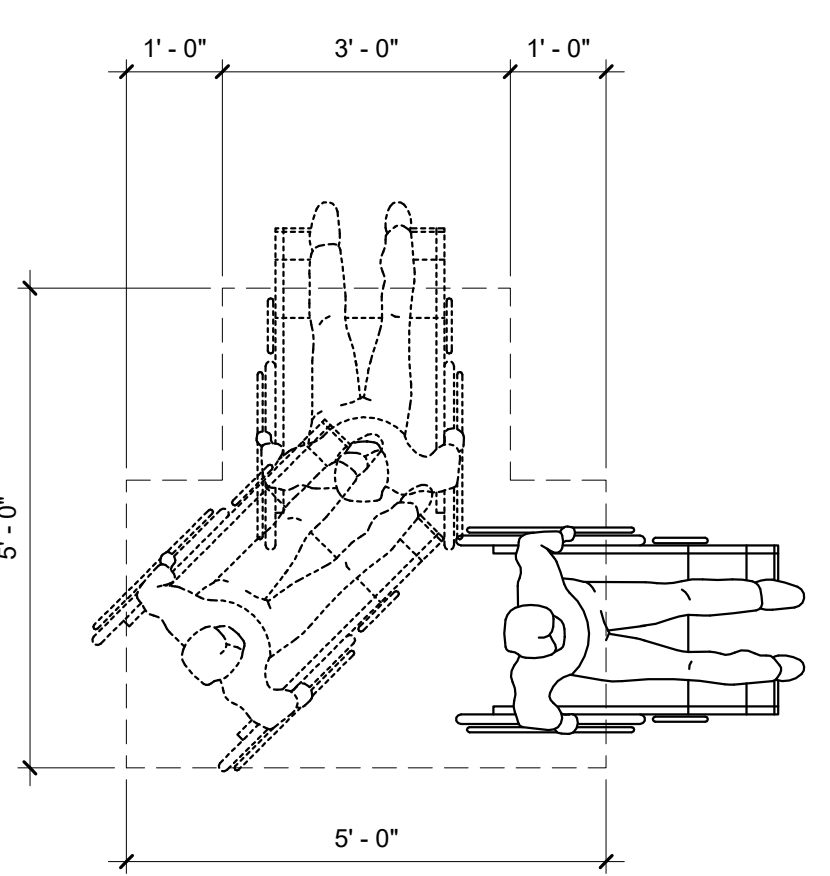
ADA - ACCESSIBLE RESTROOM SIGNAGE
 1/4" = 1'-0"



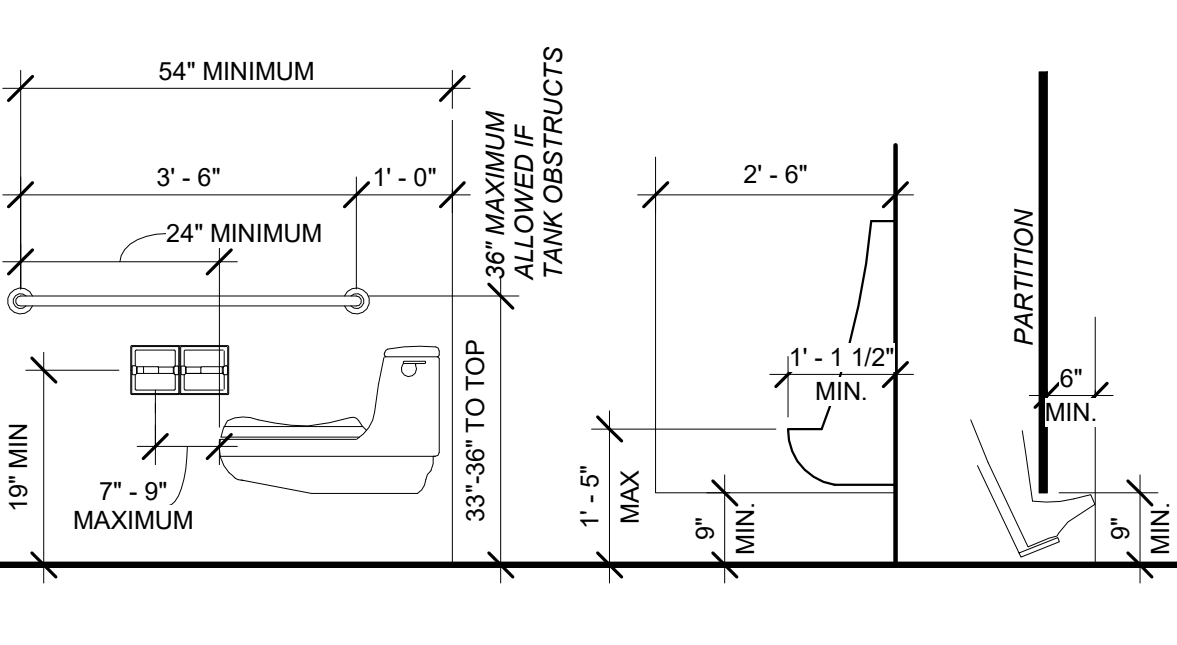
ADA - HANDRAIL EXTENSIONS AT STAIRS
 1/4" = 1'-0"



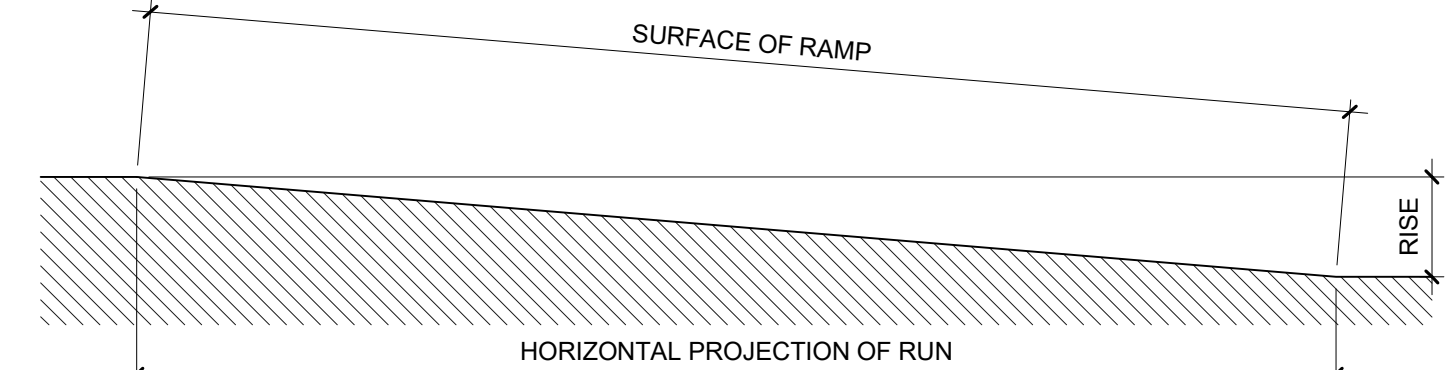
ADA - RESTROOM PARTITION HANDLES
 1/2" = 1'-0"



ADA - FLOOR AREA CLEARANCES
 1/2" = 1'-0"

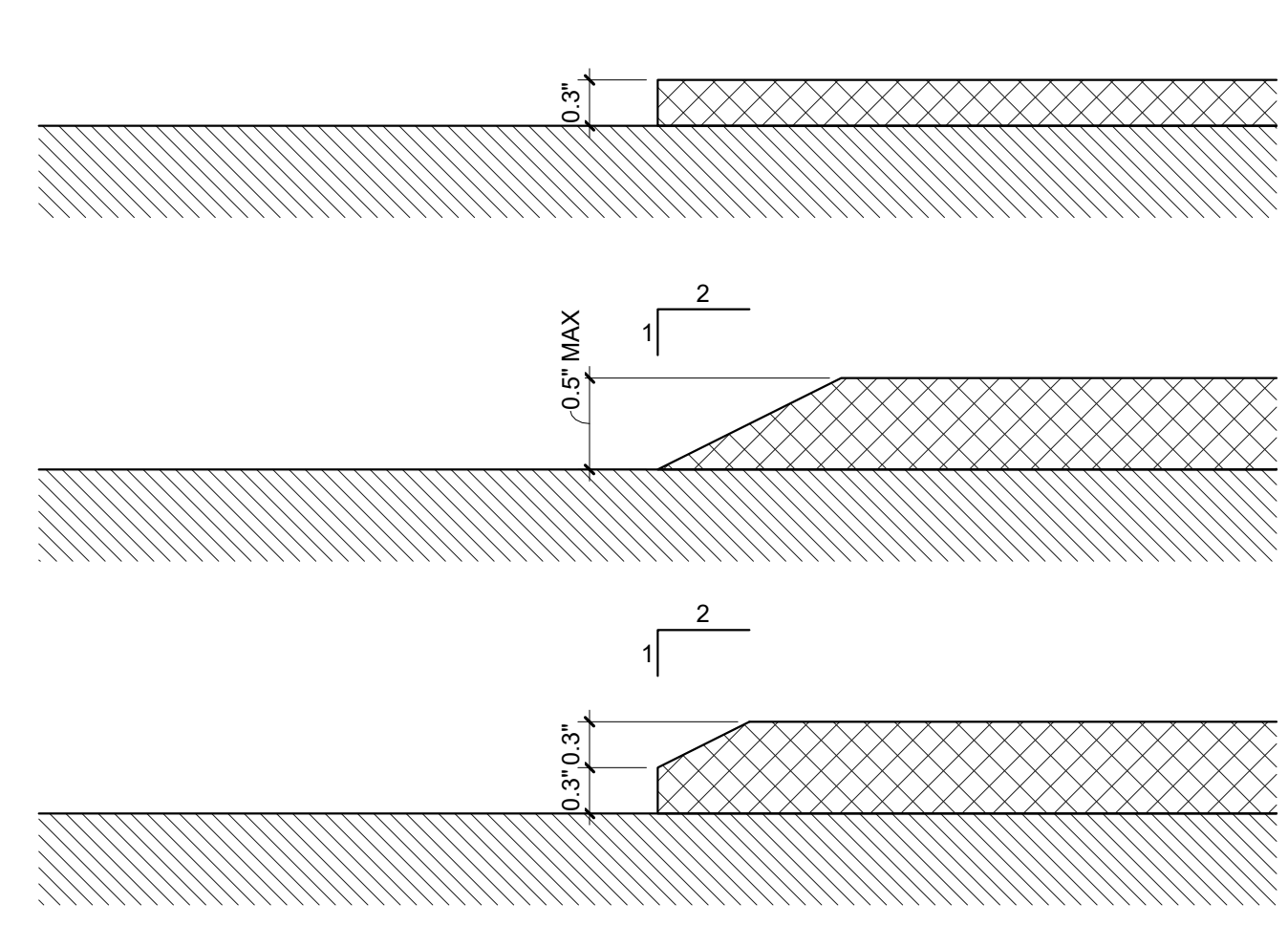


ADA - ACCESSIBILITY
 1/2" = 1'-0"

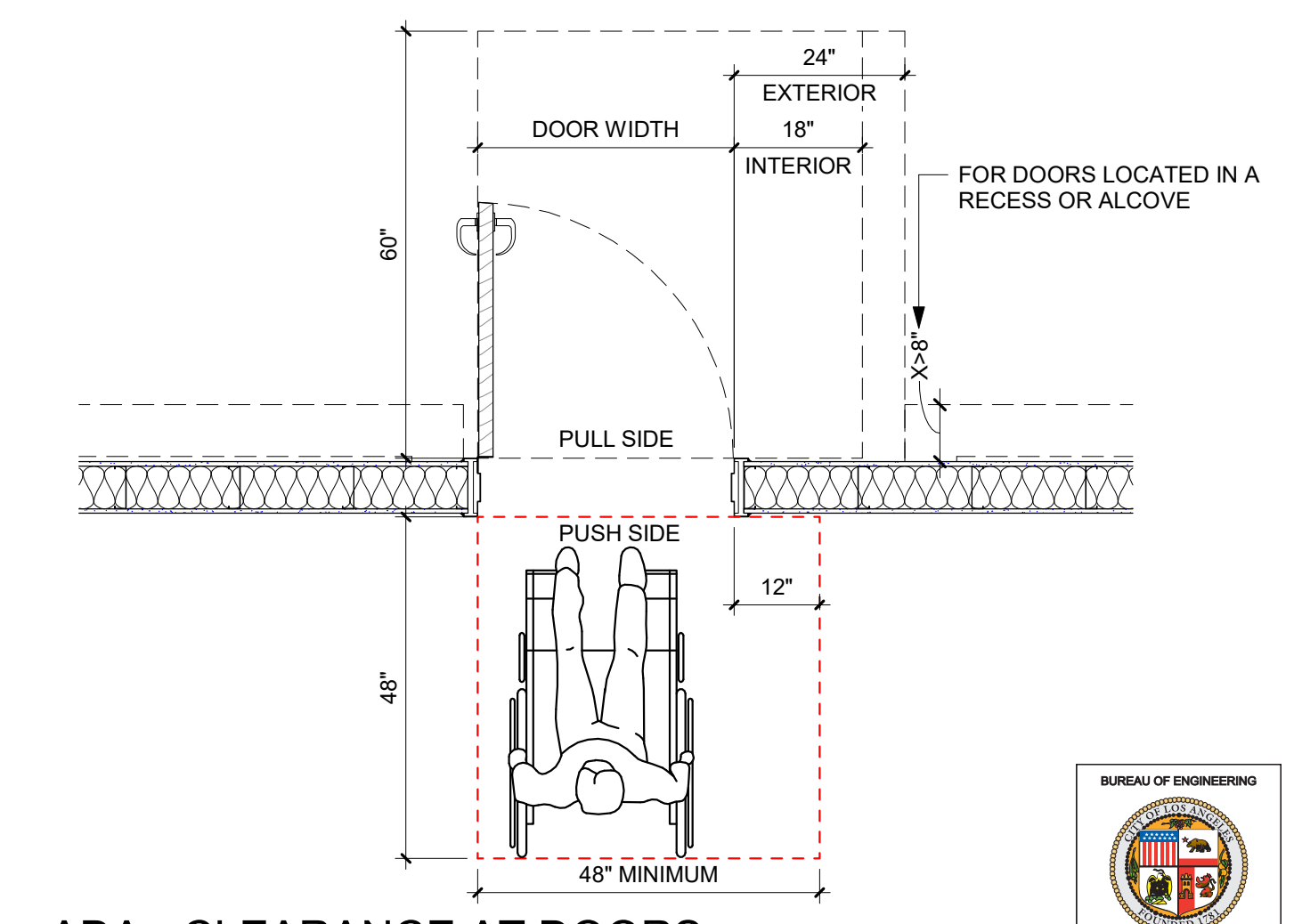


SLOPE	PERCENTAGE	RISE	PROJECTION
1:12	8.33%	30 INCHES	30 FEET
1:16	6.67%	30 INCHES	37.5 FEET
1:18	6.25%	30 INCHES	40 FEET
1:20	5.00%	30 INCHES	50 FEET

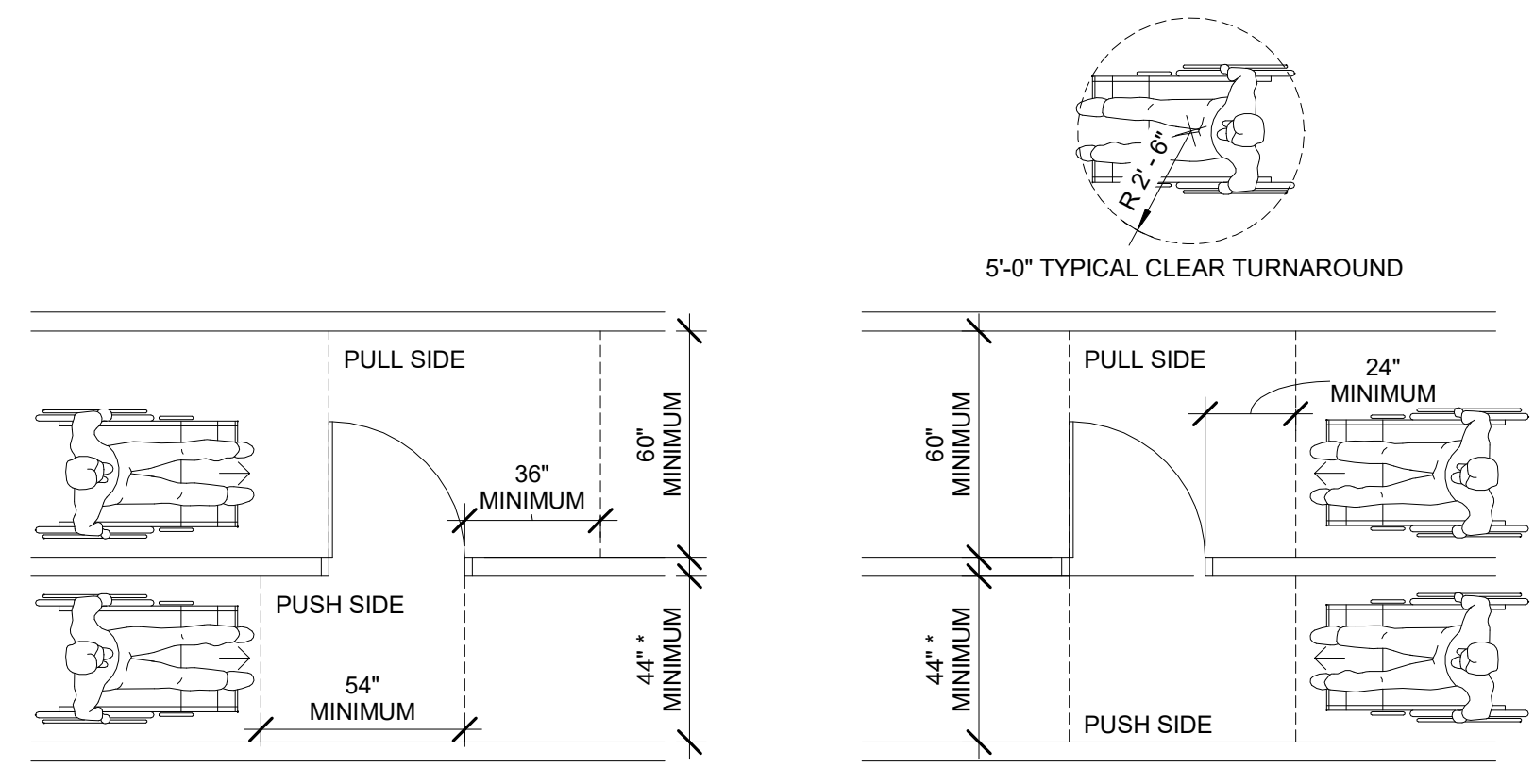
ADA - ACCESSIBLE RAMP LENGTH
 1/4" = 1'-0"



ADA - CHANGE IN LEVEL
 1/2" = 1'-0"



ADA - CLEARANCE AT DOORS
 1/2" = 1'-0"



ADA - WHEELCHAIR MANUEVERING CLEARANCE
 1/4" = 1'-0"

BUREAU OF ENGINEERING
CITY OF LOS ANGELES

DATE: 05/07/2019
 REVISION DESCRIPTION: [REVISIONS]

BY: [NAME]
 CHECKED: [NAME]
 APPROVED: [NAME]

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
 ADDRESS: 345 EAST 51ST STREET, LOS ANGELES, CA 90011

WORK ORDER: E1908366
 PLAN FILE

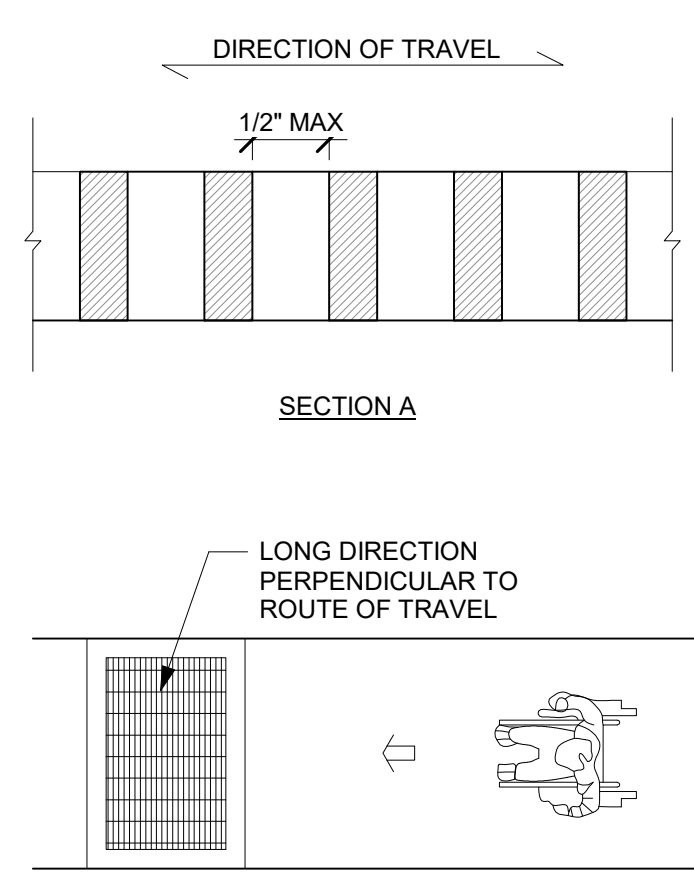
DRAWING: **G101**
 SHEET 5 OF 45

INDEX: RP-300113

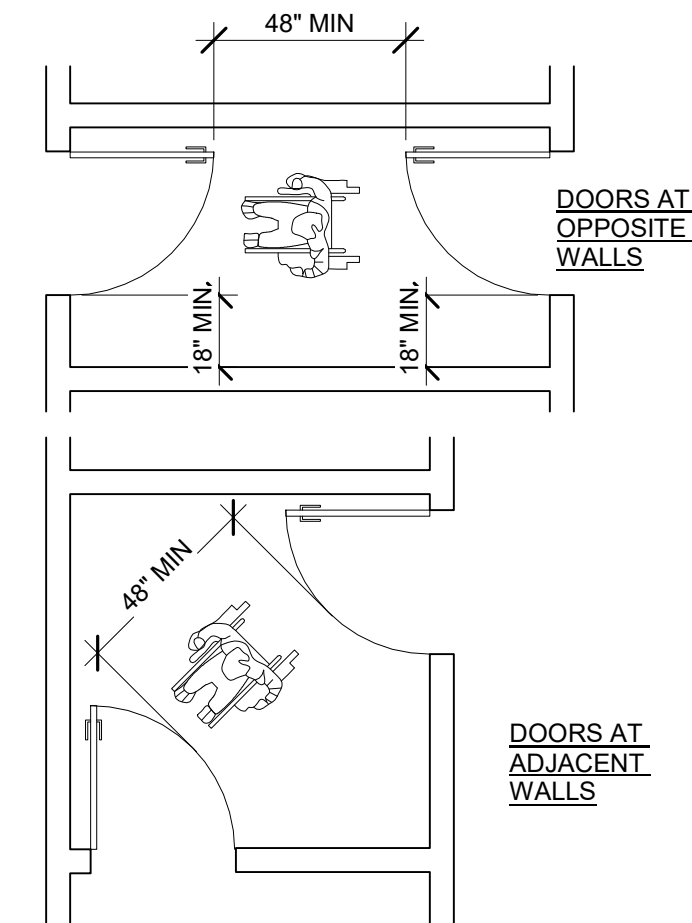
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 SHEET ISSUE

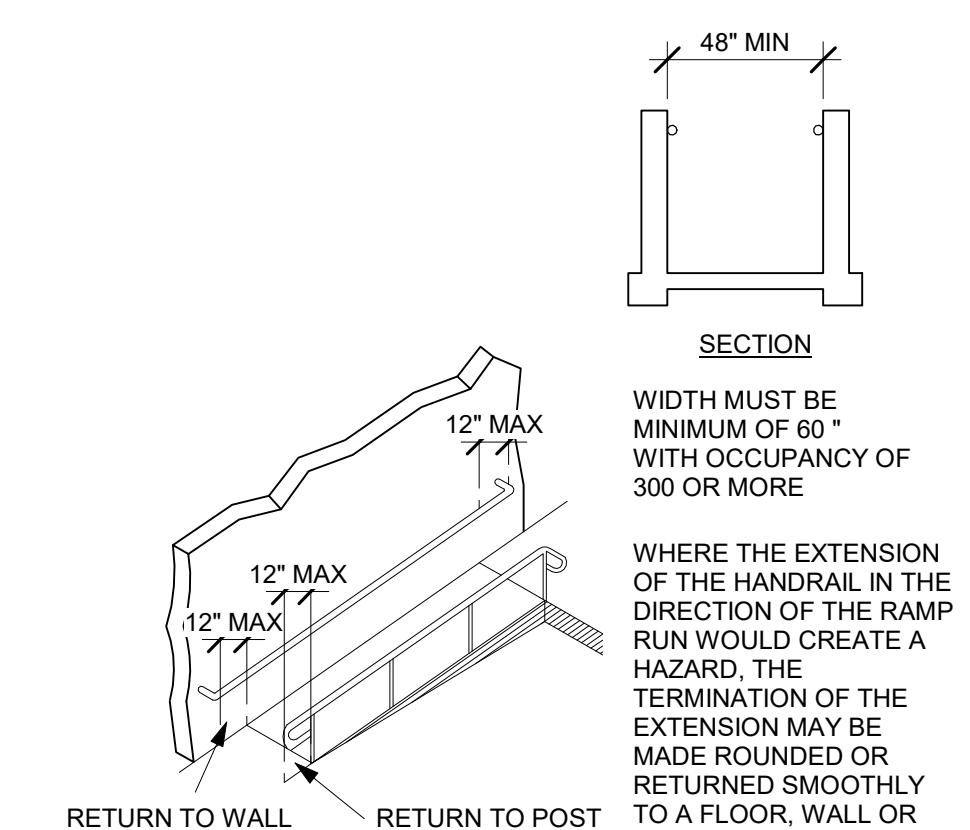
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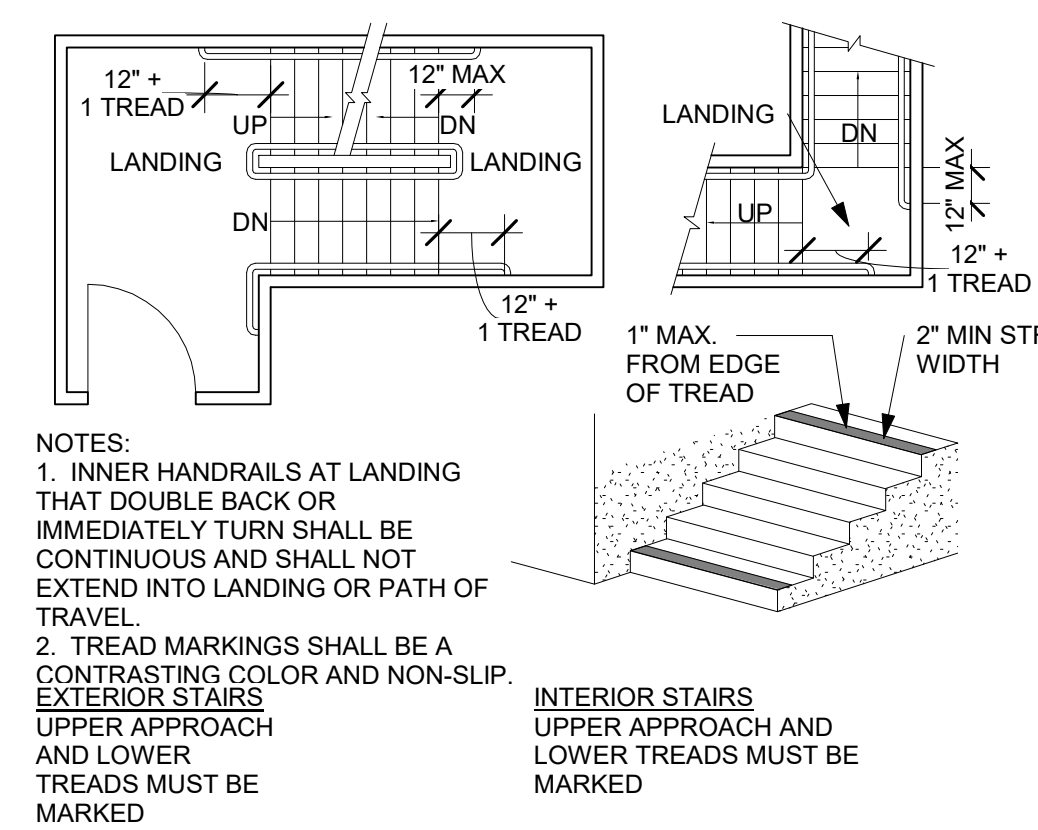
ADA - ACCESSIBLE GRATING REQUIREMENTS
 1/4" = 1'-0"



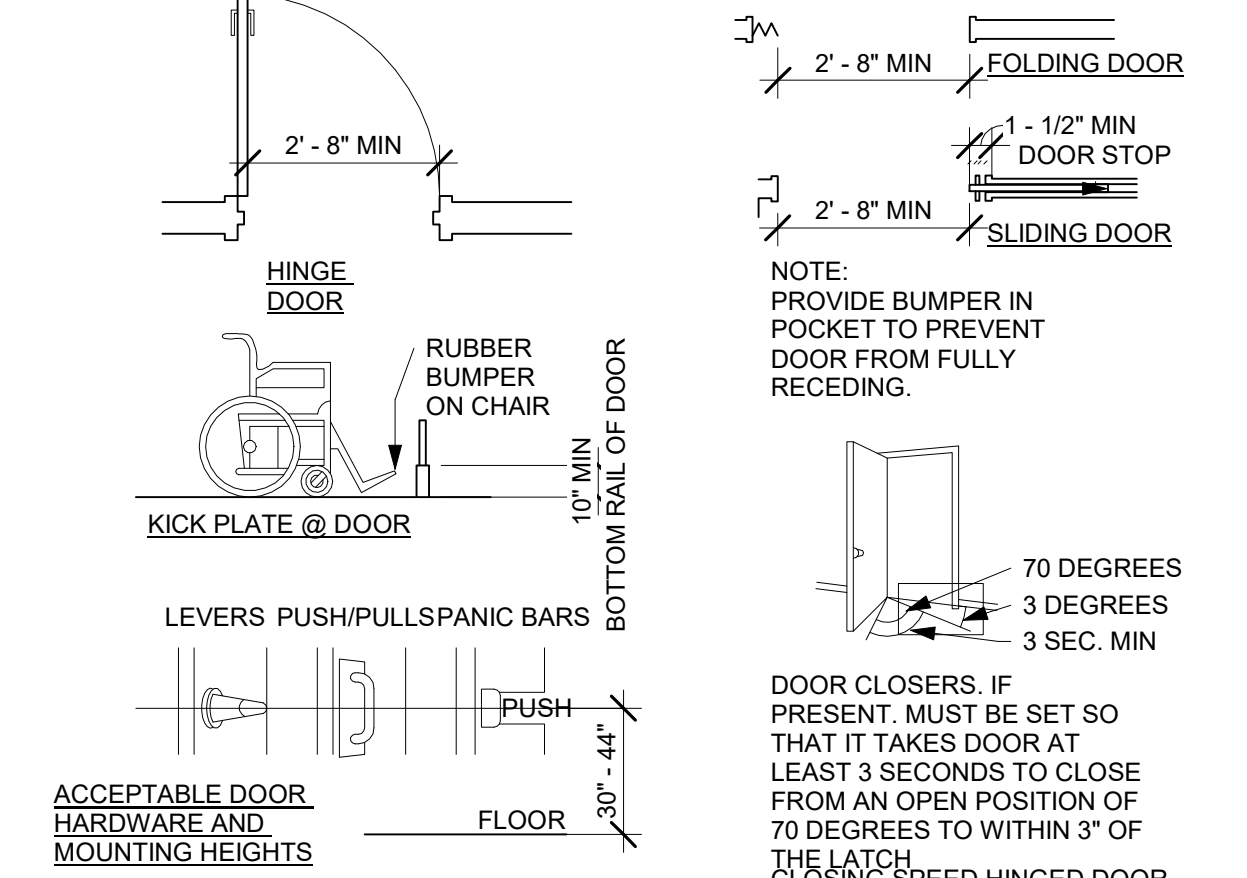
ADA - VESTIBULES
 1/4" = 1'-0"



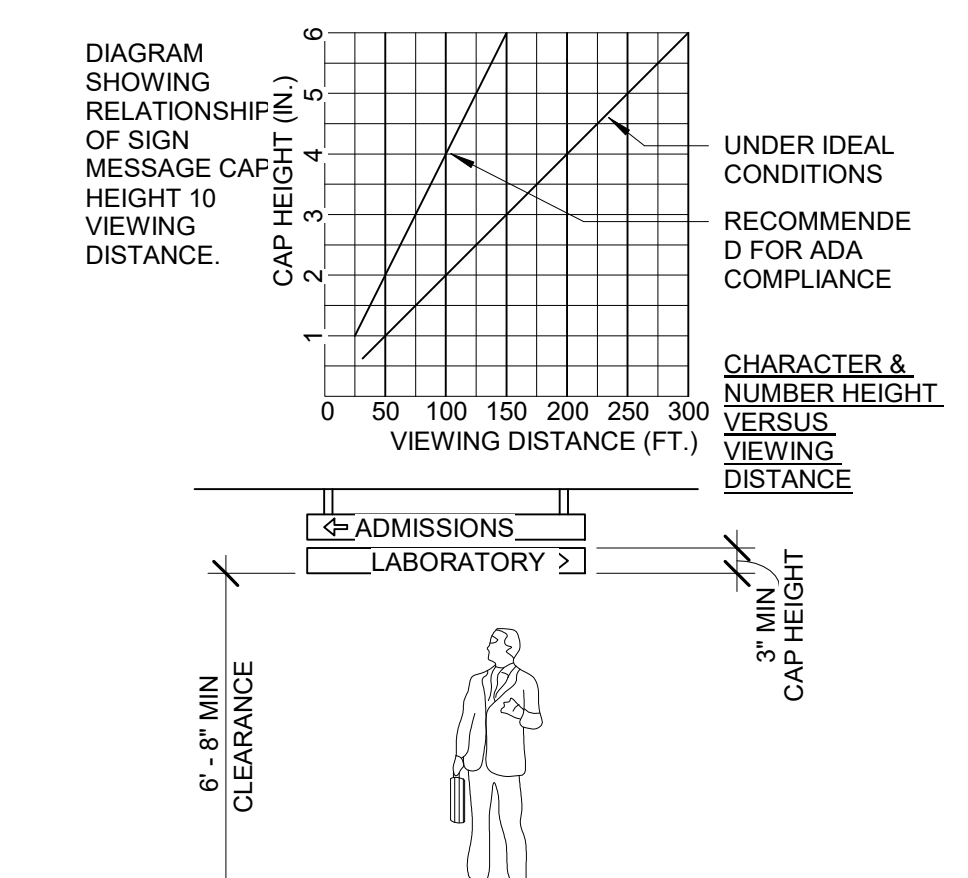
ADA - HANDRAIL AT RAMP
 1/4" = 1'-0"



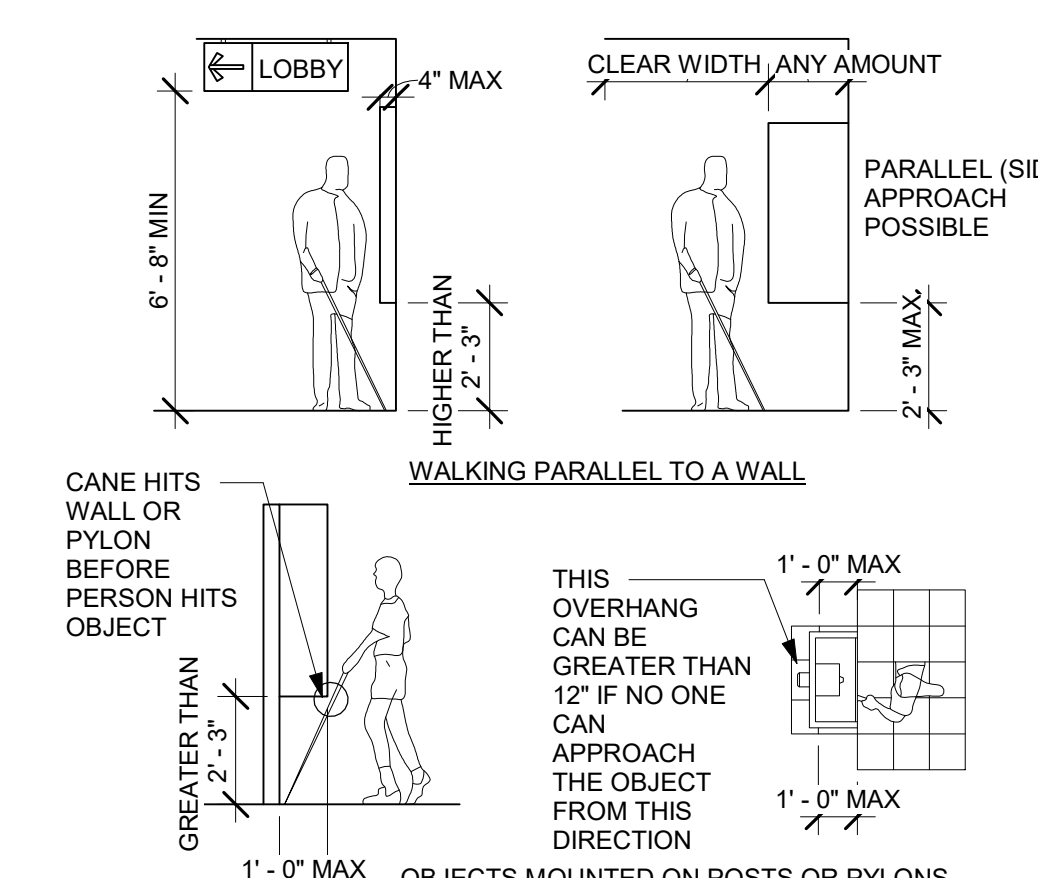
ADA - HANDRAIL EXTENSIONS
 1/4" = 1'-0"



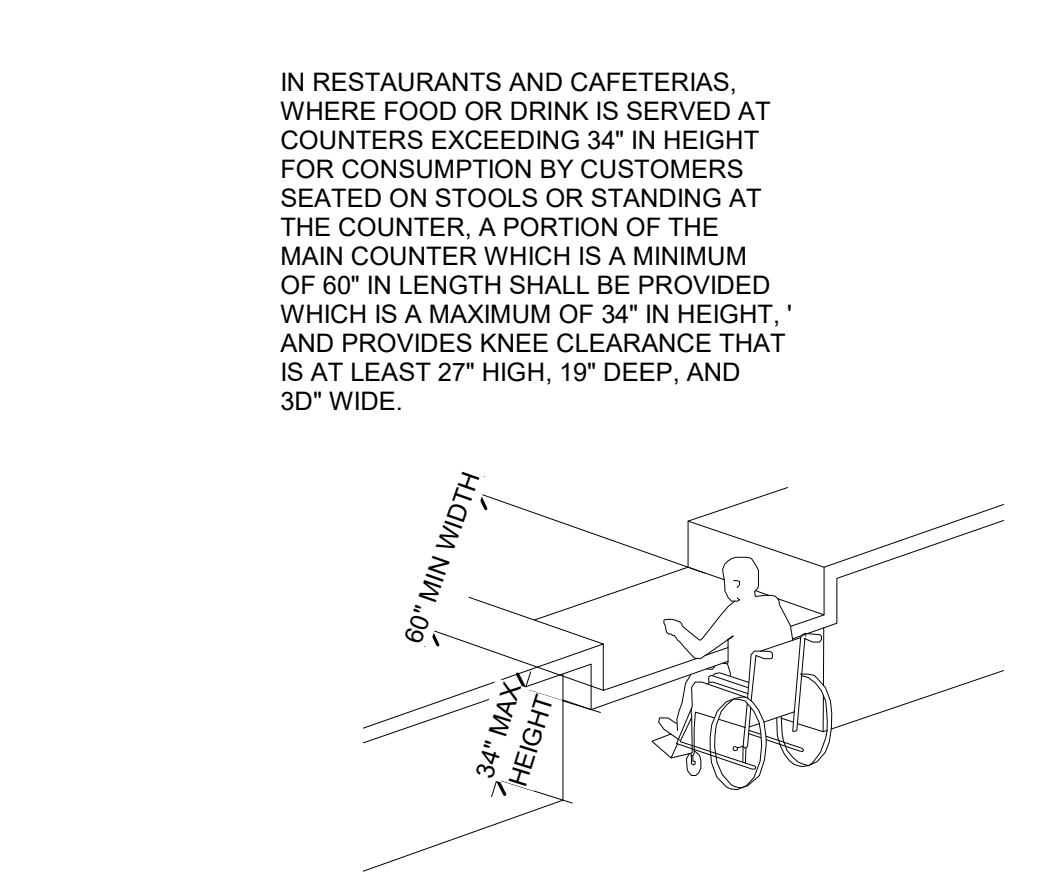
ADA - DOORS
 1/4" = 1'-0"



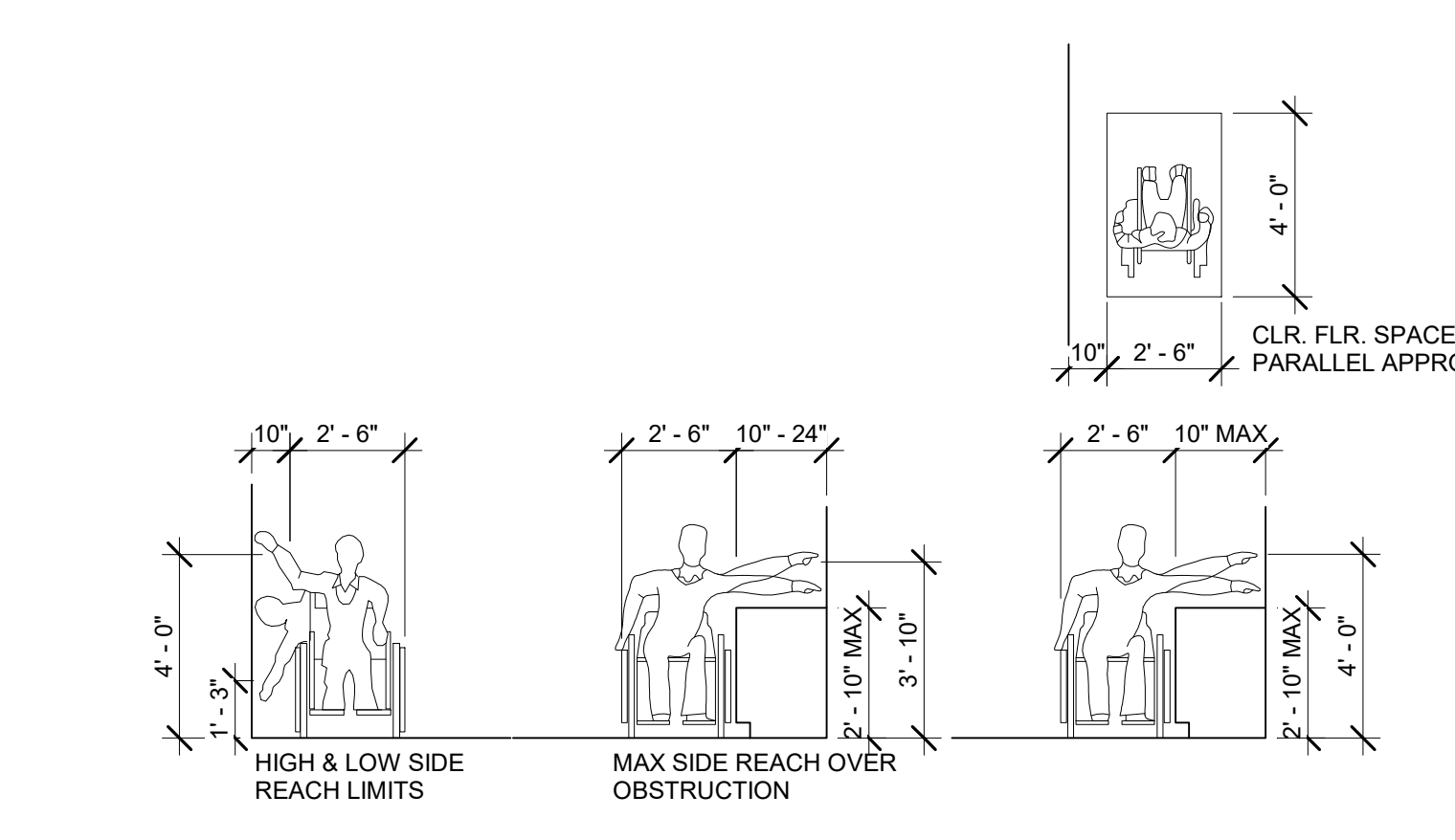
ADA - TYPICAL OVERHEAD SIGNAGE
 1/4" = 1'-0"



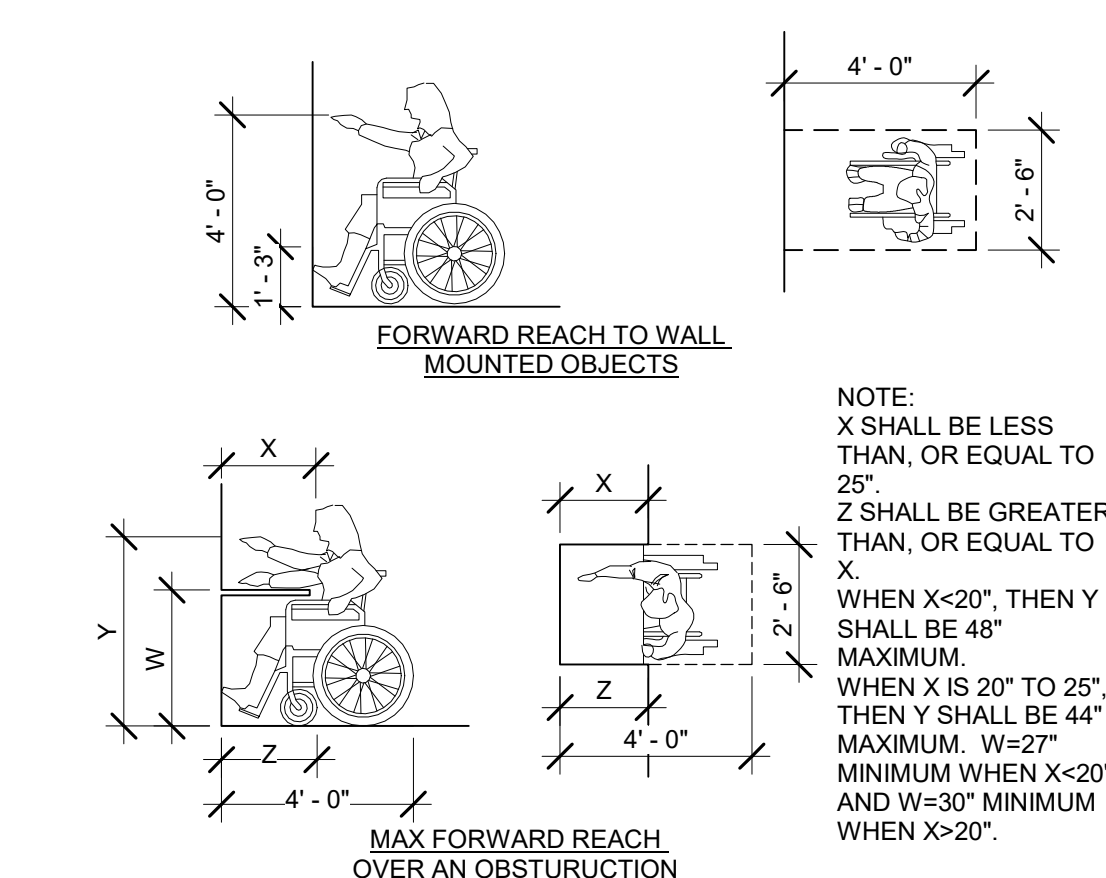
ADA - PROTRUDING OBJECTS
 1/4" = 1'-0"



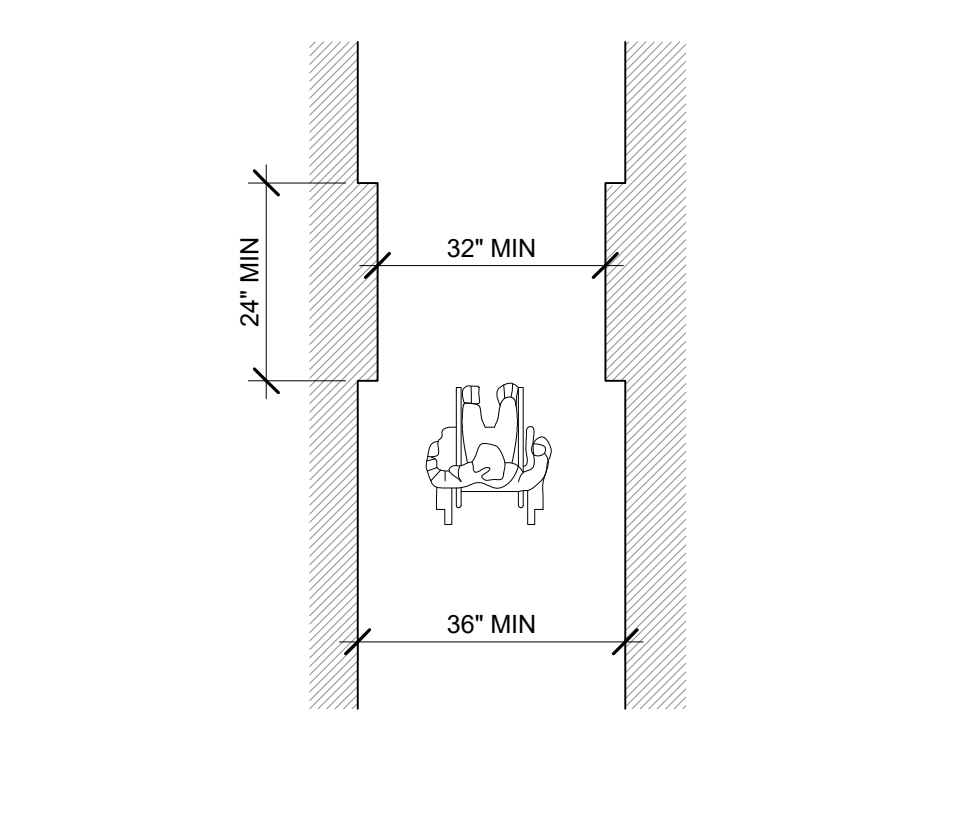
ADA - MIN COUNTER ACCESS DIMENSIONS
 1/4" = 1'-0"



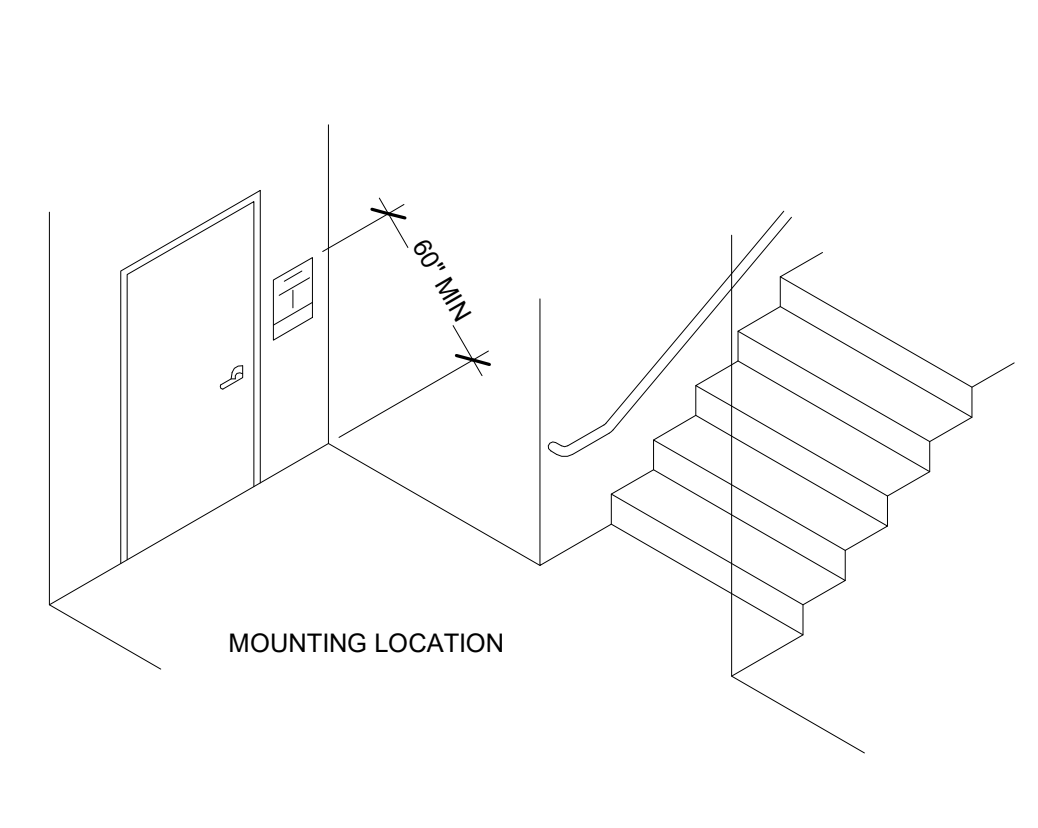
ADA - SPACE ALLOWANCE REACH RANGE TO OBJECTS
 1/4" = 1'-0"



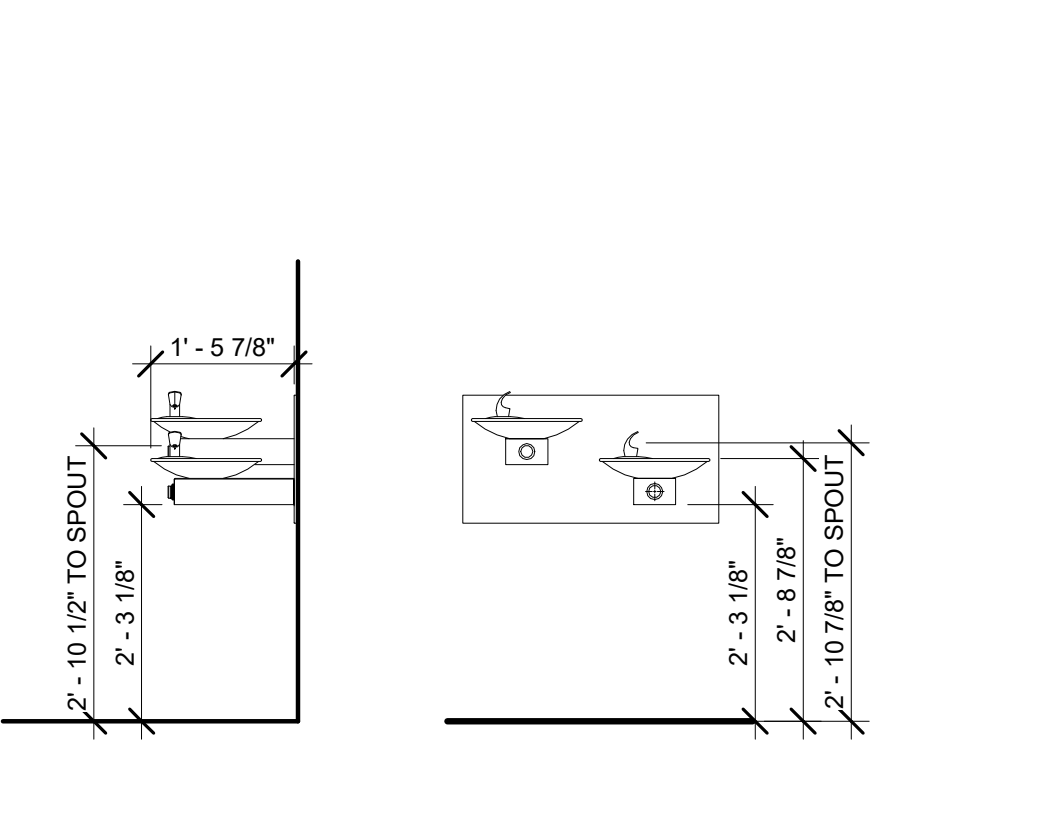
ADA - FORWARD REACH RANGE
 1/4" = 1'-0"



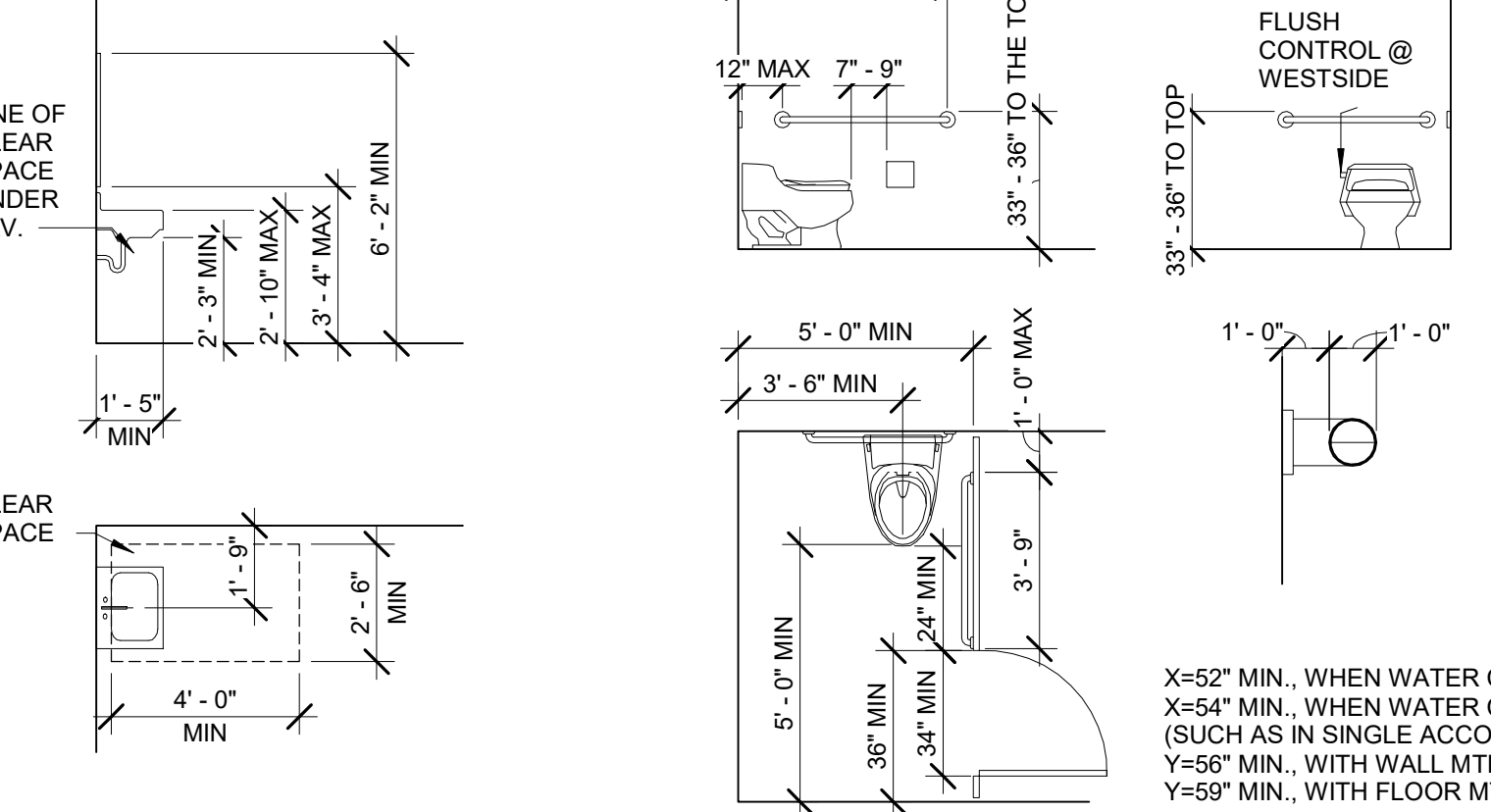
ADA - MIN CORRIDOR CLEARANCES
 1/4" = 1'-0"



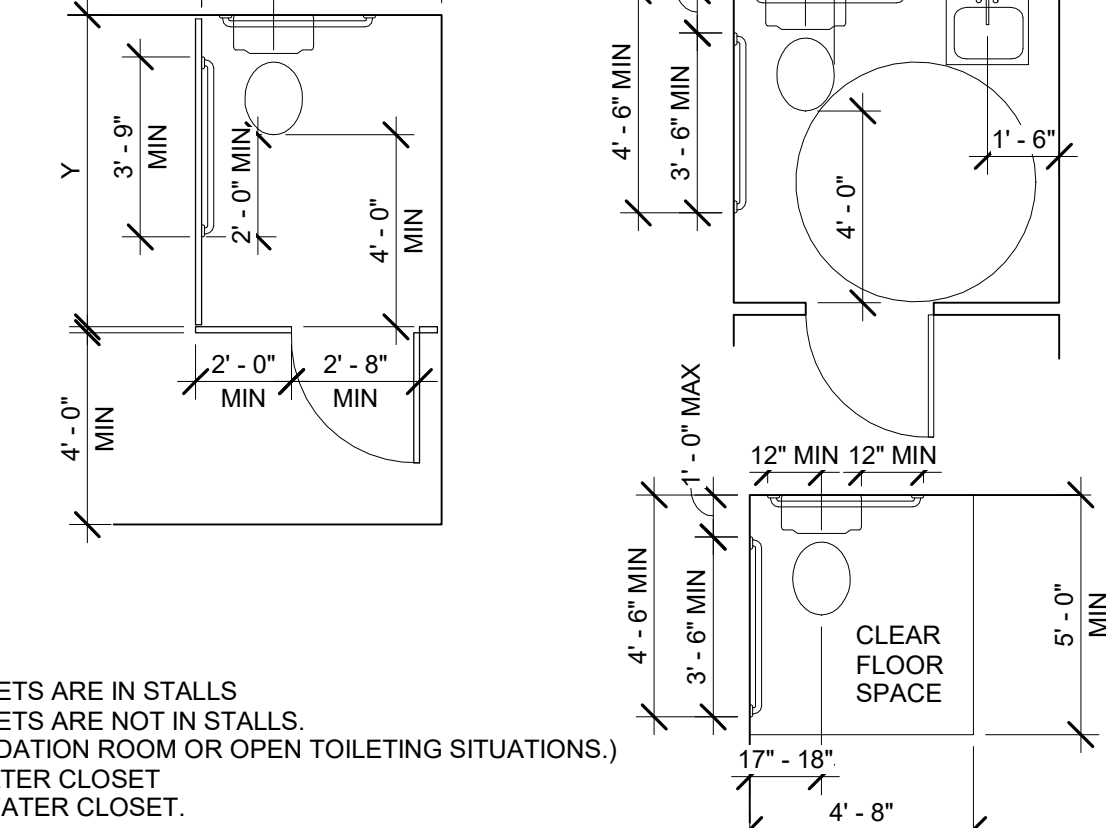
ADA - STAIR IDENTIFICATION SIGNAGE
 1/4" = 1'-0"



ADA - DRINKING FOUNTAIN
 1/2" = 1'-0"



ADA - LAVATORY CLEAR SPACE
 1/4" = 1'-0"



ADA - TOILET COMPARTMENT
 1/4" = 1'-0"



BUREAU OF ENGINEERING
 CITY OF LOS ANGELES

ENGINEERING
 CITY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS
 CITY ENGINEER: GARY LEE MOORE, PE, ENV SP
 ARCHITECTURAL DIVISION

DATE: 05/07/2019
 LIC. NO.: 23333

DESIGNED: MARCUS YEE
 DRAWN: MARCUS YEE
 CHECKED: ROBERT LOVELIN
 APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

TITLE 24 - DISABLED ACCESSIBILITY DETAILS
 PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
 ADDRESS: 345 EAST 51ST STREET, LOS ANGELES, CA 90011

WORK ORDER: E1908366
 PLAN FILE

DRAWING: **G102**
 SHEET 6 OF 45

PLOTTED 6/3/2019 10:05:31 AM

ADA ACCESSIBILITY NOTES

A. APPLICATION AND ADMINISTRATION

1. WHEN ALTERATIONS OR ADDITIONS ARE MADE TO EXISTING BUILDINGS OR FACILITIES, AN ACCESSIBLE PATH OF TRAVEL TO THE SPECIFIC AREA OF ALTERATION OR ADDITION SHALL BE PROVIDED UNLESS OTHERWISE EXEMPT. §11B-202.4
2. PRIMARY ACCESSIBLE PATH OF TRAVEL SHALL INCLUDE A PRIMARY ENTRANCE TO THE BUILDING OR FACILITY, TOILET AND BATHING FACILITIES SERVING THE AREA, DRINKING FOUNTAINS SERVING THE AREA, PUBLIC TELEPHONES SERVING THE AREA, AND SIGNS. §11B-202.4

B. BUILDING BLOCKS

1. FLOOR AND GROUND SURFACES SHALL BE STABLE, FIRM, AND SLIP RESISTANT. §11B-302.1
2. CARPET OR CARPET TILE SHALL BE SECURELY ATTACHED AND SHALL HAVE A FIRM CUSHION, PAD, OR BACKING OR NO CUSHION OR PAD. CARPET OR CARPET TILE SHALL HAVE A LEVEL LOOP, TEXTURED LOOP, LEVEL CUT PILE, OR LEVEL CUT/UNCUT PILE TEXTURE. PILE HEIGHT SHALL BE ½ INCH MAXIMUM. §11B-302.2, FIGURE 11B-302.2
3. VERTICAL CHANGES IN LEVEL FOR FLOOR OR GROUND SURFACES MAY BE ¼ INCH HIGH MAXIMUM AND WITHOUT EDGE TREATMENT, CHANGES IN LEVEL GREATER THAN ¼ INCH AND NOT EXCEEDING ¼ INCH IN HEIGHT SHALL BE BEVELED WITH A SLOPE NOT STEEPER THAN 1:2. §11B-303, FIGURES 11B-303.2 & 11B-303.3
4. CHANGES IN LEVEL GREATER THAN ¼ INCH IN HEIGHT SHALL BE RAMPED AND SHALL COMPLY WITH THE REQUIREMENTS OF 11B-405 RAMP OR 11B-406 CURB RAMPS AS APPLICABLE. §11B-303
5. ABRUPT CHANGES IN LEVEL EXCEEDING 4 INCHES IN A VERTICAL DIMENSION BETWEEN WALKS, SIDEWALKS OR OTHER PEDESTRIAN WAYS AND ADJACENT SURFACES OR FEATURES SHALL BE IDENTIFIED BY WARNING CURBS AT LEAST 6 INCHES IN HEIGHT ABOVE THE WALK OR SIDEWALK SURFACE OR BY GUARDS OR HANDRAILS WITH A GUIDE RAIL CENTERED 2 INCHES MINIMUM AND 4 INCHES MAXIMUM ABOVE THE SURFACE OF THE WALK OR SIDEWALK. THESE REQUIREMENTS DO NOT APPLY BETWEEN A WALK OR SIDEWALK AND AN ADJACENT STREET OR DRIVEWAY. §11B-303.5
6. CIRCULAR TURNING SPACES SHALL BE A SPACE OF 60 INCHES DIAMETER MINIMUM AND MAY INCLUDE KNEE AND TOE CLEARANCE COMPLYING WITH 11B-306 KNEE AND TOE CLEARANCE. §11B-304.3.1
7. T-SHAPED TURNING SPACES SHALL BE A T-SHAPED SPACE WITHIN A 60 INCH SQUARE MINIMUM WITH ARMS AND BASE 36 INCHES WIDE MINIMUM. EACH ARM OF THE T SHALL BE CLEAR OF OBSTRUCTIONS 12 INCHES MINIMUM IN EACH DIRECTION AND THE BASE SHALL BE CLEAR OF OBSTRUCTIONS 24 INCHES MINIMUM. §11B-304.3.2, FIGURE 11B-304.3.2
8. FOR LAVATORIES AND BUILT-IN DINING AND WORK SURFACES REQUIRED TO BE ACCESSIBLE, TOE CLEARANCE SHALL BE PROVIDED THAT IS 30 INCHES IN WIDTH AND 9 INCHES IN HEIGHT ABOVE THE FINISH FLOOR OR GROUND FOR A DEPTH OF 19 INCHES MINIMUM. §11B-306.2.1
9. TOE CLEARANCE SHALL EXTEND 19 INCHES MAXIMUM UNDER LAVATORIES FOR TOILET AND BATHING FACILITIES AND 25 INCHES MAXIMUM UNDER OTHER ELEMENTS. §11B-306.2.2
10. AT LAVATORIES IN TOILET AND BATHING FACILITIES, KNEE CLEARANCE SHALL BE PROVIDED THAT IS 30 INCHES IN WIDTH FOR A DEPTH OF 11 INCHES AT 9 INCHES ABOVE THE FINISH FLOOR OR GROUND AND FOR A DEPTH OF 8 INCHES AT 27 INCHES ABOVE THE FINISH FLOOR OR GROUND INCREASING TO 29 INCHES HIGH MINIMUM ABOVE THE FINISH FLOOR OR GROUND AT THE FRONT EDGE OF A COUNTER WITH A BUILT-IN LAVATORY OR AT THE FRONT EDGE OF A WALL-MOUNTED LAVATORY FIXTURE. §11B-306.3, FIGURE 11B-306.3(C)
11. AT DINING AND WORK SURFACES REQUIRED TO BE ACCESSIBLE, KNEE CLEARANCE SHALL BE PROVIDED THAT IS 30 INCHES IN WIDTH AT 27 INCHES ABOVE THE FINISH FLOOR OR GROUND FOR A DEPTH OF AT LEAST 19 INCHES. §11B-306.3
12. EXCEPT FOR HANDRAILS, OBJECTS WITH LEADING EDGES MORE THAN 27 INCHES AND LESS THAN 80 INCHES ABOVE THE FINISH FLOOR OR GROUND SHALL PROTRUDE NO MORE THAN 4 INCHES HORIZONTALLY INTO THE CIRCULATION PATH. HANDRAILS MAY PROTRUDE ¼ INCHES MAXIMUM. §11B-307.2, FIGURE 11B-307.2
13. FREESTANDING OBJECTS MOUNTED ON POSTS OR PYLONS SHALL OVERHANG CIRCULATION PATHS NO MORE THAN 12 INCHES WHEN LOCATED FROM 27 TO 80 INCHES ABOVE THE FINISH FLOOR OR GROUND. §11B-307.3, FIGURE 11B-307.3(A)
PROTRUDING OBJECTS SHALL NOT REDUCE THE CLEAR WIDTH REQUIRED FOR ACCESSIBLE ROUTES. §11B-307.5
14. LOWEST EDGE OF A SIGN OR OTHER OBSTRUCTION, WHEN MOUNTED BETWEEN POSTS OR PYLONS SEPARATED WITH A CLEAR DISTANCE GREATER THAN 12 INCHES, SHALL BE LESS THAN 27 INCHES OR MORE THAN 80 INCHES ABOVE THE FINISH FLOOR OR GROUND. §11B-307.3, FIGURE 11B-307.3(B)
15. VERTICAL CLEARANCE SHALL BE AT LEAST 80 INCHES HIGH ON CIRCULATION PATHS EXCEPT AT DOOR CLOSERS AND DOOR STOPS, WHICH MAY BE 78 INCHES MINIMUM ABOVE THE FINISH FLOOR OR GROUND. §11B-307.4
16. GUARDRAILS OR OTHER BARRIERS WITH A LEADING EDGE LOCATED 27 INCHES MAXIMUM ABOVE THE FINISH FLOOR OR GROUND SHALL BE PROVIDED WHERE THE VERTICAL CLEARANCE ON CIRCULATION PATHS IS LESS THAN 80 INCHES HIGH. §11B-307.4, FIGURE 11B-307.4
17. WHERE A GUY SUPPORT IS USED WITHIN EITHER THE WIDTH OF A CIRCULATION PATH OR 24 INCHES MAXIMUM OUTSIDE OF A CIRCULATION PATH, A VERTICAL GUY BRACE, SIDEWALK GUY OR SIMILAR DEVICE SHALL BE USED TO PREVENT A HAZARD OR AN OVERHEAD OBSTRUCTION. §11B-307.4.1, FIGURE 11B-307.4.1
18. ELECTRICAL CONTROLS AND SWITCHES INTENDED TO BE USED BY THE OCCUPANT OF A ROOM OR AREA TO CONTROL LIGHTING AND RECEPTACLE OUTLETS, APPLIANCES OR COOLING, HEATING AND VENTILATING EQUIPMENT SHALL BE LOCATED WITHIN ALLOWABLE REACH RANGES. LOW REACH SHALL BE MEASURED TO THE BOTTOM OF THE OUTLET BOX AND HIGH REACH SHALL BE MEASURED TO THE TOP OF THE OUTLET BOX. §11B-308.1.1
19. ELECTRICAL RECEPTACLE OUTLETS ON BRANCH CIRCUITS OF 30 AMPERES OR LESS AND COMMUNICATION SYSTEM RECEPTACLES SHALL BE LOCATED WITHIN ALLOWABLE REACH RANGES. LOW REACH SHALL BE MEASURED TO THE BOTTOM OF THE OUTLET BOX AND HIGH REACH SHALL BE MEASURED TO THE TOP OF THE OUTLET BOX. §11B-308.1.2
20. HIGH FORWARD REACH THAT IS UNOBSTRUCTED SHALL BE 48 INCHES MAXIMUM AND THE LOW FORWARD REACH SHALL BE 15 INCHES MINIMUM ABOVE THE FINISH FLOOR OR GROUND. §11B-308.2.1, FIGURE 11B-308.2.1
21. HIGH FORWARD REACH SHALL BE 48 INCHES MAXIMUM WHERE THE REACH DEPTH IS 20 INCHES OR LESS AND 44 INCHES MAXIMUM WHERE THE REACH DEPTH EXCEEDS 20 INCHES. HIGH FORWARD REACH SHALL NOT EXCEED 25 INCHES IN DEPTH. §11B-308.2.2, FIGURE 11B-308.2.2
22. HIGH SIDE REACH SHALL BE 48 INCHES MAXIMUM AND THE LOW SIDE REACH SHALL BE 15 INCHES MINIMUM ABOVE THE FINISH FLOOR WHERE THE SIDE REACH IS UNOBSTRUCTED OR THE DEPTH OF ANY OBSTRUCTION DOES NOT EXCEED 10 INCHES. §11B-308.3.1, FIGURE 11B-308.3.1
23. HIGH SIDE REACH SHALL BE 46 INCHES MAXIMUM ABOVE THE FINISH FLOOR OR GROUND WHERE THE HIGH SIDE REACH IS OVER AN OBSTRUCTION MORE THAN 10 INCHES BUT NOT MORE THAN 24 INCHES IN DEPTH. §11B-308.3.2, FIGURE 11B-308.3.2
24. OBSTRUCTIONS FOR HIGH SIDE REACH SHALL NOT EXCEED 34 INCHES IN HEIGHT AND 24 INCHES IN DEPTH. §11B-308.3.2, FIGURE 11B-308.3.2
25. OBSTRUCTED HIGH SIDE REACH FOR THE TOP OF WASHING MACHINES AND CLOTHES DRYERS SHALL BE PERMITTED TO BE 36 INCHES MAXIMUM ABOVE THE FINISH FLOOR. §11B-308.3.2
26. OBSTRUCTED HIGH SIDE REACH FOR THE OPERABLE PARTS OF FUEL DISPENSERS SHALL BE PERMITTED TO BE 54 INCHES MAXIMUM MEASURED FROM THE SURFACE OF THE VEHICULAR WAY WHERE FUEL DISPENSERS ARE INSTALLED ON EXISTING CURBS. §11B-308.3.2
27. OPERABLE PARTS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. FORCE REQUIRED TO ACTIVATE OPERABLE PARTS SHALL BE 5 POUNDS MAXIMUM. §11B-309.4
28. AT LEAST ONE ACCESSIBLE ROUTE SHALL BE PROVIDED WITHIN THE SITE FROM ACCESSIBLE PARKING SPACES AND ACCESSIBLE PASSENGER LOADING ZONES; PUBLIC STREETS AND SIDEWALKS; AND PUBLIC TRANSPORTATION STOPS TO THE ACCESSIBLE BUILDING OR FACILITY ENTRANCE THEY SERVE, WHERE MORE THAN ONE ROUTE IS PROVIDED, ALL ROUTES MUST BE ACCESSIBLE. §11B-206.2.1 (SEE EXCEPTIONS)

C. ACCESSIBLE ROUTES

1. AT LEAST ONE ACCESSIBLE ROUTE SHALL BE PROVIDED WITHIN THE SITE FROM ACCESSIBLE PARKING SPACES AND ACCESSIBLE PASSENGER LOADING ZONES; PUBLIC STREETS AND SIDEWALKS; AND PUBLIC TRANSPORTATION STOPS TO THE ACCESSIBLE BUILDING OR FACILITY ENTRANCE THEY SERVE, WHERE MORE THAN ONE ROUTE IS PROVIDED, ALL ROUTES MUST BE ACCESSIBLE. §11B-206.2.1 (SEE EXCEPTIONS)
2. AT LEAST ONE ACCESSIBLE ROUTE SHALL CONNECT ACCESSIBLE BUILDINGS, ACCESSIBLE FACILITIES, ACCESSIBLE ELEMENTS, AND ACCESSIBLE SPACES THAT ARE ON THE SAME SITE. §11B-206.2.2 (SEE EXCEPTION)
3. AT LEAST ONE ACCESSIBLE ROUTE SHALL CONNECT EACH STORY AND MEZZANINE IN MULTI-STORY BUILDINGS AND FACILITIES. §11B-206.2.3 (SEE EXCEPTIONS)
4. IN NEW CONSTRUCTION OF BUILDINGS WHERE ELEVATORS ARE REQUIRED BY 11B-206.2.3 MULTI-STORY BUILDINGS AND FACILITIES, AND WHICH EXCEED 10,000 SQUARE FEET ON ANY FLOOR, AN ACCESSIBLE MEANS OF VERTICAL ACCESS VIA RAMP, ELEVATOR OR LIFT SHALL BE PROVIDED WITHIN 200 FEET OF TRAVEL OF EACH STAIR AND EACH ESCALATOR. §11B-206.2.3.2
5. IN EXISTING BUILDINGS THAT EXCEED 10,000 SQUARE FEET ON ANY FLOOR AND IN WHICH ELEVATORS ARE REQUIRED BY 11B-206.2.3 MULTI-STORY BUILDINGS AND FACILITIES, WHENEVER A NEWLY CONSTRUCTED MEANS OF VERTICAL ACCESS IS PROVIDED VIA STAIRS OR AN ESCALATOR, AN ACCESSIBLE MEANS OF VERTICAL ACCESS VIA RAMP, ELEVATOR OR LIFT SHALL BE PROVIDED WITHIN 200 FEET OF TRAVEL OF EACH NEW STAIR OR ESCALATOR. §11B-206.2.3.2
6. AT LEAST ONE ACCESSIBLE ROUTE SHALL CONNECT ACCESSIBLE BUILDING OR FACILITY ENTRANCES WITH ALL ACCESSIBLE BUILDING OR FACILITY ENTRANCES, INCLUDING MEZZANINES, WHICH ARE OTHERWISE CONNECTED BY A CIRCULATION PATH. §11B-206.2.4 (SEE EXCEPTIONS 1 THROUGH 7)
7. ACCESSIBLE ROUTES SHALL COINCIDE WITH OR BE LOCATED IN THE SAME AREA AS GENERAL CIRCULATION PATHS, WHERE CIRCULATION PATHS ARE INTERIOR, REQUIRED ACCESSIBLE ROUTES SHALL ALSO BE INTERIOR, AN ACCESSIBLE ROUTE SHALL NOT PASS THROUGH KITCHENS, STORAGE ROOMS, RESTROOMS, CLOSETS OR OTHER SPACES USED FOR SIMILAR PURPOSES, EXCEPT AS PERMITTED BY CHAPTER 10. §11B-206.3
8. EMPLOYEE WORKSTATIONS SHALL BE ON AN ACCESSIBLE ROUTE COMPLYING WITH DIVISION 4. SPACES AND ELEMENTS WITHIN EMPLOYEE WORKSTATIONS SHALL ONLY BE REQUIRED TO COMPLY WITH SECTIONS 11B-207.1, 11B-215.3, 11B-302, 11B-303, AND 11B-404.2.3. COMMON USE CIRCULATION PATHS WITHIN EMPLOYEE WORKSTATIONS SHALL COMPLY WITH SECTION 11B-206.2.8. §11B-203.9
9. CURB RAMPS SHALL HAVE DETECTABLE WARNINGS THAT EXTEND 36 INCHES IN THE DIRECTION OF TRAVEL FOR THE FULL WIDTH OF THE RAMP AND LESS THAN 2 INCHES MAXIMUM ON EACH SIDE, EXCLUDING ANY FLARED SIDES. §11B-247.1.2.2, §11B-705.1.2.2
10. ON PERPENDICULAR CURB RAMPS, DETECTABLE WARNINGS SHALL BE LOCATED SO THE EDGE NEAREST THE CURB IS 6 TO 8 INCHES FROM THE LINE AT THE FACE OF THE CURB MARKING THE TRANSITION BETWEEN THE CURB AND THE GUTTER, STREET OR HIGHWAY. §11B-247.1.2.2, §11B-705.1.2.2
11. ON PARALLEL CURB RAMPS, DETECTABLE WARNINGS SHALL BE PLACED ON THE TURNING SPACE AT THE FLUSH TRANSITION BETWEEN THE STREET AND SIDEWALK. DETECTABLE WARNINGS SHALL EXTEND THE FULL WIDTH OF THE TURNING SPACE AT THE FLUSH TRANSITION BETWEEN THE STREET AND THE SIDEWALK LESS THAN 2 INCHES MAXIMUM ON EACH SIDE. §11B-247.1.2.2, §11B-705.1.2.2, FIGURE 11B-406.3.2
13. WALKS THAT CROSS OR ADJOIN A ROUTE PROVIDED FOR VEHICULAR TRAFFIC, SUCH AS IN A STREET, DRIVEWAY, OR PARKING FACILITY, SHALL BE SEPARATED BY DETECTABLE WARNINGS, CURBS, RAILINGS OR OTHER ELEMENTS BETWEEN THE PEDESTRIAN AREAS AND VEHICULAR AREAS. §202, §11B-247.1.2.5, §11B-705.1.2.5
14. DETECTABLE WARNINGS PROVIDED TO SEPARATE WALKS THAT CROSS OR ADJOIN A ROUTE PROVIDED FOR VEHICULAR TRAFFIC, SUCH AS IN A STREET, DRIVEWAY, OR PARKING FACILITY, SHALL BE 36 INCHES IN WIDTH AND CONTINUOUS AT THE BOUNDARY BETWEEN THE PEDESTRIAN AREAS AND VEHICULAR AREAS. §202, §11B-247.1.2.5, §11B-705.1.2.5
15. PROVIDE DETECTABLE WARNING DETAILS SHOWING COMPLIANCE WITH THE FOLLOWING: A. DETECTABLE WARNING SURFACES AT TRANSIT BOARDING PLATFORM EDGES, BUS STOPS, HAZARDOUS VEHICULAR AREAS, REFLECTING POOLS, AND TRACK CROSSINGS SHALL COMPLY WITH SECTION 11B-705.1.1.3.1. §11B-705.1.1.3.1 B. DETECTABLE WARNINGS AT OTHER LOCATIONS SHALL COMPLY WITH EITHER SECTION 11B-705.1.1.3.1 OR SECTION 11B-705.1.1.3.2. THE MATERIAL SHALL PROVIDE VISUAL CONTRAST SHALL BE AN INTEGRAL PART OF THE SURFACE. §11B-705.1.1.3
16. DETECTABLE WARNING SURFACES SHALL BE YELLOW AND APPROXIMATE FS 35358 OF FEDERAL STANDARD 595C. §11B-705.1.1.3.1
17. DETECTABLE WARNING SURFACES SHALL PROVIDE A 70 PERCENT MINIMUM VISUAL CONTRAST WITH ADJACENT WALKING SURFACES. CONTRAST IN PERCENT SHALL BE DETERMINED BY: CONTRAST PERCENT = [(B1-B2)/B1] X 100 WHERE B1 = LIGHT REFLECTANCE VALUE (LRV) OF THE LIGHTER AREA AND B2 = LIGHT REFLECTANCE VALUE (LRV) OF THE DARKER AREA §11B-705.1.1.3.2 (SEE EXCEPTION)
18. ENTRANCES SHALL BE PROVIDED IN ACCORDANCE WITH 11B-206.4 ENTRANCES, ENTRANCE DOORS, DOORWAYS, AND GATES SHALL COMPLY WITH 11B-404 DOORS, DOORWAYS, AND GATES AND SHALL BE ON AN ACCESSIBLE ROUTE COMPLYING WITH 11B-402 ACCESSIBLE ROUTES. (SEE EXCEPTIONS) §11B-206.4
19. ALL ENTRANCES AND EXTERIOR GROUND-FLOOR EXITS TO BUILDINGS AND FACILITIES SHALL COMPLY WITH 11B-404 DOORS, DOORWAYS, AND GATES. §11B-206.4.1
20. WHERE DIRECT ACCESS IS PROVIDED FOR PEDESTRIANS FROM A PARKING STRUCTURE TO A BUILDING OR FACILITY ENTRANCE, EACH DIRECT ACCESS TO THE BUILDING OR FACILITY ENTRANCE SHALL COMPLY WITH 11B-404 DOORS, DOORWAYS, AND GATES. §11B-206.4.2
21. DIRECT CONNECTIONS TO OTHER FACILITIES SHALL PROVIDE AN ACCESSIBLE ROUTE COMPLYING WITH 11B-404 DOORS, DOORWAYS, AND GATES FROM THE POINT OF CONNECTION TO BOARDING PLATFORMS AND ALL TRANSPORTATION SYSTEM ELEMENTS REQUIRED TO BE ACCESSIBLE. ANY ELEMENTS PROVIDED TO FACILITATE FUTURE DIRECT CONNECTIONS SHALL BE ON AN ACCESSIBLE ROUTE CONNECTING BOARDING PLATFORMS AND ALL TRANSPORTATION SYSTEM ELEMENTS REQUIRED TO BE ACCESSIBLE. §11B-206.4.2 (SEE EXCEPTION)
22. ACCESSIBLE ROUTES SHALL CONSIST OF ONE OR MORE OF THE FOLLOWING COMPONENTS: WALKING SURFACES WITH A RUNNING SLOPE NOT STEEPER THAN 1:20 (5%), DOORWAYS, RAMP SURFACES, CURB RAMPS EXCLUDING THE FLARED SIDES, ELEVATORS, AND PLATFORM LIFTS. §11B-402.2
23. THE RUNNING SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:20 (5%). THE CROSS SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:48 (2.083%). §11B-403.3
24. EXCEPT AT TURNS OR PASSING SPACES, THE CLEAR WIDTH OF WALKING SURFACES SHALL BE 36 INCHES MINIMUM. §11B-403.5.1
25. THE CLEAR WIDTH FOR WALKING SURFACES IN CORRIDORS SERVING AN OCCUPANT LOAD OF 10 OR MORE SHALL BE 44 INCHES MINIMUM. §11B-403.5.1 EXCEPTION 2
26. THE CLEAR WIDTH FOR SIDEWALKS AND WALKS SHALL BE 48 INCHES MINIMUM. §11B-403.5.1 EXCEPTION 3
27. THE CLEAR WIDTH FOR AISLES SHALL BE 36 INCHES MINIMUM IF SERVING ELEMENTS ON ONLY ONE SIDE, AND 44 INCHES MINIMUM IF SERVING ELEMENTS ON BOTH SIDES. §11B-403.5.1 EXCEPTION 4
28. THE CLEAR WIDTH FOR ACCESSIBLE ROUTES TO ACCESSIBLE TOILET COMPARTMENTS SHALL BE 44 INCHES EXCEPT FOR DOOROPENING WIDTHS AND DOOR SWINGS. §11B-403.5.1 EXCEPTIONS 5 DOORS, DOORWAYS, AND GATES
29. DOORS, DOORWAYS, AND GATES PROVIDING USER PASSAGE SHALL BE PROVIDED IN ACCORDANCE WITH 11B-206.5 DOORS, DOORWAYS, AND GATES. §11B-206.5
30. DOORS, DOORWAYS AND GATES THAT ARE PART OF AN ACCESSIBLE ROUTE SHALL COMPLY WITH 11B-404 DOORS, DOORWAYS, AND GATES. §11B-404.1
31. REVOLVING DOORS, REVOLVING GATES, AND TURNSTILES SHALL NOT BE PART OF AN ACCESSIBLE ROUTE. §11B-402.2.1
32. AT LEAST ONE OF THE ACTIVE LEAVES OF DOORWAYS WITH TWO LEAVES SHALL COMPLY WITH 11B-404.2.3 CLEAR WIDTH AND 11B-404.2.4 MANEUVERING CLEARANCES. §11B-404.2.2
33. DOOR OPENINGS SHALL PROVIDE A CLEAR WIDTH OF 32 INCHES MINIMUM, CLEAR OPENINGS OF DOORWAYS WITH SWINGING DOORS SHALL BE MEASURED BETWEEN THE FACE OF THE DOOR AND THE STOP, WITH THE DOOR OPEN 90 DEGREES. OPENINGS MORE THAN 24 INCHES DEEP SHALL PROVIDE A CLEAR OPENING OF 36 INCHES MINIMUM. THERE SHALL BE NO PROJECTIONS INTO THE REQUIRED CLEAR OPENING WIDTH LOWER THAN 34 INCHES ABOVE THE FINISH FLOOR OR GROUND. PROJECTIONS INTO THE CLEAR OPENING WIDTH BETWEEN 34 INCHES AND 80 INCHES ABOVE THE FINISH FLOOR OR GROUND SHALL NOT EXCEED 4 INCHES. §11B-404.2.3
- LL BE OF MATERIAL THAT IS AT LEAST AS SLIP RESISTANT AS THE OTHER TREADS OF THE STAIR. A PAINTED STRIPE SHALL BE ACCEPTABLE. GROOVES SHALL NOT BE USED TO SATISFY THIS REQUIREMENT. §11B-504.4.1
34. MINIMUM MANEUVERING CLEARANCES AT DOORS AND GATES SHALL COMPLY WITH 11B-404.2.4 MANEUVERING CLEARANCES. MANEUVERING CLEARANCES SHALL EXTEND THE FULL WIDTH OF THE DOORWAY AND THE REQUIRED LATCH SIDE OR HINGE SIDE CLEARANCE. §11B-404.2.4
35. SWINGING DOORS AND GATES SHALL HAVE MANEUVERING CLEARANCES COMPLYING WITH TABLE 11B-404.2.4.1. §11B-404.2.4.1
36. DOORWAYS LESS THAN 36 INCHES WIDE WITHOUT DOORS OR GATES, SLIDING DOORS, OR FOLDING DOORS SHALL HAVE MANEUVERING CLEARANCES COMPLYING WITH TABLE 11B-404.2.4.2. §11B-404.2.4.2
37. MANEUVERING CLEARANCES FOR FORWARD APPROACH SHALL BE PROVIDED WHEN ANY OBSTRUCTION WITHIN 18 INCHES OF THE LATCH SIDE AN INTERIOR DOORWAY, OR WITHIN 24 INCHES OF THE LATCH SIDE OF AN EXTERIOR DOORWAY, PROJECTS MORE THAN 8 INCHES BEYOND THE FACE OF THE DOOR, MEASURED PERPENDICULAR TO THE FACE OF THE DOOR OR GATE. §11B-404.2.4.3
38. THRESHOLDS, IF PROVIDED AT DOORWAYS, SHALL BE ½ INCH HIGH MAXIMUM, RAISED THRESHOLDS AND CHANGES IN LEVEL AT DOORWAYS SHALL COMPLY WITH 11B-302 FLOOR OR GROUND SURFACES AND 11B-303 CHANGES IN LEVEL. §11B-404.2.5.
39. HANDLES, PULLS, LATCHES, LOCKS, AND OTHER OPERABLE PARTS ON DOORS AND GATES SHALL COMPLY WITH 11B-309.4 OPERATION. OPERABLE PARTS OF SUCH HARDWARE SHALL BE 34 INCHES MINIMUM AND 44 INCHES MAXIMUM ABOVE THE FINISH FLOOR OR GROUND, WHERE SLIDING DOORS ARE IN THE FULLY OPEN POSITION, OPERATING HARDWARE SHALL BE EXPOSED AND USABLE FROM BOTH SIDES. §11B-404.2.7
40. THE FORCE FOR PUSHING OR PULLING OPEN A DOOR OR GATE OTHER THAN FIRE DOORS SHALL BE AS FOLLOWS: §11B-404.2.9 A. INTERIOR HINGED DOORS AND GATES: 5 POUNDS MAXIMUM. B. SLIDING OR FOLDING DOORS: 5 POUNDS MAXIMUM. C. REQUIRED FIRE DOORS: THE MINIMUM OPENING FORCE ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY, NOT TO EXCEED 15 POUNDS. D. EXTERIOR HINGED DOORS: 5 POUNDS MAXIMUM.
41. SWINGING DOOR AND GATE SURFACES WITHIN 10 INCHES OF THE FINISH FLOOR OR GROUND MEASURED VERTICALLY SHALL HAVE A SMOOTH SURFACE ON THE PUSH SIDE EXTENDING THE FULL WIDTH OF THE DOOR OR GATE. PARTS CREATING HORIZONTAL OR VERTICAL JOINTS IN THESE SURFACES SHALL BE WITHIN 1/8 INCH OF THE SAME PLANE AS THE OTHER AND BE FREE OF SHARP OR ABRASIVE EDGES. CAVITIES CREATED BY ADDED KICK PLATES SHALL BE CAPPED. §11B-404.2.10 RAMP
42. PROVIDE RAMP DETAILS, INCLUDING SLOPE, LANDINGS, AND HANDRAILS.
43. RAMP RUNS SHALL HAVE A RUNNING SLOPE NOT STEEPER THAN 1:12 (8.33%). §11B-405.2
44. CROSS SLOPE OF RAMP RUNS SHALL NOT BE STEEPER THAN 1:48 (2.083%). §11B-405.3
45. FLOOR OR GROUND SURFACES OF RAMP RUNS SHALL COMPLY WITH 11B-302 FLOOR OR GROUND SURFACES. CHANGES IN LEVEL OTHER THAN THE RUNNING SLOPE AND CROSS SLOPE ARE NOT PERMITTED ON RAMP RUNS. §11B-405.4
46. THE CLEAR WIDTH OF A RAMP RUN SHALL BE 48 INCHES MINIMUM. §11B-405.5
47. THE RISE FOR ANY RAMP RUN SHALL BE 30 INCHES MAXIMUM. §11B-405.6
48. RAMP RUNS SHALL HAVE LANDINGS AT THE TOP AND THE BOTTOM OF EACH RAMP RUN. §11B-405.7
49. LANDINGS SHALL COMPLY WITH 11B-302 FLOOR OR GROUND SURFACES. CHANGES IN LEVEL ARE NOT PERMITTED. §11B-405.7.1
50. THE LANDING CLEAR WIDTH SHALL BE AT LEAST AS WIDE AS THE WIDEST RAMP RUN LEADING TO THE LANDING. §11B-405.7.2
51. TOP LANDINGS SHALL BE 60 INCHES WIDE MINIMUM. §11B-405.7.2.1
52. THE LANDING CLEAR LENGTH SHALL BE 60 INCHES LONG MINIMUM. §11B-405.7.3
53. BOTTOM LANDINGS SHALL EXTEND 72 INCHES MINIMUM IN THE DIRECTION OF RAMP RUN. §11B-405.7.3.1
54. RAMP THAT CHANGE DIRECTION BETWEEN RUNS AT LANDINGS SHALL HAVE A CLEAR LANDING 60 INCHES MINIMUM BY 72 INCHES MINIMUM IN THE DIRECTION OF DOWNWARD TRAVEL FROM THE UPPER RAMP RUN. §11B-405.7.4
55. WHERE DOORWAYS ARE LOCATED ADJACENT TO A RAMP LANDING, MANEUVERING CLEARANCES REQUIRED BY 11B-404.2.4 AND 11B-404.3.2 SHALL BE PERMITTED TO OVERLAP THE REQUIRED LANDING AREA. DOORS, WHEN FULLY OPEN, SHALL NOT REDUCE THE REQUIRED RAMP LANDING WIDTH BY MORE THAN 3 INCHES. DOORS, IN ANY POSITION, SHALL NOT REDUCE THE MINIMUM DIMENSION OF THE RAMP LANDING TO LESS THAN 42 INCHES. §11B-405.7.5
56. RAMP RUNS SHALL HAVE COMPLIANT HANDRAILS PER 11B-505 HANDRAILS. §11B-405.8
57. EDGE PROTECTION COMPLYING WITH 11B-405.9.2 CURB OR BARRIER SHALL BE PROVIDED ON EACH SIDE OF RAMP RUNS AND AT EACH SIDE OF RAMP LANDINGS. §11B-405.9 (SEE EXCEPTIONS)
58. A CURB, 2 INCHES HIGH MINIMUM, OR BARRIER SHALL BE PROVIDED THAT PREVENTS THE PASSAGE OF A 4 INCH DIAMETER SPHERE, WHERE ANY PORTION OF THE SPHERE IS WITHIN 4 INCHES OF THE FINISH FLOOR OR GROUND SURFACE. TO PREVENT WHEEL ENTRAPMENT, THE CURB OR BARRIER SHALL PROVIDE A CONTINUOUS AND UNINTERRUPTED BARRIER ALONG THE LENGTH OF THE RAMP. §11B-405.9.2
59. LANDINGS SUBJECT TO WET CONDITIONS SHALL BE DESIGNED TO PREVENT THE ACCUMULATION OF WATER. §11B-405.10 HANDRAILS
60. HANDRAILS SHALL BE PROVIDED ON BOTH SIDES OF STAIRS AND RAMP. §11B-505.2
61. HANDRAILS SHALL BE CONTINUOUS WITHIN THE FULL LENGTH OF EACH STAIR FLIGHT OR RAMP RUN, INSIDE HANDRAILS ON SWITCHBACK OR DOGLEG STAIRS AND RAMP SHALL BE CONTINUOUS BETWEEN FLIGHTS OR RUNS. §11B-505.3
62. TOP OF GRIPPING SURFACES OF HANDRAILS SHALL BE 34 INCHES MINIMUM AND 38 INCHES MAXIMUM VERTICALLY ABOVE WALKING SURFACES, STAIR NOSINGS, AND RAMP SURFACES. HANDRAILS SHALL BE AT A CONSISTENT HEIGHT ABOVE WALKING SURFACES, STAIR NOSINGS, AND RAMP SURFACES. §11B-505.4
63. CLEARANCE BETWEEN HANDRAIL GRIPPING SURFACES AND ADJACENT SURFACES SHALL BE 1½ INCHES MINIMUM. HANDRAILS MAY BE LOCATED IN A RECESS IF THE RECESS IS 3 INCHES MAXIMUM DEEP AND 18 INCHES MINIMUM CLEAR ABOVE THE TOP OF THE HANDRAIL. §11B-505.5
64. HANDRAIL GRIPPING SURFACES SHALL BE CONTINUOUS ALONG THEIR LENGTH AND SHALL NOT BE OBSTRUCTED ALONG THEIR TOPS OR SIDES. THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL NOT BE OBSTRUCTED FOR MORE THAN 20 PERCENT OF THEIR LENGTH, WHERE PROVIDED, HORIZONTAL PROJECTIONS SHALL OCCUR 1½ INCHES MINIMUM BELOW THE BOTTOM OF THE HANDRAIL-GRIPPING SURFACE. §11B-505.6
65. HANDRAIL GRIPPING SURFACES WITH A CIRCULAR CROSS SECTION SHALL HAVE AN OUTSIDE DIAMETER OF 1½ INCHES MINIMUM AND 2 INCHES MAXIMUM. §11B-505.7.1
66. HANDRAIL GRIPPING SURFACES WITH A NON-CIRCULAR CROSS SECTION SHALL HAVE A PERIMETER DIMENSION OF 4 INCHES MINIMUM AND 6¼ INCHES MAXIMUM, AND A CROSS-SECTION DIMENSION OF 2¼ INCHES MAXIMUM. §11B-505.7.2
67. HANDRAIL GRIPPING SURFACES SHALL EXTEND BEYOND AND IN THE SAME DIRECTION OF STAIR FLIGHTS AND RAMP RUNS IN ACCORDANCE WITH SECTION 11B-505.10 HANDRAIL EXTENSIONS. §11B-505.10
68. IN ALTERATIONS, WHERE THE EXTENSION OF THE HANDRAIL IN THE DIRECTION OF STAIR FLIGHT OR RAMP RUN WOULD CREATE A HAZARD, THE EXTENSION OF THE HANDRAIL MAY BE TURNED 90 DEGREES FROM THE DIRECTION OF STAIR FLIGHT OR RAMP RUN. §11B-505.10 EXCEPTION 3
69. RAMP HANDRAILS SHALL EXTEND HORIZONTALLY ABOVE THE LANDING FOR 12 INCHES MINIMUM BEYOND THE TOP AND BOTTOM OF RAMP RUNS. EXTENSIONS SHALL RETURN TO A WALL, GUARD, OR THE LANDING SURFACE, OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT RAMP RUN. §11B-505.10.1
70. AT THE TOP OF A STAIR FLIGHT, HANDRAILS SHALL EXTEND HORIZONTALLY ABOVE THE LANDING FOR 12 INCHES MINIMUM BEGINNING DIRECTLY ABOVE THE FIRST RISER NOSING. EXTENSIONS SHALL RETURN TO A WALL, GUARD, OR THE LANDING SURFACE, OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT STAIR FLIGHT. §11B-505.10.2
71. AT THE BOTTOM OF A STAIR FLIGHT, HANDRAILS SHALL EXTEND AT THE SLOPE OF THE STAIR FLIGHT FOR A HORIZONTAL DISTANCE EQUAL TO ONE TREAD DEPTH BEYOND THE LAST RISER NOSING. THE HORIZONTAL EXTENSION OF A HANDRAIL SHALL BE 12 INCHES LONG MINIMUM AND A HEIGHT EQUAL TO THAT OF THE SLOPING PORTION OF THE HANDRAIL AS MEASURED ABOVE THE STAIR NOSINGS. EXTENSION SHALL RETURN TO A WALL, GUARD, OR THE LANDING SURFACE, OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT STAIR FLIGHT. §11B-505.10.3

72. A STAIR IS DEFINED AS A CHANGE IN ELEVATION, CONSISTING OF ONE OR MORE RISERS. §11B-202
73. ALL STEPS ON A FLIGHT OF STAIRS SHALL HAVE UNIFORM RISER HEIGHTS AND UNIFORM TREAD DEPTHS. RISERS SHALL BE 4 INCHES HIGH MINIMUM AND 7 INCHES HIGH MAXIMUM. TREADS SHALL BE 11 INCHES DEEP MINIMUM. CURVED STAIRWAYS WITH WINDER TREADS ARE PERMITTED AT STAIRS WHICH ARE NOT PART OF A REQUIRED MEANS OF EGRESS. (SEE EXCEPTION) §11B-504.2
74. OPEN RISERS ARE NOT PERMITTED. §11B-504.3 (SEE EXCEPTIONS)
75. INTERIOR STAIRS SHALL HAVE THE UPPER APPROACH AND LOWER TREAD MARKED BY A STRIPE PROVIDING CLEAR VISUAL CONTRAST. EXTERIOR STAIRS SHALL HAVE THE UPPER APPROACH AND ALL TREADS MARKED BY A STRIPE PROVIDING CLEAR VISUAL CONTRAST. THE STRIPE SHALL BE A MINIMUM OF 2 INCHES WIDE TO A MAXIMUM OF 4 INCHES WIDE PLACED PARALLEL TO, AND NOT MORE THAN 1 INCH FROM, THE NOSE OF THE STEP OR UPPER APPROACH. THE STRIPE SHALL EXTEND THE FULL WIDTH OF THE STEP OR UPPER APPROACH AND SHALL BE OF MATERIAL THAT IS AT LEAST AS SLIP RESISTANT AS THE OTHER TREADS OF THE STAIR. A PAINTED STRIPE SHALL BE ACCEPTABLE. GROOVES SHALL NOT BE USED TO SATISFY THIS REQUIREMENT. §11B-504.4.1
76. THE RADIUS OF CURVATURE AT THE LEADING EDGE OF THE TREAD SHALL BE ½ INCH MAXIMUM. NOSINGS THAT PROJECT BEYOND RISERS SHALL HAVE THE UNDERSIDE OF THE LEADING EDGE CURVED OR BEVELED. RISERS SHALL BE PERMITTED TO SLOPE UNDER THE TREAD AT AN ANGLE OF 30 DEGREES MAXIMUM FROM VERTICAL. THE PERMITTED PROJECTION OF THE NOSING SHALL EXTEND ¼ INCHES MAXIMUM OVER THE TREAD BELOW. §11B-504.5 (SEE EXCEPTION FOR EXISTING BUILDINGS)
77. STAIRS SHALL HAVE HANDRAILS COMPLYING WITH SECTION 11B-505 HANDRAILS. §11B-504.6
78. STAIR TREADS AND LANDINGS SUBJECT TO WET CONDITIONS SHALL BE DESIGNED TO PREVENT THE ACCUMULATION OF WATER. §11B-504.7
79. FLOOR IDENTIFICATION SIGNS REQUIRED BY CHAPTER 10, SECTION 1022.9 COMPLYING WITH SECTIONS 11B-702.1 SIGNS GENERAL, 11B-703.2 RAISED CHARACTERS, 11B-703.3 BRAILLE AND 11B-703.5 VISUAL CHARACTERS SHALL BE LOCATED AT THE LANDING OF EACH FLOOR LEVEL, PLACED ADJACENT TO THE DOOR ON THE LATCH SIDE, IN ALL ENCLOSED STAIRWAYS IN BUILDINGS TWO OR MORE STORIES IN HEIGHT TO IDENTIFY THE FLOOR LEVEL. AT THE EXIT DISCHARGE LEVEL, THE SIGN SHALL INCLUDE A RAISED FIVE POINTED STAR LOCATED TO THE LEFT OF THE IDENTIFYING FLOOR LEVEL. THE OUTSIDE DIAMETER OF THE STAR SHALL BE THE SAME AS THE HEIGHT OF THE RAISED CHARACTERS. §11B-504.8 CURB RAMPS, BLENDED TRANSITIONS AND ISLANDS
80. PERPENDICULAR RAMP RUNS SHALL HAVE A RUNNING SLOPE NOT STEEPER THAN 1:12 (8.33%). §11B-406.2.1
81. FOR PERPENDICULAR RAMP, WHERE PROVIDED, CURB RAMP FLARES SHALL NOT BE STEEPER THAN 1:10. §11B-406.2, FIGURE 11B-406.2.2
82. THE RUNNING SLOPE OF THE CURB RAMP SEGMENTS SHALL BE IN-LINE WITH THE DIRECTION OF SIDEWALK TRAVEL. RAMP RUNS SHALL HAVE A RUNNING SLOPE NOT STEEPER THAN 1:12 (8.33%). §11B-406.3.1, FIGURE 11B-406.3.2
83. A TURNING SPACE 48 INCHES MINIMUM BY 48 INCHES MINIMUM SHALL BE PROVIDED AT THE BOTTOM OF THE CURB RAMP. THE SLOPE OF THE TURNING SPACE IN ALL DIRECTIONS SHALL BE 1:48 MAXIMUM (2.083%). §11B-406.3.2
84. BLENDED TRANSITION RAMP HALL HAVE A RUNNING SLOPE NOT STEEPER THAN 1:20 (5%). §11B-406.4.1
85. CURB RAMPS AND THE FLARED SIDES OF CURB RAMPS SHALL BE LOCATED SO THAT THEY DO NOT PROJECT INTO VEHICULAR TRAFFIC LANES, PARKING SPACES, OR PARKING ACCESS AISLES. CURB RAMPS AT MARKED CROSSINGS SHALL BE WHOLLY CONTAINED WITHIN THE MARKINGS, EXCLUDING ANY FLARED SIDES. §11B-406.5.1
86. THE CLEAR WIDTH OF CURB RAMP RUNS (EXCLUDING ANY FLARED SIDES), BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 48 INCHES MINIMUM. §11B-406.5.2
87. LANDINGS SHALL BE PROVIDED AT THE TOPS OF CURB RAMPS AND BLENDED TRANSITIONS (PARALLEL CURB RAMPS SHALL NOT BE REQUIRED TO COMPLY). THE LANDING CLEAR LENGTH SHALL BE 48 INCHES MINIMUM. THE LANDING CLEAR WIDTH SHALL BE AT LEAST AS WIDE AS THE CURB RAMP, EXCLUDING ANY FLARED SIDES, OR THE BLENDED TRANSITION LEADING TO THE LANDING. THE SLOPE OF THE LANDING IN ALL DIRECTIONS SHALL BE 1:48 (2.083%) MAXIMUM. §11B-406.5.3
88. GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP RUNS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH. §11B-406.5.6
89. THE CROSS SLOPE OF CURB RAMPS AND BLENDED TRANSITIONS SHALL BE 1:48 (2.083%) MAXIMUM. §11B-406.5.7
90. COUNTER SLOPES OF ADJOINING GUTTERS AND ROAD SURFACES IMMEDIATELY ADJACENT TO AND WITHIN 24 INCHES OF THE CURB RAMP SHALL NOT BE STEEPER THAN 1:20 (5%). THE ADJACENT SURFACES AT TRANSITIONS AT CURB RAMPS TO WALKS, GUTTERS, AND STREETS SHALL BE AT THE SAME LEVEL. §11B-406.5.8
91. THE BOTTOM OF DIAGONAL CURB RAMPS SHALL HAVE A CLEAR SPACE 48 INCHES MINIMUM OUTSIDE ACTIVE TRAFFIC LANES OF THE ROADWAY. DIAGONAL CURB RAMPS PROVIDED AT MARKED CROSSINGS SHALL PROVIDE THE 48 INCHES MINIMUM CLEAR SPACE WITHIN THE MARKINGS. §11B-406.5.9
92. CURB RAMPS AND BLENDED TRANSITIONS SHALL HAVE DETECTABLE WARNINGS COMPLYING WITH 11B-705 DETECTABLE WARNINGS. §11B-406.5.12
93. RAISED ISLANDS IN CROSSINGS SHALL BE CUT THROUGH LEVEL WITH THE STREET OR HAVE CURB RAMPS AT BOTH SIDES. THE CLEAR WIDTH OF THE ACCESSIBLE ROUTE AT ISLANDS SHALL BE 60 INCHES WIDE MINIMUM. WHERE CURB RAMPS ARE PROVIDED, THEY SHALL COMPLY WITH 11B-406 CURB RAMPS, BLENDED TRANSITIONS AND ISLANDS. LANDINGS COMPLYING WITH 11B-406.5.3 LANDINGS AND THE ACCESSIBLE ROUTE SHALL BE PERMITTED TO OVERLAP. ISLANDS SHALL HAVE DETECTABLE WARNINGS COMPLYING WITH 11B-705 DETECTABLE WARNINGS AND DETECTABLE DIRECTIONAL TEXTURE. §11B-406.6, FIGURE 11B-406.6

ENGINEERING		CITY OF LOS ANGELES	
REVISION DESCRIPTION	DATE	BY	BUILDING
NO			
BUREAU OF ENGINEERING		RP-300113	
DEPARTMENT OF PUBLIC WORKS		CITY ENGINEER	
GARY LEE MOORE, PE, ENV SP		DATE	
ARCHITECTURAL DIVISION		05/07/2019	
ARCHITECT:	ROBERT LOWMELIN	LIC. NO.:	23333
DESIGNED:	MARCUS YEE	05/07/2019	
DRAWN:	MARCUS YEE	05/07/2019	
CHECKED:	ROBERT LOWMELIN	05/07/2019	
APPROVED:	MAHMOOD KARIMZADEH, AIA	DEPUTY CITY ENGINEER	05/07/2019
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TTLB TEMPLATE REVISION DATE: 01/31/18

SHEET ISSUE

REVISIONS/ISSUES (DESCRIPTION)

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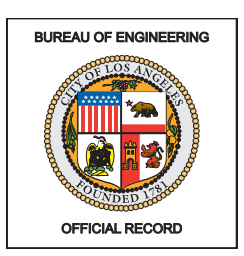
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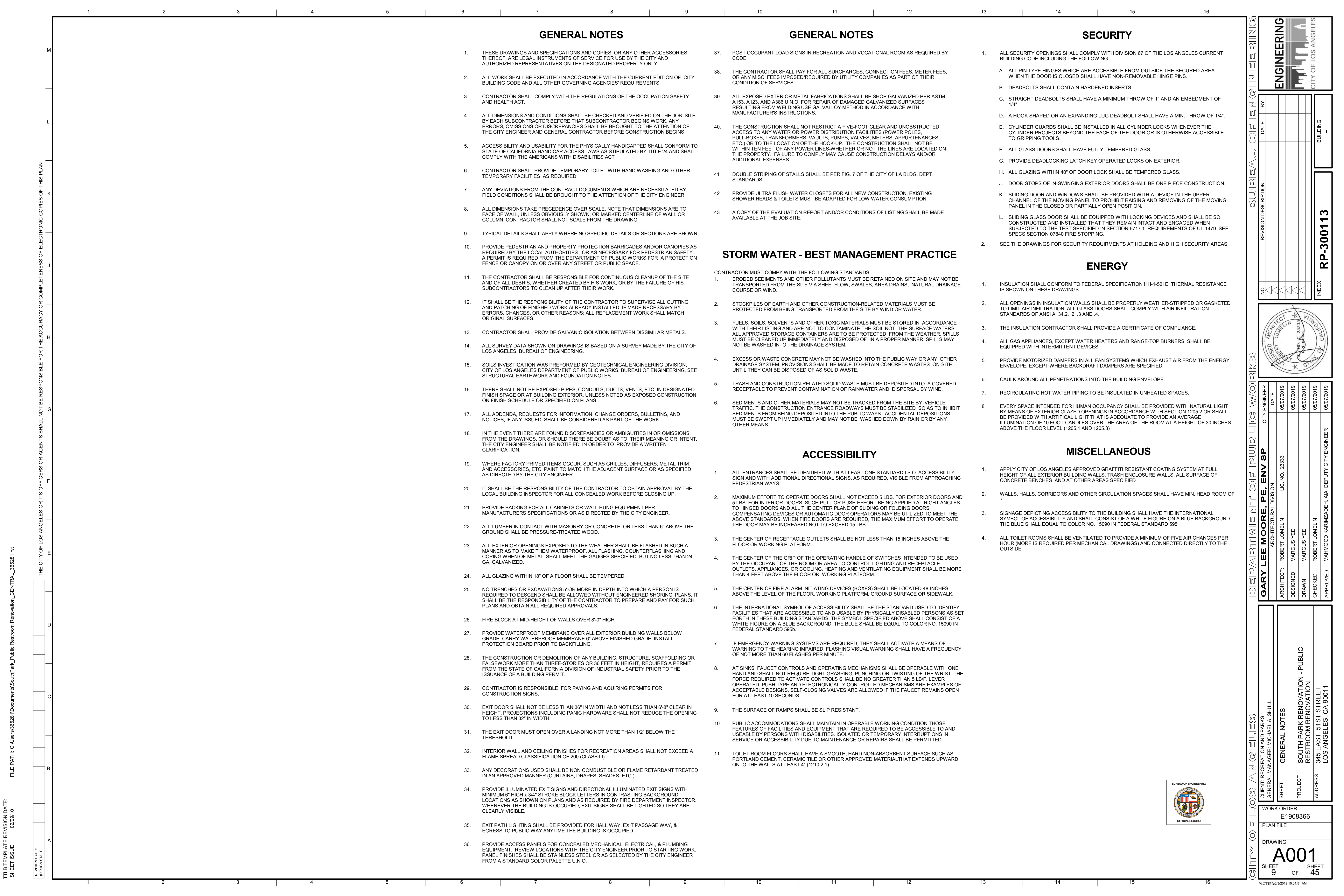
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GENERAL NOTES

- 1. THESE DRAWINGS AND SPECIFICATIONS AND COPIES, OR ANY OTHER ACCESSORIES THEREOF, ARE LEGAL INSTRUMENTS OF SERVICE FOR USE BY THE CITY AND AUTHORIZED REPRESENTATIVES ON THE DESIGNATED PROPERTY ONLY.
2. ALL WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE CURRENT EDITION OF CITY BUILDING CODE AND ALL OTHER GOVERNING AGENCIES' REQUIREMENTS
3. CONTRACTOR SHALL COMPLY WITH THE REGULATIONS OF THE OCCUPATION SAFETY AND HEALTH ACT.
4. ALL DIMENSIONS AND CONDITIONS SHALL BE CHECKED AND VERIFIED ON THE JOB SITE BY EACH SUBCONTRACTOR BEFORE THAT SUBCONTRACTOR BEGINS WORK. ANY ERRORS, OMISSIONS OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CITY ENGINEER AND GENERAL CONTRACTOR BEFORE CONSTRUCTION BEGINS
5. ACCESSIBILITY AND USABILITY FOR THE PHYSICALLY HANDICAPPED SHALL CONFORM TO STATE OF CALIFORNIA HANDICAP ACCESS LAWS AS STIPULATED BY TITLE 24 AND SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT
6. CONTRACTOR SHALL PROVIDE TEMPORARY TOILET WITH HAND WASHING AND OTHER TEMPORARY FACILITIES AS REQUIRED
7. ANY DEVIATIONS FROM THE CONTRACT DOCUMENTS WHICH ARE NECESSITATED BY FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CITY ENGINEER
8. ALL DIMENSIONS TAKE PRECEDENCE OVER SCALE. NOTE THAT DIMENSIONS ARE TO FACE OF WALL, UNLESS OBVIOUSLY SHOWN, OR MARKED CENTERLINE OF WALL OR COLUMN. CONTRACTOR SHALL NOT SCALE FROM THE DRAWING
9. TYPICAL DETAILS SHALL APPLY WHERE NO SPECIFIC DETAILS OR SECTIONS ARE SHOWN
10. PROVIDE PEDESTRIAN AND PROPERTY PROTECTION BARRICADES AND/OR CANOPIES AS REQUIRED BY THE LOCAL AUTHORITIES, OR AS NECESSARY FOR PEDESTRIAN SAFETY. A PERMIT IS REQUIRED FROM THE DEPARTMENT OF PUBLIC WORKS FOR A PROTECTION FENCE OR CANOPY ON OR OVER ANY STREET OR PUBLIC SPACE.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTINUOUS CLEANUP OF THE SITE AND OF ALL DEBRIS, WHETHER CREATED BY HIS WORK, OR BY THE FAILURE OF HIS SUBCONTRACTORS TO CLEAN UP AFTER THEIR WORK.
12. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPERVISE ALL CUTTING AND PATCHING OF FINISHED WORK ALREADY INSTALLED, IF MADE NECESSARY BY ERRORS, CHANGES, OR OTHER REASONS; ALL REPLACEMENT WORK SHALL MATCH ORIGINAL SURFACES.
13. CONTRACTOR SHALL PROVIDE GALVANIC ISOLATION BETWEEN DISSIMILAR METALS.
14. ALL SURVEY DATA SHOWN ON DRAWINGS IS BASED ON A SURVEY MADE BY THE CITY OF LOS ANGELES, BUREAU OF ENGINEERING.
15. SOILS INVESTIGATION WAS PERFORMED BY GEOTECHNICAL ENGINEERING DIVISION, CITY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS, BUREAU OF ENGINEERING, SEE STRUCTURAL EARTHWORK AND FOUNDATION NOTES
16. THERE SHALL NOT BE EXPOSED PIPES, CONDUITS, DUCTS, VENTS, ETC. IN DESIGNATED FINISH SPACE OR AT BUILDING EXTERIOR, UNLESS NOTED AS EXPOSED CONSTRUCTION ON FINISH SCHEDULE OR SPECIFIED ON PLANS.
17. ALL ADDENDA, REQUESTS FOR INFORMATION, CHANGE ORDERS, BULLETINS, AND NOTICES, IF ANY ISSUED, SHALL BE CONSIDERED AS PART OF THE WORK.
18. IN THE EVENT THERE ARE FOUND DISCREPANCIES OR AMBIGUITIES IN OR OMISSIONS FROM THE DRAWINGS, OR SHOULD THERE BE DOUBT AS TO THEIR MEANING OR INTENT, THE CITY ENGINEER SHALL BE NOTIFIED, IN ORDER TO PROVIDE A WRITTEN CLARIFICATION.
19. WHERE FACTORY PRIMED ITEMS OCCUR, SUCH AS GRILLES, DIFFUSERS, METAL TRIM AND ACCESSORIES, ETC. PAINT TO MATCH THE ADJACENT SURFACE OR AS SPECIFIED AS DIRECTED BY THE CITY ENGINEER.
20. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN APPROVAL BY THE LOCAL BUILDING INSPECTOR FOR ALL CONCEALED WORK BEFORE CLOSING UP.
21. PROVIDE BACKING FOR ALL CABINETS OR WALL HUNG EQUIPMENT PER MANUFACTURERS SPECIFICATIONS OR AS DIRECTED BY THE CITY ENGINEER.
22. ALL LUMBER IN CONTACT WITH MASONRY OR CONCRETE, OR LESS THAN 6" ABOVE THE GROUND SHALL BE PRESSURE-TREATED WOOD.
23. ALL EXTERIOR OPENINGS EXPOSED TO THE WEATHER SHALL BE FLASHED IN SUCH A MANNER AS TO MAKE THEM WATERPROOF. ALL FLASHING, COUNTERFLASHING AND COPING WHEN OF METAL, SHALL MEET THE GAUGES SPECIFIED, BUT NO LESS THAN 24 GA. GALVANIZED.
24. ALL GLAZING WITHIN 18" OF A FLOOR SHALL BE TEMPERED.
25. NO TRENCHES OR EXCAVATIONS 5' OR MORE IN DEPTH INTO WHICH A PERSON IS REQUIRED TO DESCEND SHALL BE ALLOWED WITHOUT ENGINEERED SHORING PLANS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PREPARE AND PAY FOR SUCH PLANS AND OBTAIN ALL REQUIRED APPROVALS.
26. FIRE BLOCK AT MID-HEIGHT OF WALLS OVER 8'-0" HIGH.
27. PROVIDE WATERPROOF MEMBRANE OVER ALL EXTERIOR BUILDING WALLS BELOW GRADE. CARRY WATERPROOF MEMBRANE 6" ABOVE FINISHED GRADE. INSTALL PROTECTION BOARD PRIOR TO BACKFILLING.
28. THE CONSTRUCTION OR DEMOLITION OF ANY BUILDING, STRUCTURE, SCAFFOLDING OR FALSEWORK MORE THAN THREE-STORIES OR 36 FEET IN HEIGHT, REQUIRES A PERMIT FROM THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
29. CONTRACTOR IS RESPONSIBLE FOR PAYING AND ACQUIRING PERMITS FOR CONSTRUCTION SIGNS.
30. EXIT DOOR SHALL NOT BE LESS THAN 36" IN WIDTH AND NOT LESS THAN 6'-8" CLEAR IN HEIGHT. PROJECTIONS INCLUDING PANIC HARDWARE SHALL NOT REDUCE THE OPENING TO LESS THAN 32" IN WIDTH.
31. THE EXIT DOOR MUST OPEN OVER A LANDING NOT MORE THAN 1/2" BELOW THE THRESHOLD.
32. INTERIOR WALL AND CEILING FINISHES FOR RECREATION AREAS SHALL NOT EXCEED A FLAME SPREAD CLASSIFICATION OF 200 (CLASS III)
33. ANY DECORATIONS USED SHALL BE NON COMBUSTIBLE OR FLAME RETARDANT TREATED IN AN APPROVED MANNER (CURTAINS, DRAPES, SHADES, ETC.)
34. PROVIDE ILLUMINATED EXIT SIGNS AND DIRECTIONAL ILLUMINATED EXIT SIGNS WITH MINIMUM 6" HIGH x 3/4" STROKE BLOCK LETTERS IN CONTRASTING BACKGROUND. LOCATIONS AS SHOWN ON PLANS AND AS REQUIRED BY FIRE DEPARTMENT INSPECTOR. WHENEVER THE BUILDING IS OCCUPIED, EXIT SIGNS SHALL BE LIGHTED SO THEY ARE CLEARLY VISIBLE.
35. EXIT PATH LIGHTING SHALL BE PROVIDED FOR HALL WAY, EXIT PASSAGE WAY, & EGRESS TO PUBLIC WAY ANYTIME THE BUILDING IS OCCUPIED.
36. PROVIDE ACCESS PANELS FOR CONCEALED MECHANICAL, ELECTRICAL, & PLUMBING EQUIPMENT. REVIEW LOCATIONS WITH THE CITY ENGINEER PRIOR TO STARTING WORK. PANEL FINISHES SHALL BE STAINLESS STEEL OR AS SELECTED BY THE CITY ENGINEER FROM A STANDARD COLOR PALETTE U.N.O.

GENERAL NOTES

- 37. POST OCCUPANT LOAD SIGNS IN RECREATION AND VOCATIONAL ROOM AS REQUIRED BY CODE.
38. THE CONTRACTOR SHALL PAY FOR ALL SURCHARGES, CONNECTION FEES, METER FEES, OR ANY MISC. FEES IMPOSED/REQUIRED BY UTILITY COMPANIES AS PART OF THEIR CONDITION OF SERVICES.
39. ALL EXPOSED EXTERIOR METAL FABRICATIONS SHALL BE SHOP GALVANIZED PER ASTM A153, A123, AND A386 U.N.O. FOR REPAIR OF DAMAGED GALVANIZED SURFACES RESULTING FROM WELDING USE GALVALLOY METHOD IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
40. THE CONSTRUCTION SHALL NOT RESTRICT A FIVE-FOOT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUTION FACILITIES (POWER POLES, PULL-BOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO THE LOCATION OF THE HOOK-UP. THE CONSTRUCTION SHALL NOT BE WITHIN TEN FEET OF ANY POWER LINES-WHETHER OR NOT THE LINES ARE LOCATED ON THE PROPERTY. FAILURE TO COMPLY MAY CAUSE CONSTRUCTION DELAYS AND/OR ADDITIONAL EXPENSES.
41. DOUBLE STRIPING OF STALLS SHALL BE PER FIG. 7 OF THE CITY OF LA BLDG. DEPT. STANDARDS.
42. PROVIDE ULTRA FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS & TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.
43. A COPY OF THE EVALUATION REPORT AND/OR CONDITIONS OF LISTING SHALL BE MADE AVAILABLE AT THE JOB SITE.

STORM WATER - BEST MANAGEMENT PRACTICE

- CONTRACTOR MUST COMPLY WITH THE FOLLOWING STANDARDS:
1. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEETFLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSE OR WIND.
2. STOCKPILES OF EARTH AND OTHER CONSTRUCTION-RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY WIND OR WATER.
3. FUELS, SOILS, SOLVENTS AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL NOR THE SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
4. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO THE PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON-SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
5. TRASH AND CONSTRUCTION-RELATED SOLID WASTE MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
6. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAYS. ACCIDENTAL DEPOSITIONS MUST BE SWEEPED UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR BY ANY OTHER MEANS.

ACCESSIBILITY

- 1. ALL ENTRANCES SHALL BE IDENTIFIED WITH AT LEAST ONE STANDARD I.S.O. ACCESSIBILITY SIGN AND WITH ADDITIONAL DIRECTIONAL SIGNS, AS REQUIRED, VISIBLE FROM APPROACHING PEDESTRIAN WAYS.
2. MAXIMUM EFFORT TO OPERATE DOORS SHALL NOT EXCEED 5 LBS. FOR EXTERIOR DOORS AND 5 LBS. FOR INTERIOR DOORS. SUCH PULL OR PUSH EFFORT BEING APPLIED AT RIGHT ANGLES TO HINGED DOORS AND ALL THE CENTER PLANE OF SLIDING OR FOLDING DOORS. COMPENSATING DEVICES OR AUTOMATIC DOOR OPERATORS MAY BE UTILIZED TO MEET THE ABOVE STANDARDS. WHEN FIRE DOORS ARE REQUIRED, THE MAXIMUM EFFORT TO OPERATE THE DOOR MAY BE INCREASED NOT TO EXCEED 15 LBS.
3. THE CENTER OF RECEPTACLE OUTLETS SHALL BE NOT LESS THAN 15 INCHES ABOVE THE FLOOR OR WORKING PLATFORM.
4. THE CENTER OF THE GRIP OF THE OPERATING HANDLE OF SWITCHES INTENDED TO BE USED BY THE OCCUPANT OF THE ROOM OR AREA TO CONTROL LIGHTING AND RECEPTACLE OUTLETS, APPLIANCES, OR COOLING, HEATING AND VENTILATING EQUIPMENT SHALL BE MORE THAN 4-FEET ABOVE THE FLOOR OR WORKING PLATFORM.
5. THE CENTER OF FIRE ALARM INITIATING DEVICES (BOXES) SHALL BE LOCATED 48-INCHES ABOVE THE LEVEL OF THE FLOOR, WORKING PLATFORM, GROUND SURFACE OR SIDEWALK.
6. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL BE THE STANDARD USED TO IDENTIFY FACILITIES THAT ARE ACCESSIBLE TO AND USABLE BY PHYSICALLY DISABLED PERSONS AS SET FORTH IN THESE BUILDING STANDARDS. THE SYMBOL SPECIFIED ABOVE SHALL CONSIST OF A WHITE FIGURE ON A BLUE BACKGROUND. THE BLUE SHALL BE EQUAL TO COLOR NO. 15090 IN FEDERAL STANDARD 595b.
7. IF EMERGENCY WARNING SYSTEMS ARE REQUIRED, THEY SHALL ACTIVATE A MEANS OF WARNING TO THE HEARING IMPAIRED. FLASHING VISUAL WARNING SHALL HAVE A FREQUENCY OF NOT MORE THAN 60 FLASHES PER MINUTE.
8. AT SINKS, FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PUNCHING OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBS IF LEVER OPERATED, PUSH TYPE AND ELECTRONICALLY CONTROLLED MECHANISMS ARE EXAMPLES OF ACCEPTABLE DESIGNS. SELF-CLOSING VALVES ARE ALLOWED IF THE FAUCET REMAINS OPEN FOR AT LEAST 10 SECONDS.
9. THE SURFACE OF RAMPS SHALL BE SLIP RESISTANT.
10. PUBLIC ACCOMMODATIONS SHALL MAINTAIN IN OPERABLE WORKING CONDITION THOSE FEATURES OF FACILITIES AND EQUIPMENT THAT ARE REQUIRED TO BE ACCESSIBLE TO AND USEABLE BY PERSONS WITH DISABILITIES. ISOLATED OR TEMPORARY INTERRUPTIONS IN SERVICE OR ACCESSIBILITY DUE TO MAINTENANCE OR REPAIRS SHALL BE PERMITTED.
11. TOILET ROOM FLOORS SHALL HAVE A SMOOTH, HARD NON-ABSORBENT SURFACE SUCH AS PORTLAND CEMENT, CERAMIC TILE OR OTHER APPROVED MATERIAL THAT EXTENDS UPWARD ONTO THE WALLS AT LEAST 4" (1210.2.1)

SECURITY

- 1. ALL SECURITY OPENINGS SHALL COMPLY WITH DIVISION 67 OF THE LOS ANGELES CURRENT BUILDING CODE INCLUDING THE FOLLOWING:
A. ALL PIN TYPE HINGES WHICH ARE ACCESSIBLE FROM OUTSIDE THE SECURED AREA WHEN THE DOOR IS CLOSED SHALL HAVE NON-REMOVABLE HINGE PINS.
B. DEADBOLTS SHALL CONTAIN HARDENED INSERTS.
C. STRAIGHT DEADBOLTS SHALL HAVE A MINIMUM THROW OF 1" AND AN EMBEDMENT OF 1/4".
D. A HOOK SHAPED OR AN EXPANDING LUG DEADBOLT SHALL HAVE A MIN. THROW OF 1/4".
E. CYLINDER GUARDS SHALL BE INSTALLED IN ALL CYLINDER LOCKS WHENEVER THE CYLINDER PROJECTS BEYOND THE FACE OF THE DOOR OR IS OTHERWISE ACCESSIBLE TO GRIPPING TOOLS.
F. ALL GLASS DOORS SHALL HAVE FULLY TEMPERED GLASS.
G. PROVIDE DEADLOCKING LATCH KEY OPERATED LOCKS ON EXTERIOR.
H. ALL GLAZING WITHIN 40" OF DOOR LOCK SHALL BE TEMPERED GLASS.
J. DOOR STOPS OF IN-SWINGING EXTERIOR DOORS SHALL BE ONE PIECE CONSTRUCTION.
K. SLIDING DOOR AND WINDOWS SHALL BE PROVIDED WITH A DEVICE IN THE UPPER CHANNEL OF THE MOVING PANEL TO PROHIBIT RAISING AND REMOVING OF THE MOVING PANEL IN THE CLOSED OR PARTIALLY OPEN POSITION.
L. SLIDING GLASS DOOR SHALL BE EQUIPPED WITH LOCKING DEVICES AND SHALL BE SO CONSTRUCTED AND INSTALLED THAT THEY REMAIN INTACT AND ENGAGED WHEN SUBJECTED TO THE TEST SPECIFIED IN SECTION 6717.1 REQUIREMENTS OF UL-1479. SEE SPECS SECTION 07840 FIRE STOPPING.
2. SEE THE DRAWINGS FOR SECURITY REQUIREMENTS AT HOLDING AND HIGH SECURITY AREAS.

ENERGY

- 1. INSULATION SHALL CONFORM TO FEDERAL SPECIFICATION HH-1-521E. THERMAL RESISTANCE IS SHOWN ON THESE DRAWINGS.
2. ALL OPENINGS IN INSULATION WALLS SHALL BE PROPERLY WEATHER-STRIPPED OR GASKETED TO LIMIT AIR INFILTRATION. ALL GLASS DOORS SHALL COMPLY WITH AIR INFILTRATION STANDARDS OF ANSI A134.2, 2, 3 AND 4.
3. THE INSULATION CONTRACTOR SHALL PROVIDE A CERTIFICATE OF COMPLIANCE.
4. ALL GAS APPLIANCES, EXCEPT WATER HEATERS AND RANGE-TOP BURNERS, SHALL BE EQUIPPED WITH INTERMITTENT DEVICES.
5. PROVIDE MOTORIZED DAMPERS IN ALL FAN SYSTEMS WHICH EXHAUST AIR FROM THE ENERGY ENVELOPE, EXCEPT WHERE BACKDRAFT DAMPERS ARE SPECIFIED.
6. CAULK AROUND ALL PENETRATIONS INTO THE BUILDING ENVELOPE.
7. RECIRCULATING HOT WATER PIPING TO BE INSULATED IN UNHEATED SPACES.
8. EVERY SPACE INTENDED FOR HUMAN OCCUPANCY SHALL BE PROVIDED WITH NATURAL LIGHT BY MEANS OF EXTERIOR GLAZED OPENINGS IN ACCORDANCE WITH SECTION 1205.2 OR SHALL BE PROVIDED WITH ARTIFICIAL LIGHT THAT IS ADEQUATE TO PROVIDE AN AVERAGE ILLUMINATION OF 10 FOOT-CANDLES OVER THE AREA OF THE ROOM AT A HEIGHT OF 30 INCHES ABOVE THE FLOOR LEVEL (1205.1 AND 1205.3)

MISCELLANEOUS

- 1. APPLY CITY OF LOS ANGELES APPROVED GRAFFITI RESISTANT COATING SYSTEM AT FULL HEIGHT OF ALL EXTERIOR BUILDING WALLS, TRASH ENCLOSURE WALLS, ALL SURFACE OF CONCRETE BENCHES AND AT OTHER AREAS SPECIFIED
2. WALLS, HALLS, CORRIDORS AND OTHER CIRCULATION SPACES SHALL HAVE MIN. HEAD ROOM OF 7'
3. SIGNAGE DEPICTING ACCESSIBILITY TO THE BUILDING SHALL HAVE THE INTERNATIONAL SYMBOL OF ACCESSIBILITY AND SHALL CONSIST OF A WHITE FIGURE ON A BLUE BACKGROUND. THE BLUE SHALL EQUAL TO COLOR NO. 15090 IN FEDERAL STANDARD 595
4. ALL TOILET ROOMS SHALL BE VENTILATED TO PROVIDE A MINIMUM OF FIVE AIR CHANGES PER HOUR (MORE IS REQUIRED PER MECHANICAL DRAWINGS) AND CONNECTED DIRECTLY TO THE OUTSIDE

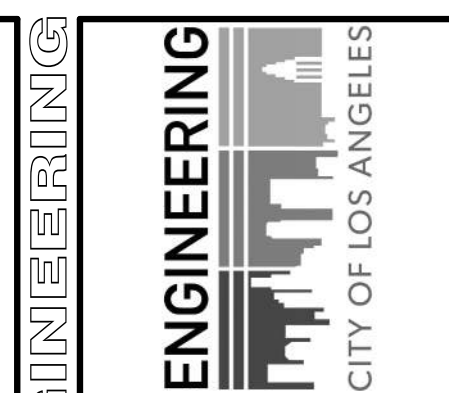


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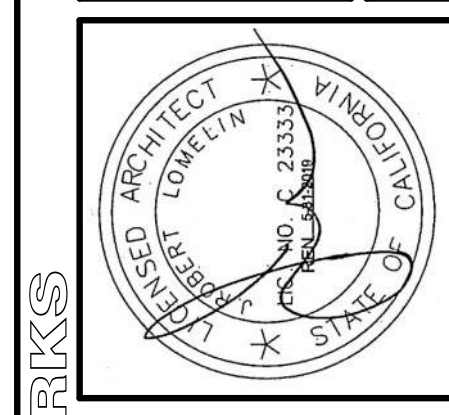
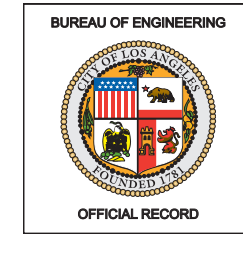


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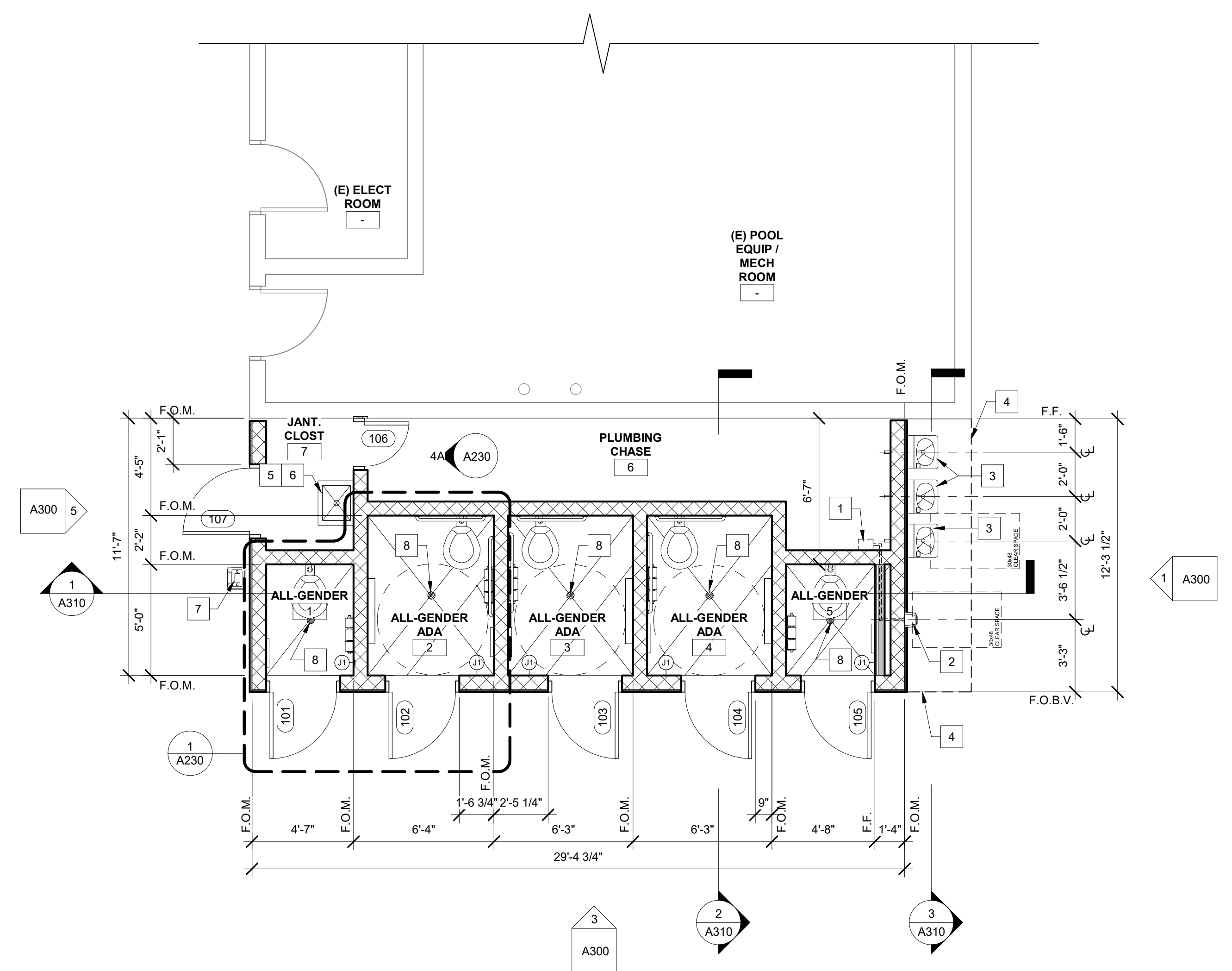
Table with columns: CLIENT, GENERAL NOTES, PROJECT, ADDRESS. Lists 'SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION' at '345 EAST 51ST STREET, LOS ANGELES, CA 90011'.

Table with columns: WORK ORDER, PLAN FILE, DRAWING, SHEET OF. Shows 'E1908366' and 'A001 OF 45'.

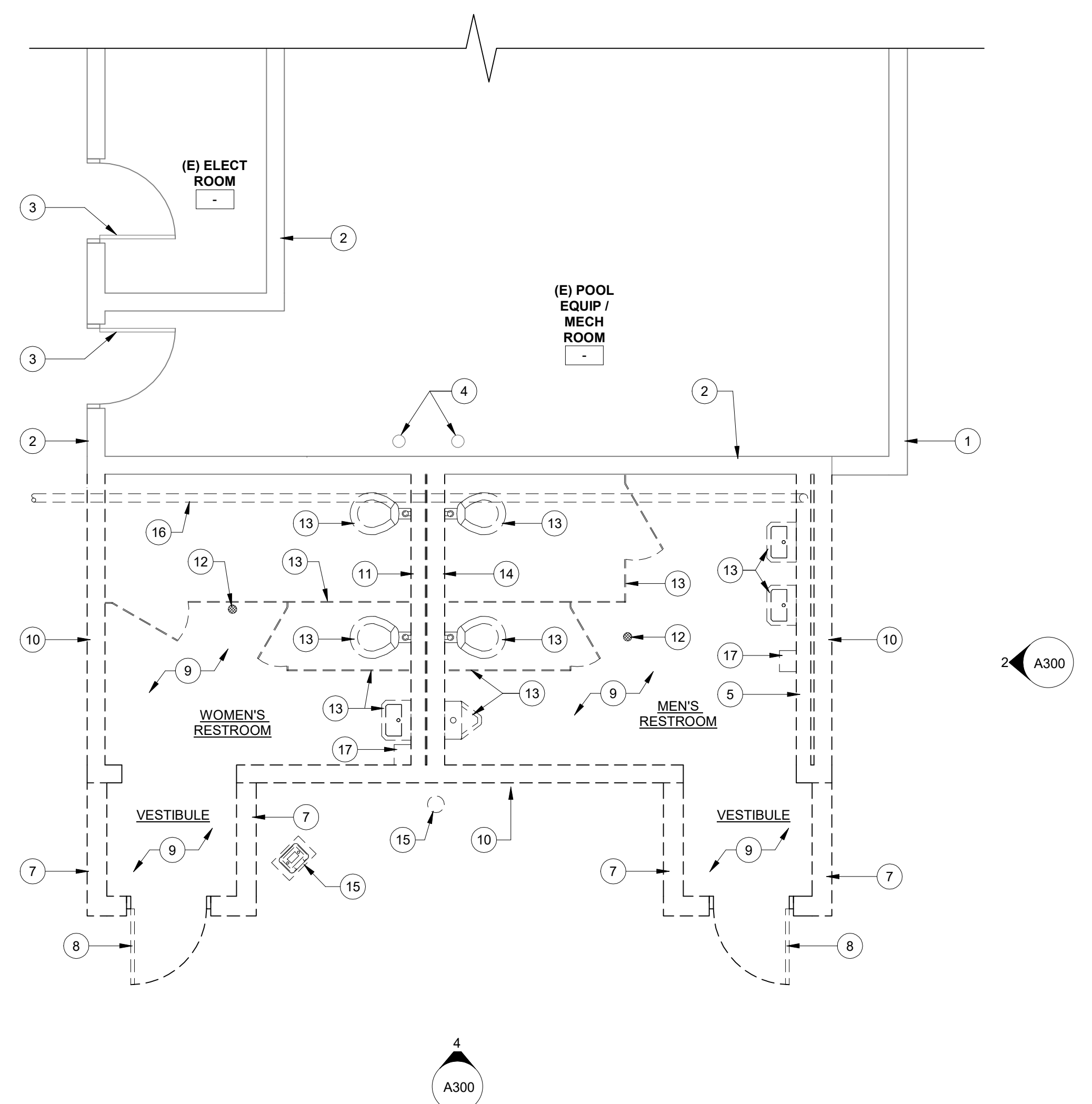


FILE PATH: C:\Users\365281\Documents\SouthPark_Public Restroom Renovation_CENTRAL_365281.rvt
SHEET ISSUE
02/09/10
REVISION DATES (DESIGN STAGE)

THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN



PROPOSED RESTROOM ROOF PLAN
1/4" = 1'-0"



DEMOLITION RESTROOM FLOOR PLAN
1/4" = 1'-0"

PROPOSED KEYNOTE:

- 1 WALL-MOUNTED HAND DRYER BLOWER MOTOR, RUN FLEX HOSE AND CABLE IN FURRED WALL TO THE NOZZLE
2 NEW WALL-MOUNTED VANDAL-RESISTANT ELECTRIC HAND DRYER, MANUF: MURDOCK, TYPE: FASTAIRE, MODEL: 1118-3, SEE DETAIL A13/A230 AND ELECT DRAWING
3 NEW WALL-MOUNTED STAINLESS STEEL VANDAL-RESISTANT THREE STATION HAND WASH BASIN, SEE DETAIL A5/A230 AND PLUMBING DRAWING
4 ROOF CANOPY OUTLINE, SEE ROOF PLAN
5 FLOOR MOUNTED MOP SINK, SEE PLUMBING DRAWING
6 NEW WALL-MOUNTED STAINLESS STEEL MOP / BROOM HOLDER, MANUF: BOBRICK, MODEL: B-223x36, LENGTH: 36" OR APPROVED EQUAL
7 RELOCATED GAS METER, SEE PLUMBING DRAWING
8 FLOOR DRAIN, SEE PLUMBING DRAWING, SLOPE TOPPING SLAB TO DRAIN @ 2% SLOPE

LEGEND

- EXISTING WALL
NEW 2x PARTITION / FURRED WALL (SEE ARCHITECTURAL DRAWING)
8" CONCRETE MASONRY WALL #5 @ 16" O.C. @ CENTER OF WALL, #4 @ 16" O.C.
J-BOX FOR DOOR HARDWARE (EMERGENCY TOUCH PLATE), SEE ELECT DRAWING
F.O.M. FACE OF MASONRY (CMU)
F.O.B.V. FACE OF BRICK VENEER
F.F. FINISH FACE

GENERAL NOTES

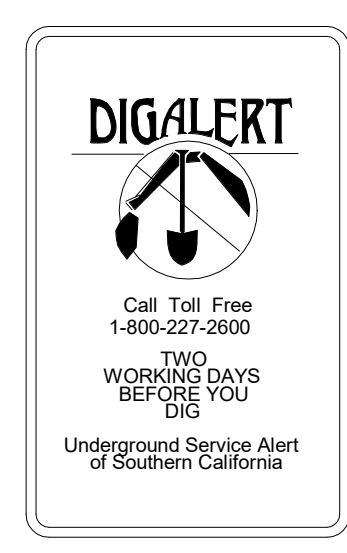
- 1. ALL WORK IS NEW UNLESS OTHERWISE NOTED.
2. THE BUILDING IS NOT EXPOSED TO A NOISE LEVEL OF 65dB Leq- 1HR DURING ANY HOUR OF OPERATION
3. SYMBOL KEY LEGEND, SEE SHEET A002
4. DOWN SPOUT DRAIN SHALL BE 6" ABOVE THE SPLASH BLOCK
5. THE CONSTRUCTION SHALL NOT RESTRICT A FIVE-FOOT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUTION FACILITIES (POWER POLES, PULL-BOXES, TRANSFORMERS, VALVES, PUMPS, VALVES, METERS, APPURTENANCES, ETC) OR TO THE LOCATION OF THE HOOK-UP. THE CONSTRUCTION SHALL NOT BE WITHIN TEN FEET OF ANY POWER LINES-WHETHER OR NOT THE LINES ARE LOCATED ON THE PROPERTY. FAILURE TO COMPLY MAY CAUSE CONSTRUCTION DELAYS AND/OR ADDITIONAL EXPENSES
6. AN APPROVED SEISMIC GAS SHUTOFF VALVE WILL BE INSTALLED ON THE FUEL GAS LINE ON THE DOWNSTREAM SIDE OF THE UTILITY METER AND BE RIGIDLY CONNECTED TO THE EXTERIOR OF THE BUILDING OR STRUCTURE CONTAINING THE FUEL GAS PIPING (PER ORDINANCE 170, 158) (INCLUDES COMMERCIAL ADDITIONS AND TI WORK OVER \$10,000) SEPARATE PLUMBING PERMIT IS REQUIRED
7. PROVIDE ULTRA-LOW FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION. EXISTING SHOWER HEADS AND TOILETS MUST BE ADAPTED FOR LOW WATER CONSUMPTION.
8. A COPY OF THE EVALUATION REPORT AND/OR CONDITIONS OF LISTING SHALL BE MADE AVAILABLE AT THE JOB SITE.

DEMOLITION KEYNOTE:

- 1 EXISTING CMU BLOCK WALL TO REMAIN
2 EXISTING MASONRY WALL TO REMAIN
3 EXISTING DOOR TO REMAIN
4 EXISTING PLUMBING PIPE AND VENT TO REMAIN, SEE PLUMBING DRAWING
5 DEMOLISH EXISTING FURRED WALL
6 NOT USED
7 AT VESTIBULE: DEMOLISH EXISTING CMU BLOCK WALL, WALL FOOTING, AND CUT-BACK ROOF, SEE PROPOSED FLOOR & ROOF PLAN
8 DEMOLISH EXISTING METAL DOOR AND FRAME
9 DEMOLISH EXISTING CONCRETE SLAB ON GRADE
10 DEMOLISH EXISTING MASONRY WALL AND FOOTING, SEE PROPOSED FLOOR PLAN AND STRUCTURAL DRAWING FOR NEW WALL AND FOOTING
11 DEMOLISH EXISTING FURRED WALL AND FOOTING
12 DEMOLISH EXISTING FLOOR DRAIN, SEE PLUMBING DRAWING
13 DEMOLISH EXISTING LAVATORY, URINAL, TOILET, HOT AND COLD WATER LINE, WASTE LINES, VENT LINES, HAND DRYER, MIRROR, TOILET PARTITION, AND ALL ACCESSORIES, TYP.
14 DEMOLISH EXISTING MASONRY WALL AND FOOTING
15 EXISTING GAS METER AND PIPING TO BE RELOCATED, SEE PLUMBING DRAWING
16 EXISTING UNDERGROUND 4" WASTE LINE TO REMAIN, SEE PLUMBING DRAWING
17 DEMOLISH EXISTING WALL-MOUNTED HAND DRYER, SEE ELECT DRAWING FOR WIRING DEMO

LEGEND

- EXISTING WALL TO REMAIN
EXISTING WALL TO BE DEMOLISH



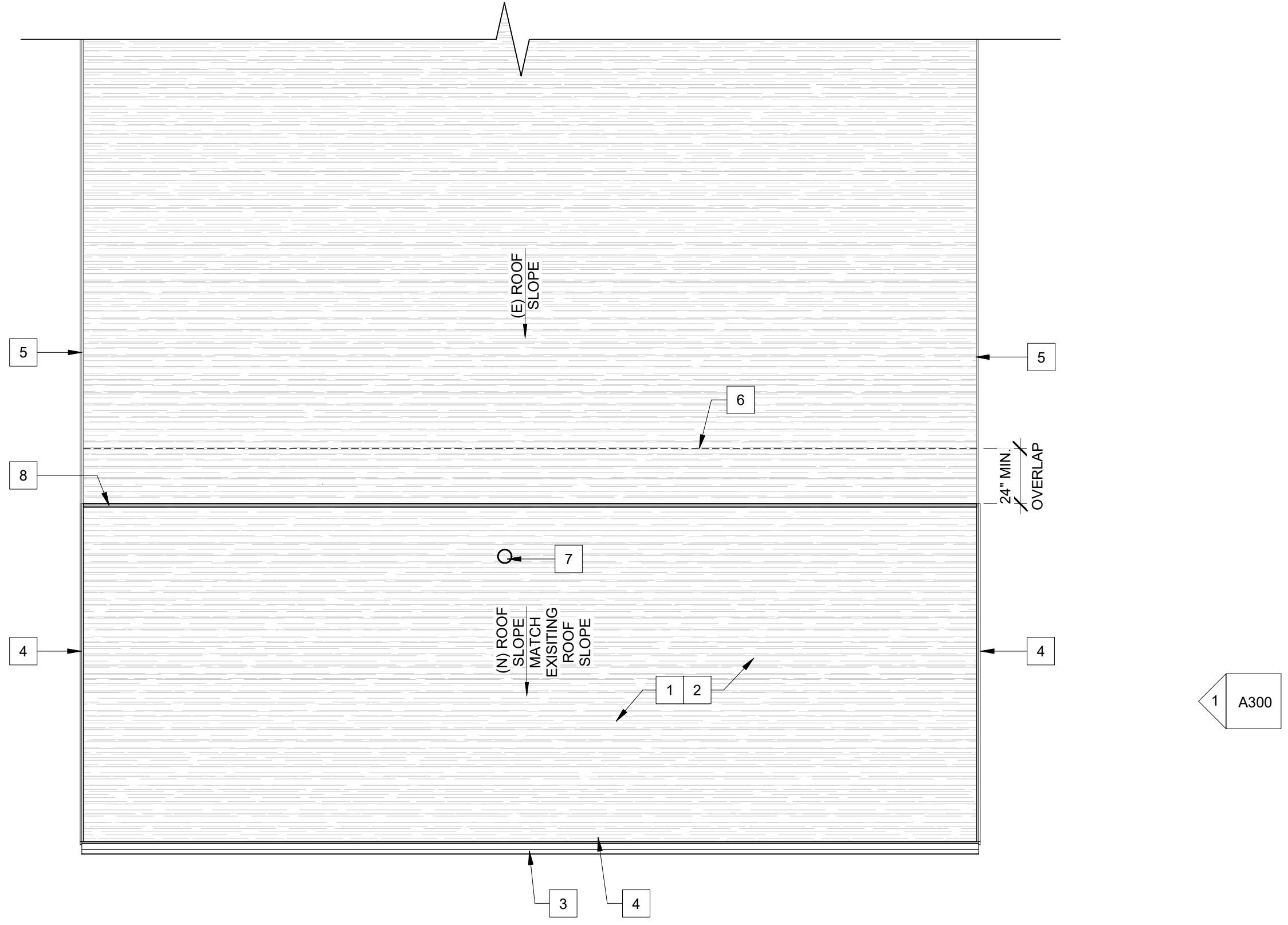
DEMOLITION NOTES

- 1. CONTRACTOR SHALL VISIT AND INSPECT THE SITE PRIOR TO COMMENCING ANY DEMOLITION WORK ON THE SITE TO CONFIRM LOCATIONS OF OBJECTS TO REMAIN OR BE DEMOLISHED.
2. SEE SITE SURVEY PLAN FOR LOCATION OF ITEMS NOT SHOWN ON THIS PLAN.
3. ALL STREET SIGNS, UTILITIES, POWER & LIGHT POLES, LOCATED IN THE PUBLIC SIDEWALK, PARKWAY OR OUTSIDE OF THE PROJECT PROPERTY LINE SHALL REMAIN IN PLACE AND PROTECTED UNLESS OTHERWISE DIRECTED BY THESE PLANS OR CITY ENGINEER.
4. ANY DISCREPANCIES BETWEEN THIS PLAN AND THE SITE SHALL BE BROUGHT TO THE ATTENTION OF THE CITY ENGINEER FOR CLARIFICATION. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES OR UNAUTHORIZED DEMOLITION.
5. ALL ITEMS INDICATED TO BE REMOVED SHALL BE DEMOLISHED AND REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER.
6. IN ADDITION TO ITEMS SHOWN ON THE PLAN THE CONTRACTOR SHALL REMOVE AND DISPOSE OF LEGALLY OFF-SITE ANY VEGETATION (INCLUDING GRASS, SHRUBS & ROOTS), TREE STUMPS AND ROOTS, MASONRY, CONCRETE, FENCE POST FOOTINGS, RUBBISH, DEBRIS, ABANDONED UTILITY LINES, AND OTHER OBJECTIONABLE OBJECTS FOUND EXISTING ON THE SITE.
7. ALL TREES TO BE REMOVED SHALL BE CUT DOWN ON SITE AND STUMPS REMOVED. SEE GRADING PLAN. CONTRACTOR HAS THE OPTION TO RELOCATE TREES AT THEIR OWN EXPENSE WITH APPROVAL OF THE CITY ENGINEER AND IF SUCH OPERATION DOES NOT INTERFERE WITH CONSTRUCTION OPERATIONS OR THE PROJECT SCHEDULE.
8. EXISTING SITE SOIL SHALL REMAIN ON-SITE FOR GRADING PURPOSES UNLESS OTHERWISE DIRECTED BY THE CITY ENGINEER. ON-SITE CLAY SOILS SHALL BE REMOVED FROM THE SITE OR USED AS BACKFILL ONLY IN NON-STRUCTURAL AREAS. ALL EARTH WORK SHALL CONFORM TO THE LANDSCAPE DRAWINGS, SPECIFICATIONS, BUILDING DEPARTMENT REQUIREMENTS, AND GEOTECHNICAL ENGINEER'S DIRECTIONS.
9. NOT ALL AREA REQUIRING DEMOLITION IS NOTED ON THE DEMOLITION PLANS. IT'S THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE ITSELF WITH THE PLANS FOR THE NEW WORK THAT MIGHT CAUSE DEMOLITION THAT IS NOT NOTED ON THE DEMOLITION PLANS. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ANY TIME EXTENSION OR MONETARY COMPENSATION DUE TO SUCH CONDITION.
10. NON-RESIDENTIAL ADDITIONS AND ALTERATIONS SHALL REQUIRE VERIFICATION THAT CALIFORNIA PROHIBITED UNIVERSAL WASTE MATERIALS ARE DISPOSED OF PROPERTY AND DIVERTED FROM LANDFILLS (2017 LAGBC: 5-408.2). SEE SHEET G004 FOR UNIVERSAL WASTE FACT SHEET.

Vertical sidebar containing: CITY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING, PROJECT INFORMATION (SHEET, PROJECT, ADDRESS), ARCHITECTURAL DIVISION (ARCHITECT, DESIGNED, DRAWN, CHECKED, APPROVED), CITY ENGINEER (DATE, CITY ENGINEER), and INDEX (NO, REVISION DESCRIPTION, DATE, BUILDING).

WORK ORDER E1908366, PLAN FILE, DRAWING A200, SHEET 14 OF 45, PLOTTED 6/3/2019 10:05:00 AM

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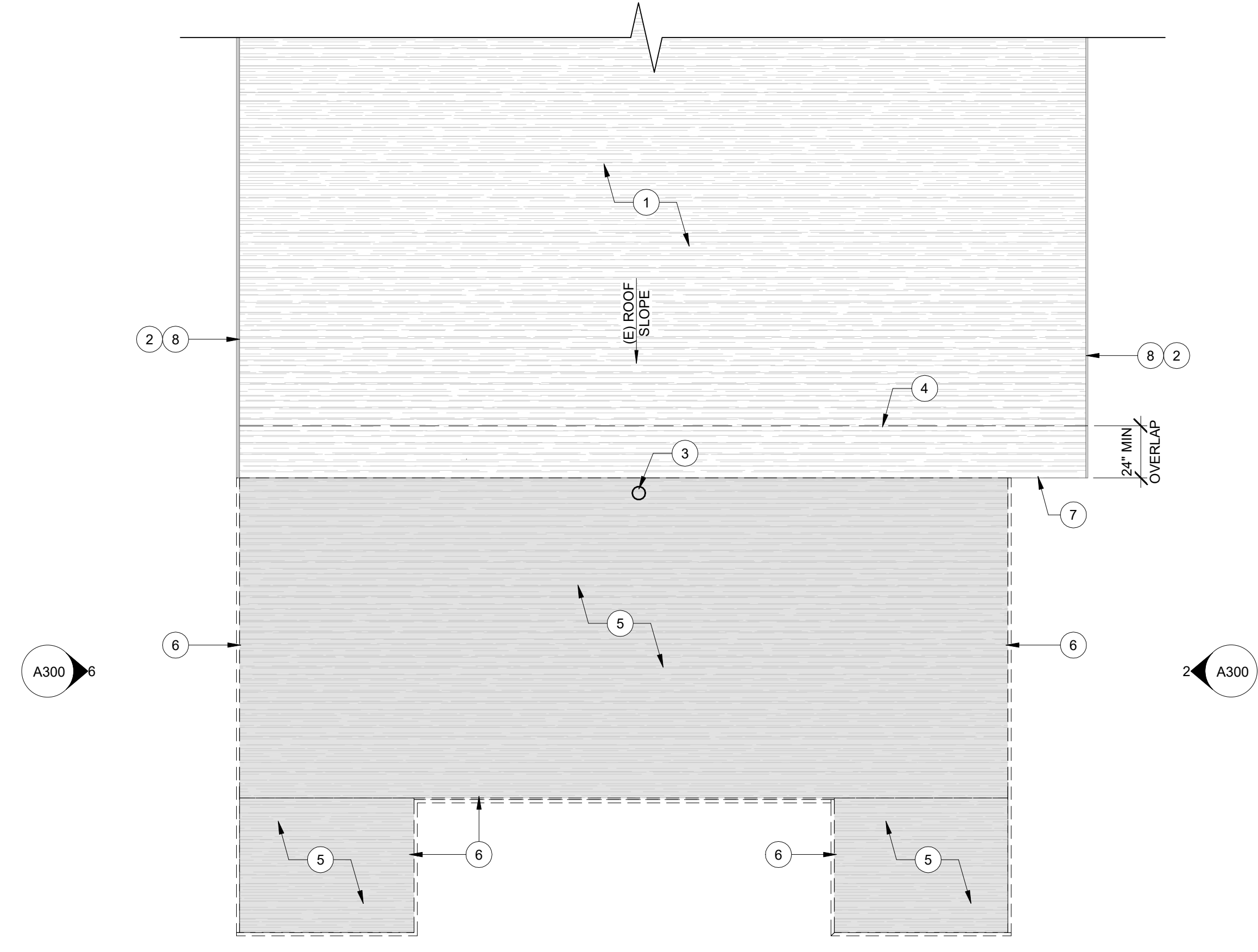
PROPOSED RESTROOM ROOF PLAN
1/4" = 1'-0"

PROPOSED KEYNOTE:

- 1 NEW ROOF FRAMING, ATTACH, ALIGN, AND MATCH EXISTING ROOF SLOPE, SEE ROOF DETAILS AND STRUCTURAL DRAWING
- 2 NEW CLASS 'A' ROOF SHINGLE WITH ROOFING SHIELD UNDERLAYMENT, MATCH TO EXISTING SHINGLE STYLE, COLOR, AND FINISHES
- 3 NEW METAL 'K'-STYLE RAIN GUTTER WITH DOWN SPOUT, PAINT TO MATCH COLOR OF ROOF FASICA TRIM, PROVIDE CONCRETE SPLASH BLOCK AT DOWN SPOUT
- 4 NEW EXTERIOR WALL AND PLASTER w/ BUILDING PAPER, FASICA BOARD TRIM, MATCH TO EXISTING FASICA TRIM SIZE AND PAINT COLOR, SEE PROPOSED ELEVATION AND DETAILS
- 5 WHERE REQUIRED, REPLACE AND INSTALL NEW METAL ROOF DRIP EDGE FLASHING AT ROOF EDGES, PAINT TO MATCH COLOR OF ROOF FASICA TRIM
- 6 CUTBACK EXISTING ROOF SHINGLES, INSTALL NEW ROOF SHINGLE AND ROOFING WATERPROOF SHIELD
- 7 NEW VENT PIPE WITH MEMBRANE FLASHING, SEE DETAIL A13 / A503 AND PLUMBING DRAWING
- 8 EXPANSION JOINT ROOF COVER, SEE DETAIL A5 / A503

GENERAL NOTES

- 1. ALL WORK IS NEW UNLESS OTHERWISE NOTED.
- 2. SYMBOL KEY LEGEND, SEE SHEET A002
- 3. DOWN SPOUT DRAIN SHALL BE 6" ABOVE THE CONCRETE SPLASH BLOCK



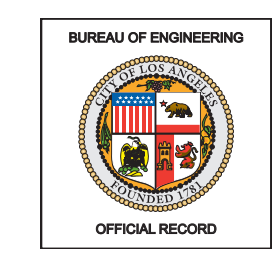
DEMOLITION RESTROOM ROOF PLAN
1/4" = 1'-0"

DEMOLITION KEYNOTE:

- 1 EXISTING ROOF SHINGLES TO REMAIN, U.N.O. SEE PROPOSED ROOF PLAN
- 2 EXISTING WALL AND ROOF FASICA BOARD TRIM AND EXTERIOR WALL PLASTER TO REMAIN, SEE DEMO ELEVATION
- 3 DEMOLISH EXISTING PLUMBING VENT PIPE, SEE PLUMBING DRAWING
- 4 CUT-BACK EXISTING ROOFING SHEATHING, ROOF SHINGLES, AND WATERPROOF MEMBRANE, PROVIDE TEMPORARY WEATHER AND RAIN PROTECTION COVER, SEE DEMO AND PROPOSED FLOOR, ROOF, AND STRUCTURAL DRAWING
- 5 SHADED AREA: DEMOLISH EXISTING INTERNAL FLAT (CEILING JOIST) AND EXTERIOR SLOPE ROOF FRAMING AND ASSEMBLY, SEE PROPOSED ROOF PLAN AND STRUCTURAL DRAWING
- 6 DEMOLISH EXISTING WALL FRAMING AT ABOVE EXISTING MASONRY WALL. SEE DEMO & PROPOSED ELEVATION, PROPOSED ROOF PLAN AND STRUCTURAL DRAWING
- 7 CAREFULLY REMOVE EXISTING EXTERIOR WALL PLASTER AND ROOF FASICA TRIM AT ROOF EDGE WHERE NEW ROOF SOFFIT OCCURS, EXISTING WALL FRAMING WHERE NEW ROOF SOFFIT OCCUR TO REMAIN, SEE DEMO & PROPOSED ELEVATION, PROPOSED ROOF PLAN AND STRUCTURAL DRAWING
- 8 CONTRACTOR TO VERIFY EXISTING ROOF DRIP EDGE FLASHING CONDITION, IF REPAIR REQUIRED, CAREFULLY REMOVE EXISTING ROOF DRIP EDGE FLASHING AND REPLACE WITH NEW ROOF DRIP EDGE FLASHING

DEMOLITION NOTES

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BUREAU OF ENGINEERING
CITY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS
GARY LEE MOORE, PE, ENV SP
ARCHITECT: ROBERT LOWELIN LIC. NO.: 23333
DESIGNED: MARCUS YEE
DRAWN: MARCUS YEE
CHECKED: ROBERT LOWELIN
APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

WORK ORDER
E1908366
PLAN FILE

DRAWING
A210
SHEET 15 OF 45

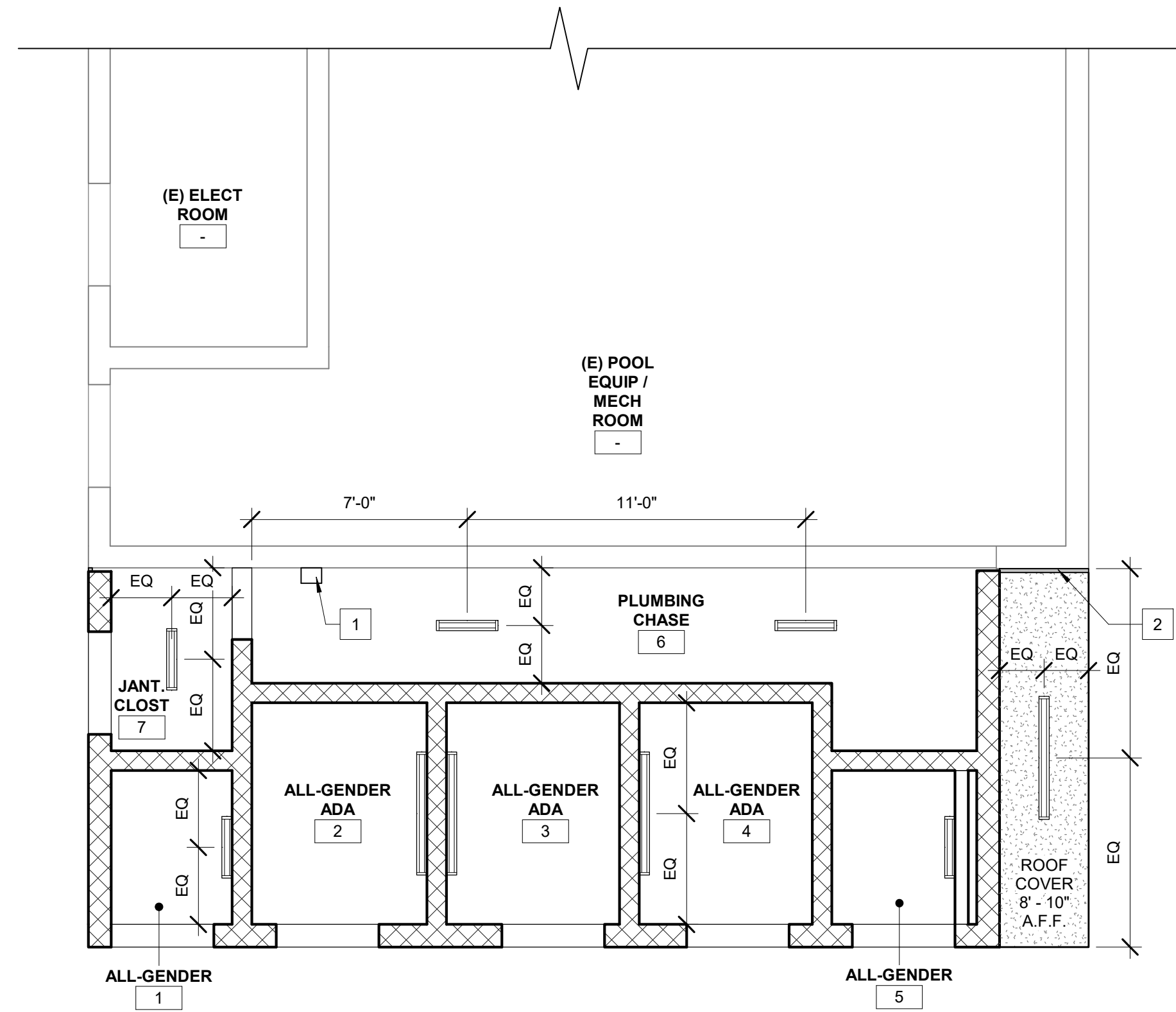
INDEX
NO. REVISION DESCRIPTION DATE BY

RP-300113

CLIENT: RECREATION AND PARKS
GENERAL MANAGER: MICHAEL A. SHULL
PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
ADDRESS: 345 EAST 51ST STREET
LOS ANGELES, CA 90011

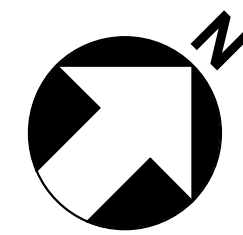
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TLB TEMPLATE REVISION DATE: 05/07/18
SHEET ISSUE



PROPOSED REFLECTED CEILING PLAN

1/4" = 1'-0"

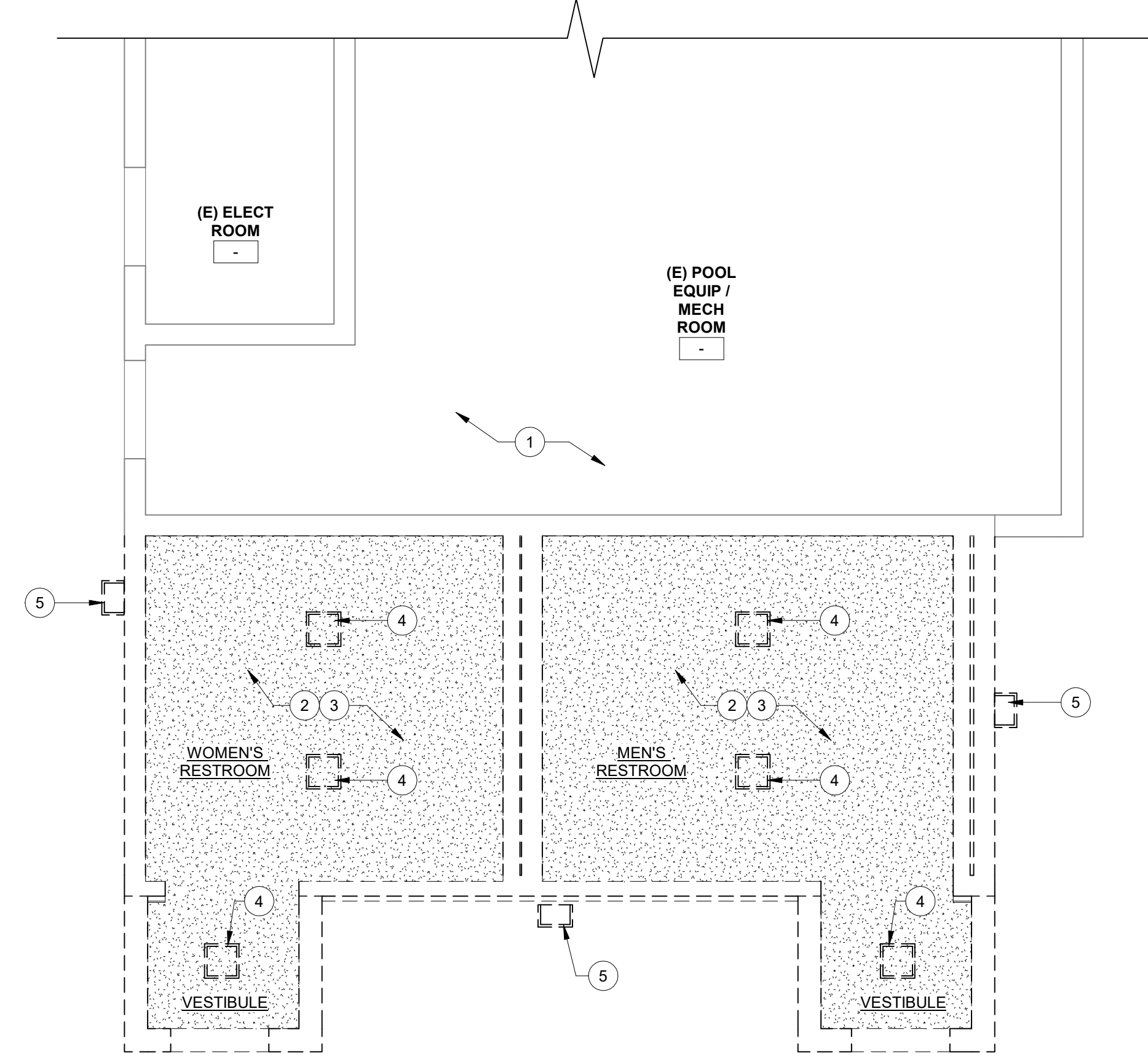


PROPOSED KEYNOTE:

- 1 TIME CLOCK, SEE ELECTRICAL DRAWING
- 2 EXTERIOR EXPANSION JOINT COVER AT SOFFIT, MANUF: CS (CONSTRUCTION SPECIALTIES), TYPE: FOAM SEAL, MODEL: VF, MATCH EXTERIOR BUILDING COLOR, SEE SIM DETAIL A9 / A320

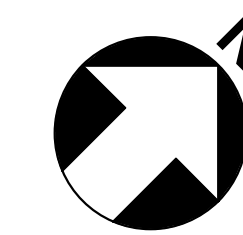
LEGEND

- PLASTER CEILING
 - WALL / CEILING / PENDANT MOUNTED LIGHT FIXTURE (2' LONG)
 - WALL / CEILING / PENDANT MOUNTED LIGHT FIXTURE (4' LONG)
- NOTE: FOR LIGHT FIXTURE TYPE, SEE ELECTRICAL DRAWING



DEMOLITION REFLECTED CEILING PLAN

1/4" = 1'-0"

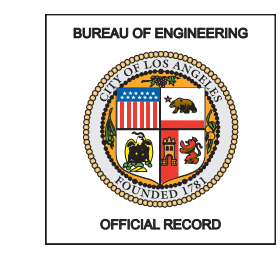


DEMOLITION KEYNOTE:

- 1 EXISTING OPEN CEILING TO REMAIN
- 2 DEMOLISH EXISTING CEILING PLASTER AND PLYWOOD SHEATHING
- 3 DEMOLISH EXISTING ROOF/CEILING JOIST, SEE DEMO ROOF PLAN AND STRUCTURAL DRAWING
- 4 DEMOLISH EXISTING CEILING MOUNTED LIGHT FIXTURE, SEE ELECTRICAL DRAWING
- 5 DEMOLISH EXISTING EXTERIOR WALL-MOUNTED LIGHT FIXTURE, SEE ELECTRICAL DRAWING

DEMOLITION NOTES

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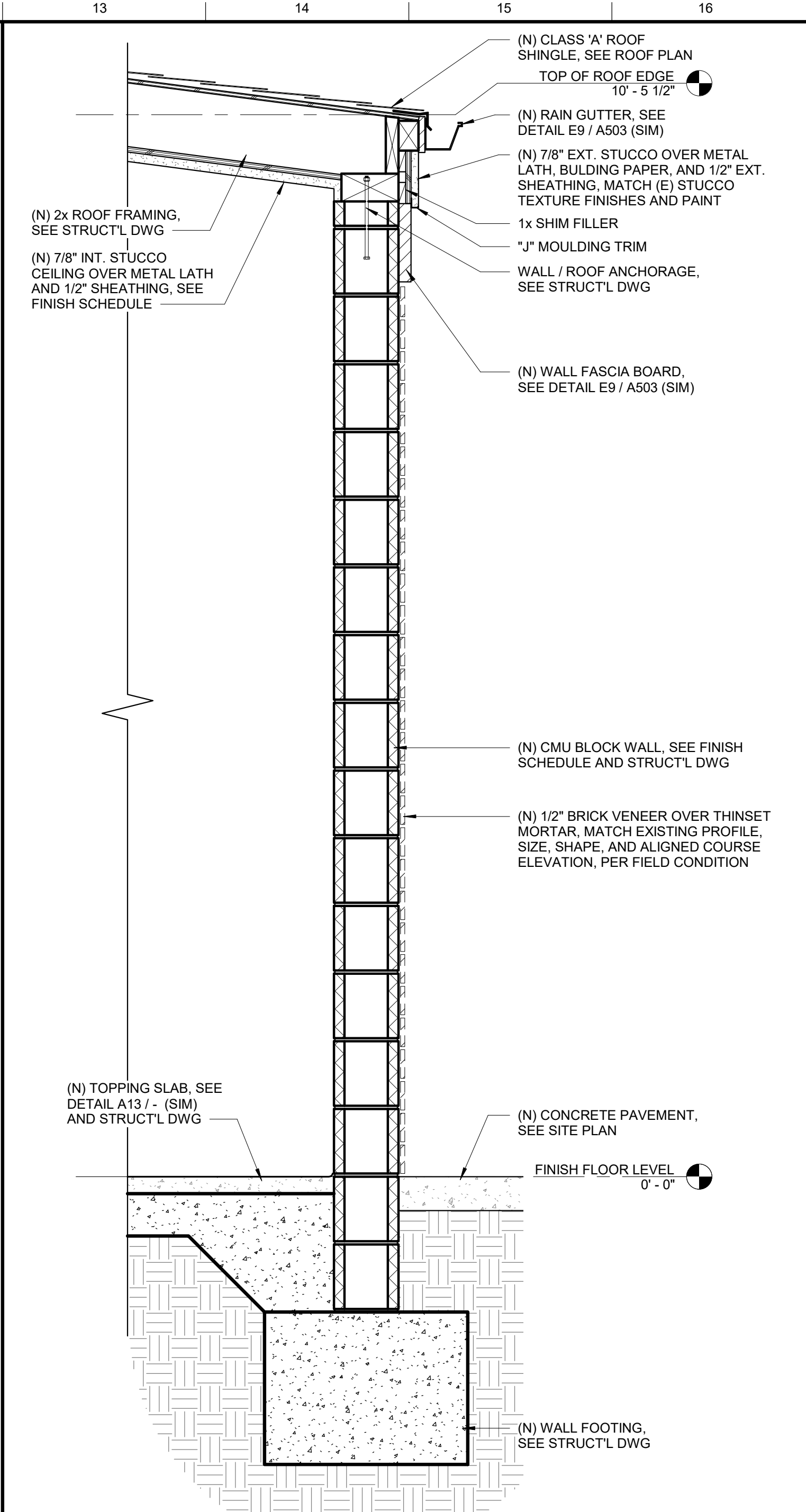
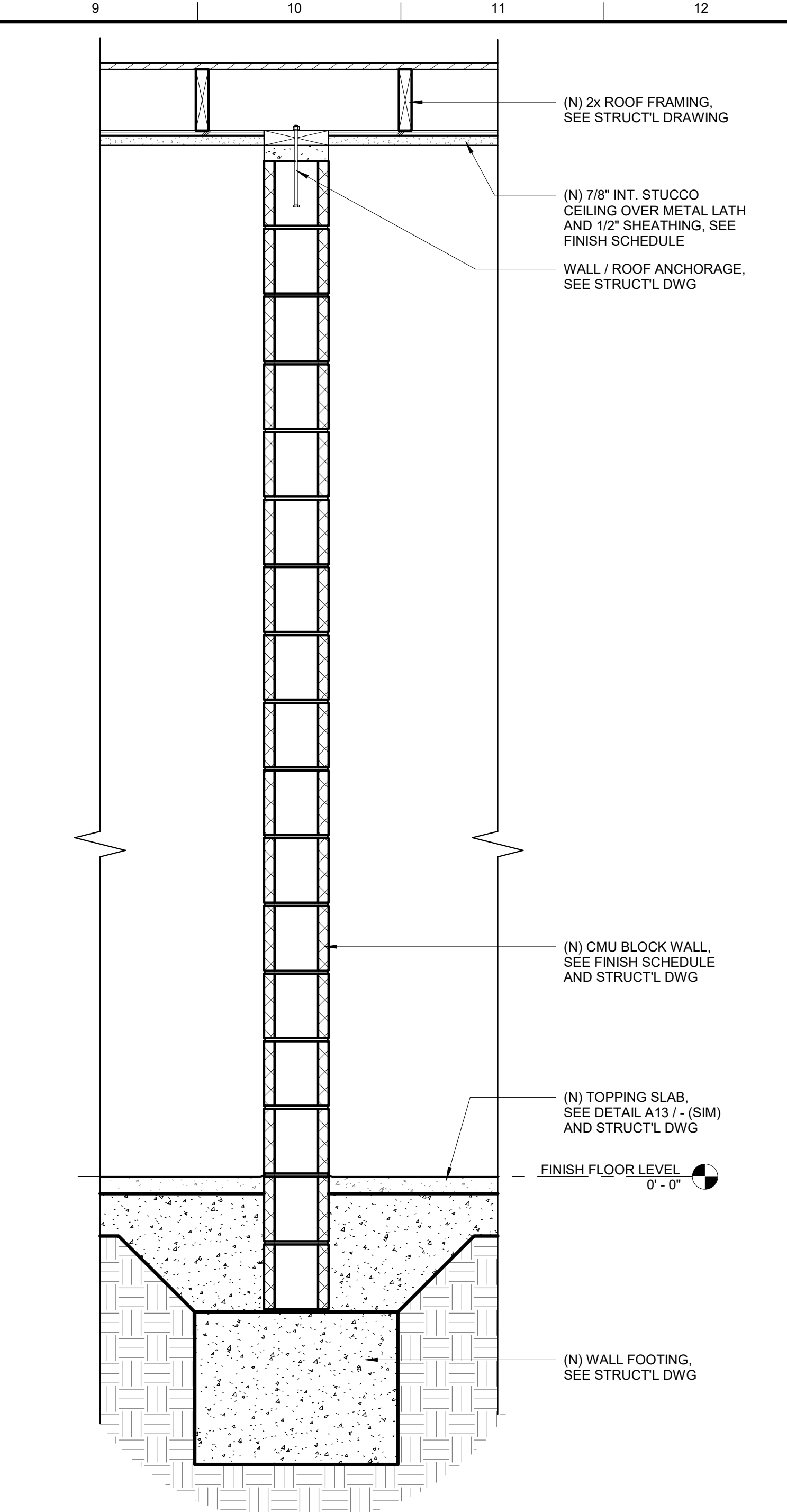
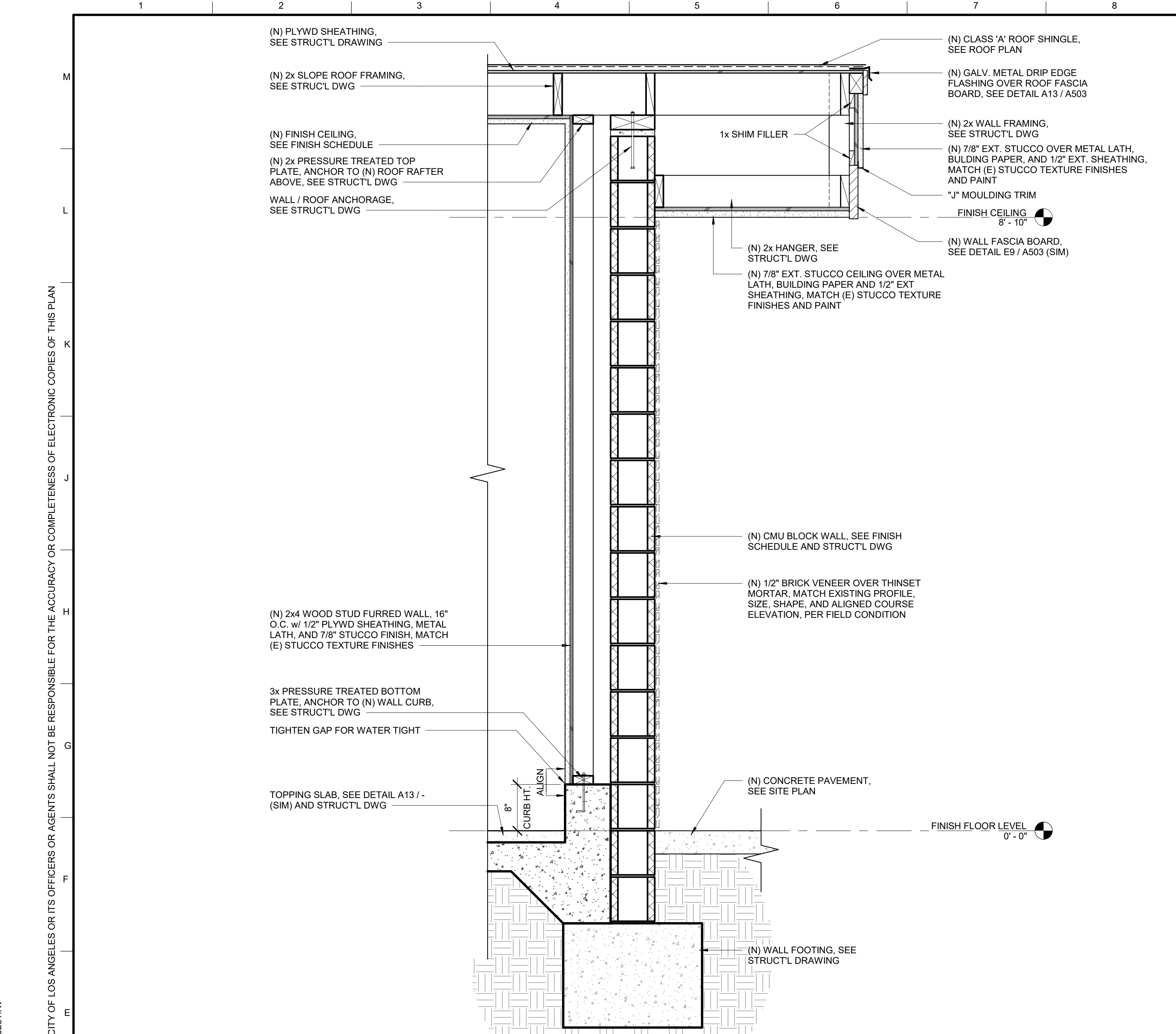
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TLB TEMPLATE REVISION DATE: 05/07/18
SHEET ISSUE

REVISION STATUS
(DESIGN STAGE)

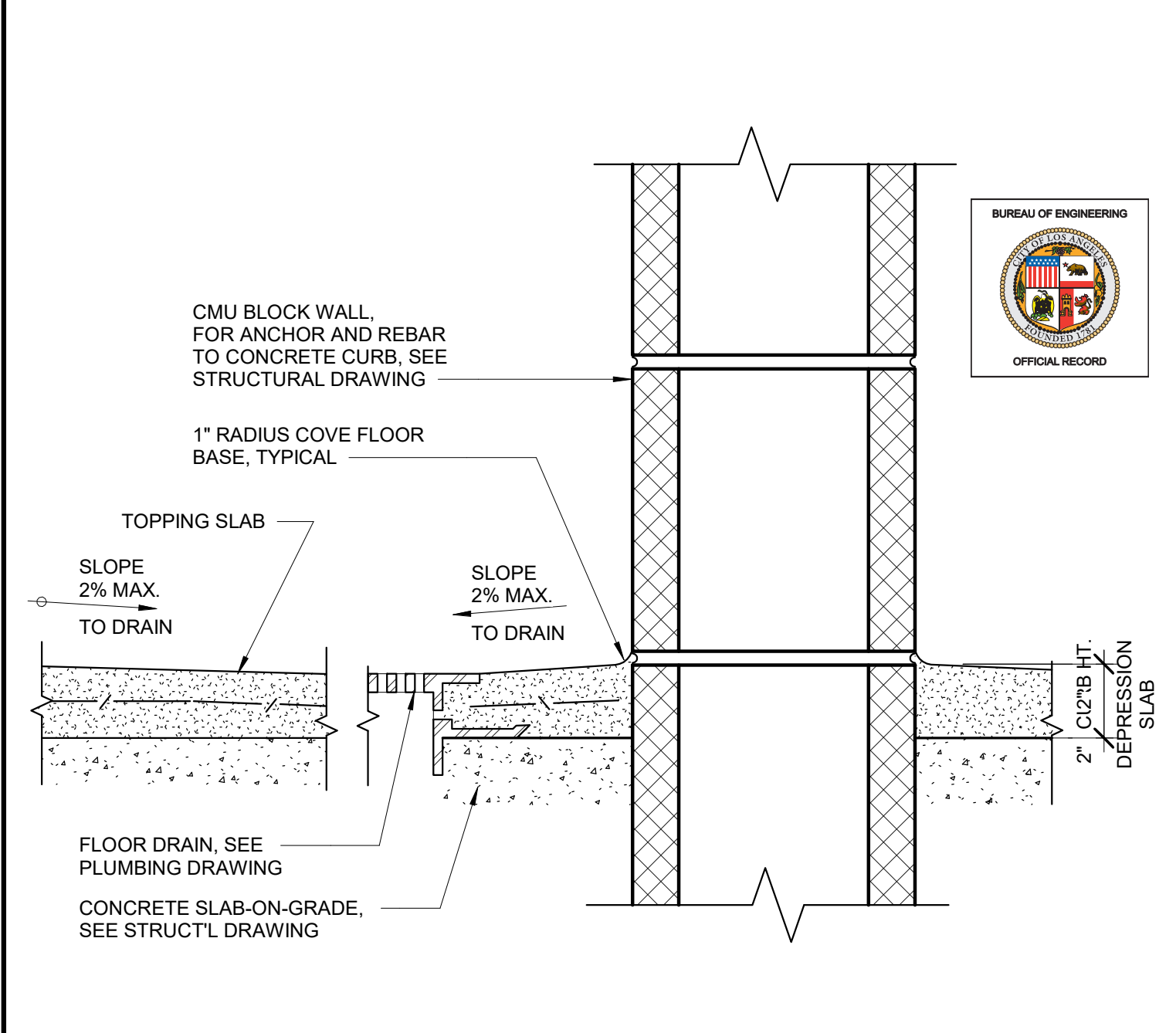
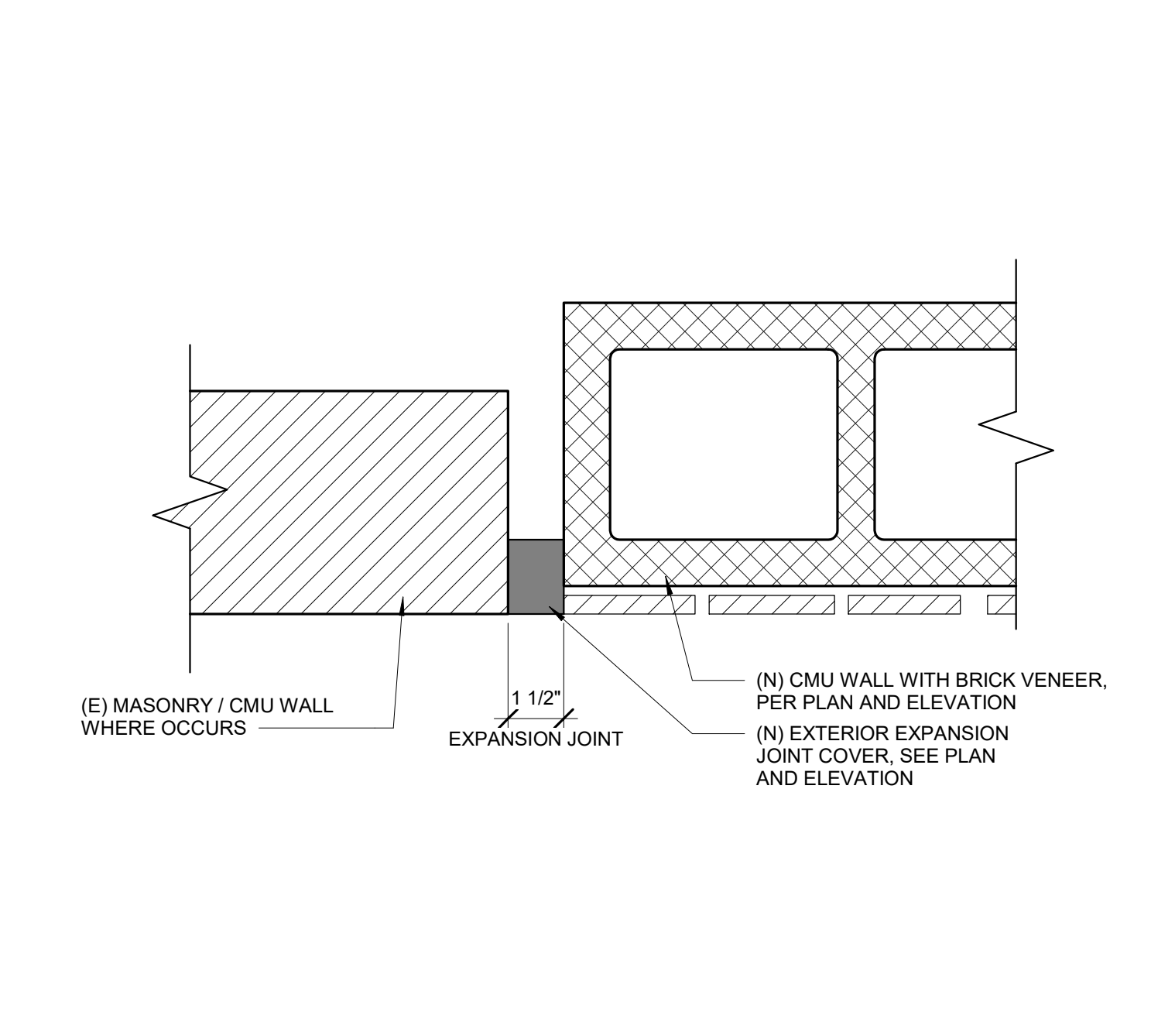
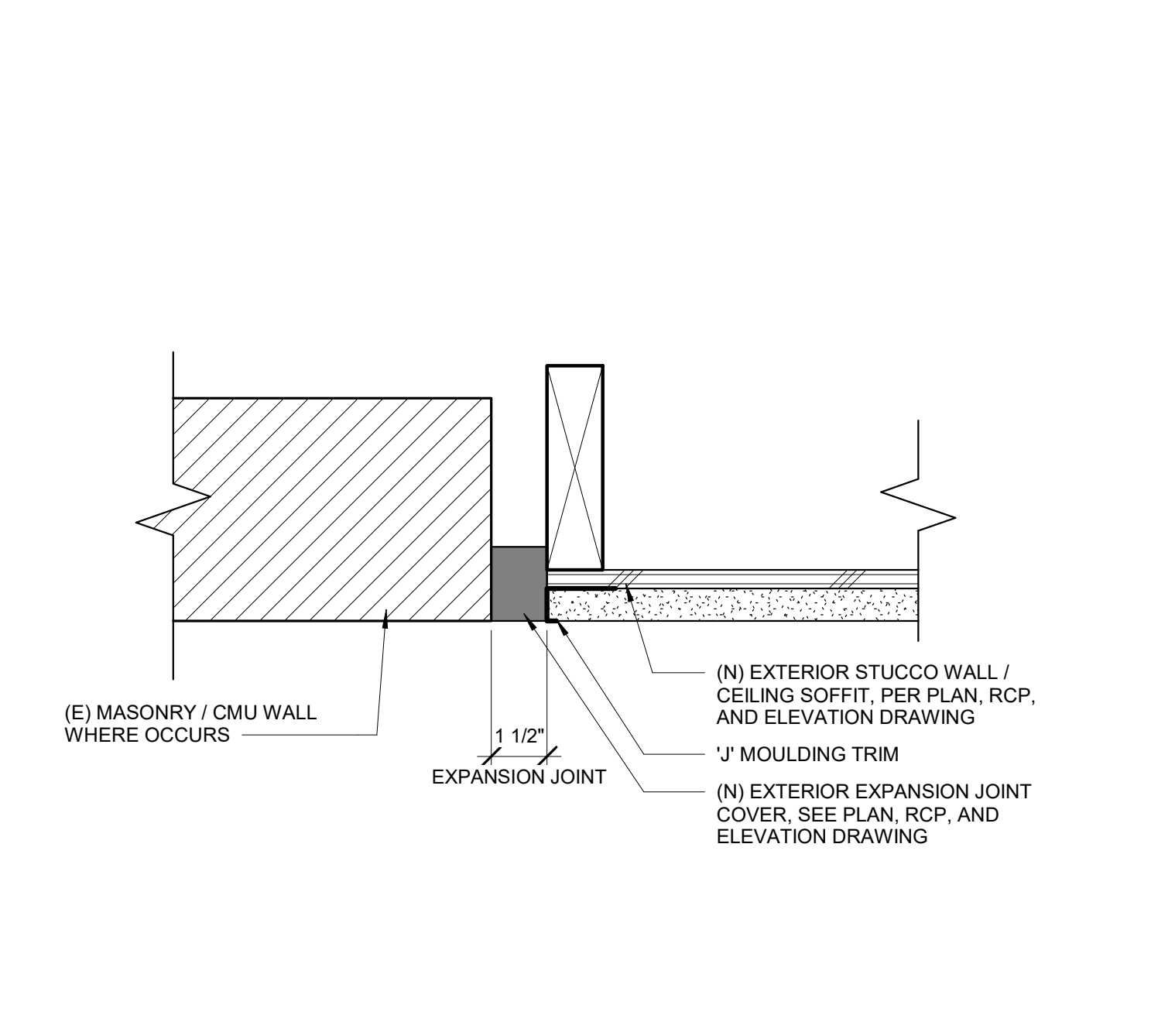
BUREAU OF ENGINEERING																			
ENGINEERING	CITY OF LOS ANGELES																		
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GARY LEE MOORE, PE, ENV SP	05/07/2019																		
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ROBERT LOWELIN	23333																		
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MARCUS YEE	MARCUS YEE	ROBERT LOWELIN	MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER																
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WORK ORDER	E1908366																		
PLAN FILE																			
DRAWING	A220																		
SHEET 16	OF 45																		



E1 WALL SECTION - ROOF COVER (EAST)
1" = 1'-0" 1/A310

E9 WALL SECTION - INTERIOR
1" = 1'-0" 1/A310

E13 WALL SECTION - EXTERIOR (SOUTH)
1" = 1'-0" 2/A310



A5 EXPANSION JOINT AT WALL/SOFFIT DETAIL, TYP.
3" = 1'-0"

A9 EXPANSION JOINT AT MASONRY WALL DETAIL, TYP.
3" = 1'-0"

A13 TOPPING FLOOR AT DRAIN DETAIL
3" = 1'-0"

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 FILE PATH: C:\Users\365281\Documents\SouthPark_Public Restroom Renovation_CENTRAL_365281.rvt
 TTB TEMPLATE REVISION DATE: 02/22/18
 SHEET ISSUE
 REVISIONS
 NO. DESCRIPTION
 DATE BY

BUREAU OF ENGINEERING
DEPARTMENT OF PUBLIC WORKS
GARY LEE MOORE, PE, ENV SP
 ARCHITECTURAL DIVISION
 ARCHITECT: ROBERT LOWEIN
 DESIGNED: MARCUS YEE
 DRAWN: MARCUS YEE
 CHECKED: ROBERT LOWEIN
 APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

CITY OF LOS ANGELES
 CLIENT: RECREATION AND PARKS
 GENERAL MANAGER: MICHAEL A. SHULL
 SHEET: WALL SECTION
 PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
 ADDRESS: 345 EAST 51ST STREET, LOS ANGELES, CA 90011
 WORK ORDER: E1908366
 PLAN FILE
 DRAWING: **A320**
 SHEET 20 OF 45
 PLOTTED 6/3/2019 10:05:17 AM

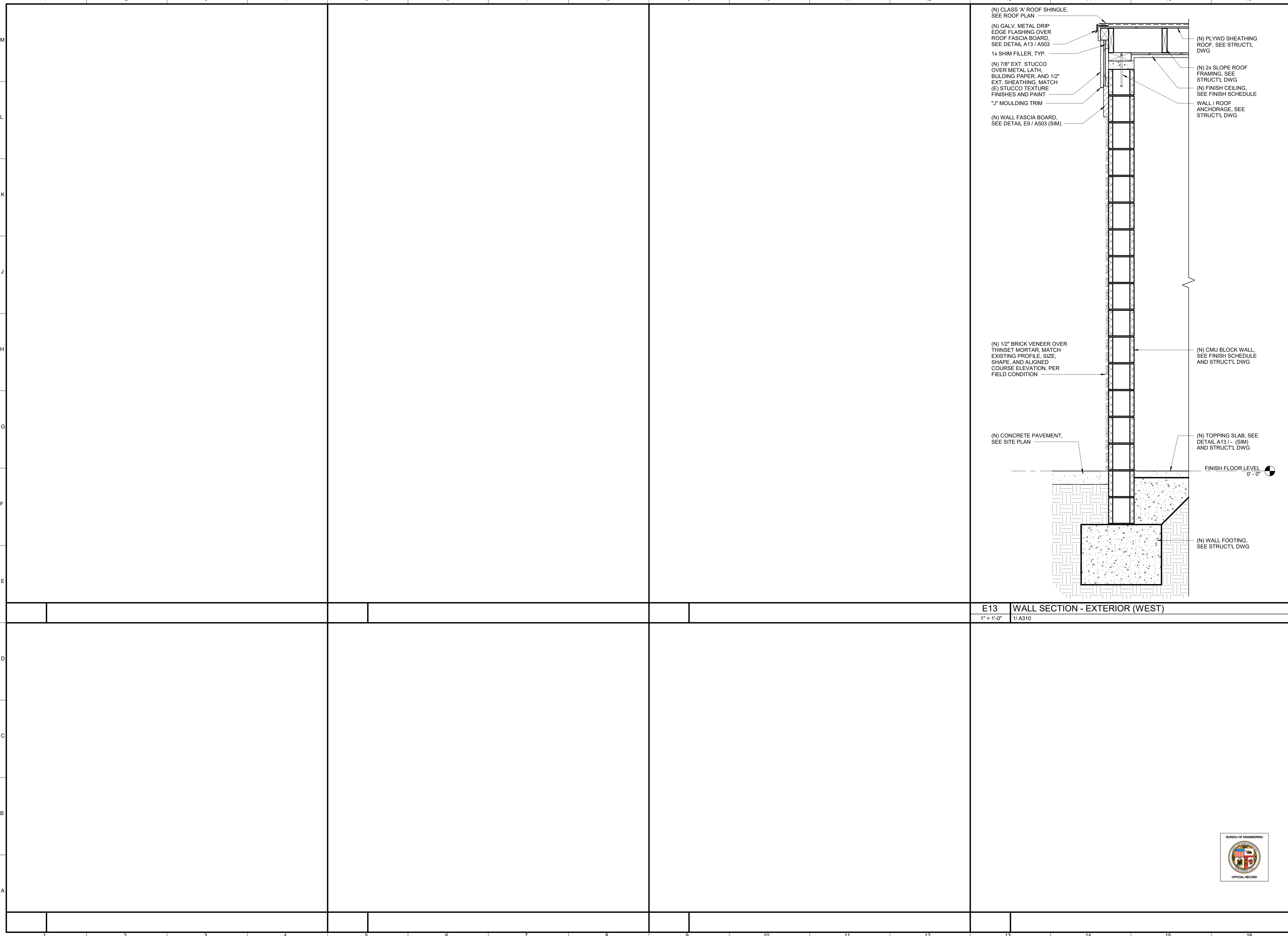
NO. REVISION DESCRIPTION
 DATE BY
 INDEX: BUILDING RP-300113

TLB TEMPLATE REVISION DATE: 04/29/19
SHEET ISSUE

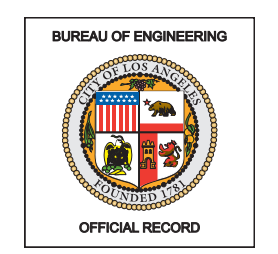
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REVISION STATUS
(DESIGN STAGE)



E13 WALL SECTION - EXTERIOR (WEST)
1" = 1'-0" 1/4 A310



BUREAU OF ENGINEERING
ENGINEERING
CITY OF LOS ANGELES

NO.	REVISION DESCRIPTION	DATE	BY

INDEX	RP-300113
BUILDING	

ARCHITECT	DESIGNED	DRAWN	CHECKED	APPROVED
ROBERT LOWELIN	MARCUS YEE	MARCUS YEE	ROBERT LOWELIN	MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

CITY ENGINEER	DATE
	05/07/2019
	05/07/2019
	05/07/2019
	05/07/2019

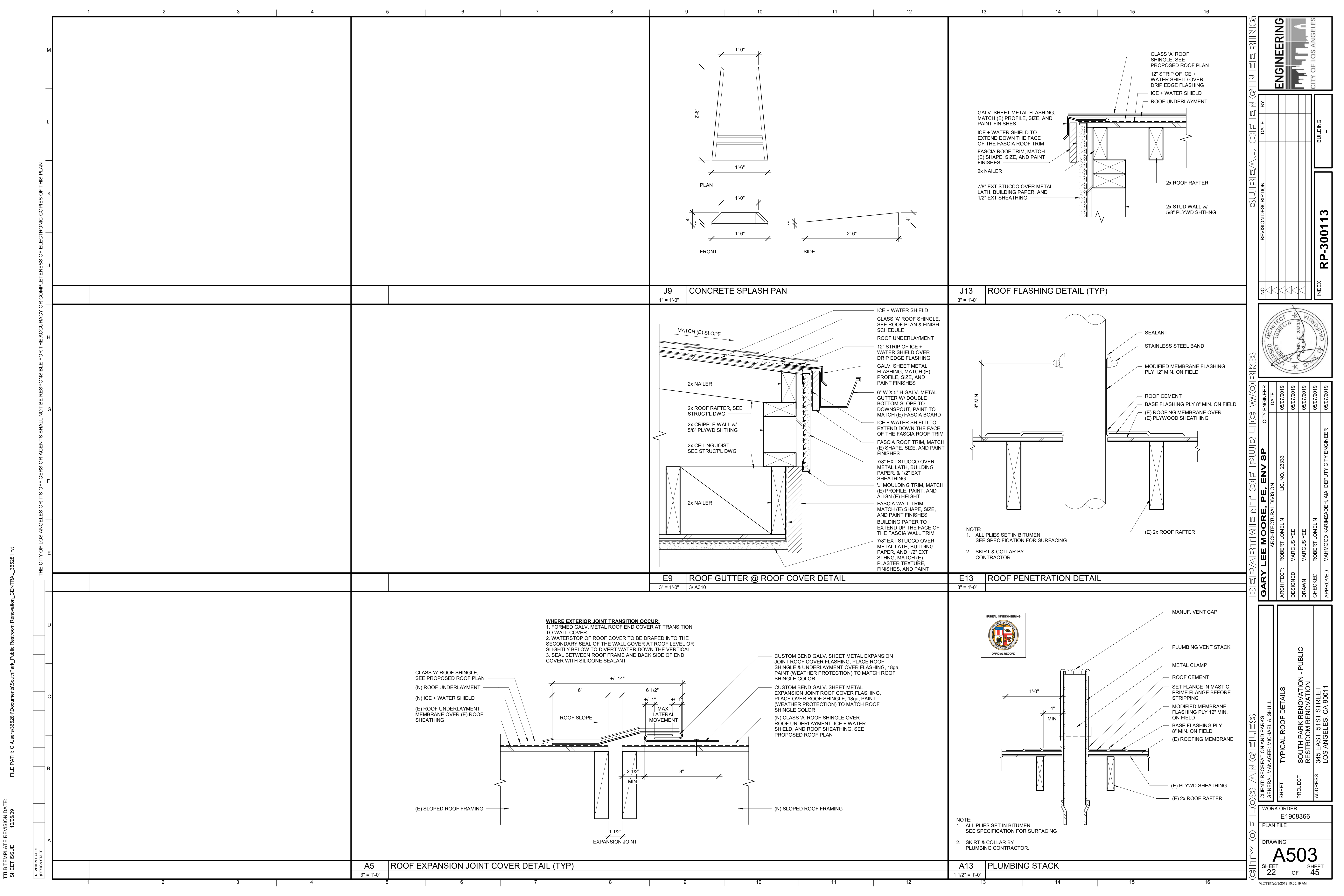
ARCHITECTURAL DIVISION	LIC. NO.: 23333
------------------------	-----------------

PROJECT	SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
ADDRESS	345 EAST 51ST STREET LOS ANGELES, CA 90011

CLIENT: RECREATION AND PARKS GENERAL MANAGER: MICHAEL A. SHULL

WORK ORDER E1908366
PLAN FILE
DRAWING A321
SHEET 21 OF 45

CITY OF LOS ANGELES
PLOTTED 6/3/2019 10:05:17 AM



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 T:\B\TEMPLATE REVISION DATE: 10/06/09
 SHEET ISSUE

REVISION STATUS (DESIGN STAGE)

WHERE EXTERIOR JOINT TRANSITION OCCUR:
 1. FORMED GALV. METAL ROOF END COVER AT TRANSITION TO WALL COVER.
 2. WATERSTOP OF ROOF COVER TO BE DRAPED INTO THE SECONDARY SEAL OF THE WALL COVER AT ROOF LEVEL OR SLIGHTLY BELOW TO DIVERT WATER DOWN THE VERTICAL.
 3. SEAL BETWEEN ROOF FRAME AND BACK SIDE OF END COVER WITH SILICONE SEALANT

BUREAU OF ENGINEERING

NO. _____

REVISION DESCRIPTION

DATE

BY

ENGINEERING

CITY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

CITY ENGINEER

GARY LEE MOORE, PE, ENV SP

DATE: 09/07/2019

ARCHITECT: ROBERT LOWELIN LIC. NO.: 23333

DESIGNED: MARCUS YEE

DRAWN: MARCUS YEE

CHECKED: ROBERT LOWELIN

APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

CITY OF LOS ANGELES

CLIENT: RECREATION AND PARKS

GENERAL MANAGER: MICHAEL A. SHULL

SHEET: TYPICAL ROOF DETAILS

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION

ADDRESS: 345 EAST 51ST STREET LOS ANGELES, CA 90011

WORK ORDER

E1908366

PLAN FILE

DRAWING

A503

SHEET 22 OF 45

ROOM FINISH SCHEDULE

NO.	ROOM NAME	PERIMETER	AREA	FLOOR	BASE	WALLS				REMARKS	CEILING			REMARKS
						NORTH	EAST	SOUTH	WEST		TYPE	HEIGHT	FINISH	
1	ALL-GENDER	17'-10"	20 SF	CONC	CR	CMU/PT1	CMU/PT1	CMU/PT1	CMU/PT1	PROVIDE ANTI-GRAFFITI COATING @ WALLS (TOP & BOTT) & DOORS	PLYWD	SLOPED	STUC	
2	ALL-GENDER ADA	25'-9"	41 SF	CONC	CR	CMU/PT1	CMU/PT1	CMU/PT1	CMU/PT1	PROVIDE ANTI-GRAFFITI COATING @ WALLS (TOP & BOTT) & DOORS	PLYWD	SLOPED	STUC	
3	ALL-GENDER ADA	25'-8"	40 SF	CONC	CR	CMU/PT1	CMU/PT1	CMU/PT1	CMU/PT1	PROVIDE ANTI-GRAFFITI COATING @ WALLS (TOP & BOTT) & DOORS	PLYWD	SLOPED	STUC	
4	ALL-GENDER ADA	25'-8"	40 SF	CONC	CR	CMU/PT1	CMU/PT1	CMU/PT1	CMU/PT1	PROVIDE ANTI-GRAFFITI COATING @ WALLS (TOP & BOTT) & DOORS	PLYWD	SLOPED	STUC	
5	ALL-GENDER	19'-5"	24 SF	CONC	CR	CMU/PT1	CMU/PT1	CMU/PT1	CMU/PT1	PROVIDE ANTI-GRAFFITI COATING @ WALLS (TOP & BOTT) & DOORS	PLYWD	SLOPED	STUC	
6	PLUMBING CHASE	59'-0"	99 SF	CONC	-	CMU/PT1	CMU/PT1	CMU/PT1	CMU/PT1		EXP	SLOPED	-	
7	JANT. CLOST	19'-9"	23 SF	CONC	-	CMU/PT1	CMU/PT1	CMU/PT1	CMU/PT1		EXP	SLOPED	-	

ROOM FINISH LEGEND

(MANUFACTURE NAME FOR REFERENCE ONLY)

- BRK: EXISTING MASONRY BRICK
- CMU: CONCRETE MASONRY UNIT BLOCK, STYLE: PRECISION, COLOR: NATURAL GRAY
- CONC: CONCRETE, COLOR: NATURAL GRAY, FINISHES: SMOOTH TROWEL AND SEALER COAT FINISH WITH SLIP-RESISTANT
- CR: 1" CONVEX RADIUS, SEE WALL SECTION
- EXP: EXPOSED STRUCTURE ABOVE
- PLYWD: 1/2" THICK MOISTURE RESISTANT PLYWOOD
- PT1: PAINT TO MATCH EXISTING COLOR AND GLOSS TYPE (CONFIRM WITH OWNER ON COLOR)
- PT2: PAINT TO MATCH EXISTING COLOR AND GLOSS TYPE (CONFIRM WITH OWNER ON COLOR)
- STUC: STUCCO CEILING (MATCH EXISTING TEXTURE FINISHES)

MATERIAL & FINISH LIST

(MANUFACTURE NAME AND COLOR ARE BASED ON DESIGN INTEND PURPOSES AND CAN BE EQUAL APPROVED PER SPECIFICATION. CONTRACTOR MUST SUBMIT COLOR SAMPLE FOR ARCHITECT FINAL APPROVAL)

- ROOF**
- ASPHALT SHINGLE CLASS 'A' RATING MATCH EXISTING TEXTURE, STYLE, AND COLOR
- MISC**
- ANTI-GRAFFITI MONOPOLE, MONOCHEM PERMASHIELD COATING SYSTEM (LARR: RR25080-T)

ROOM FINISH NOTES

- THE CONTRACTOR SHALL SUBMIT ALL FINISH COLOR SAMPLE FOR REVIEW AND APPROVAL BY THE ARCHITECT PRIOR TO INSTALLATION.
- ALL INTERIOR FINISH MATERIALS APPLIED TO WALLS AND CEILINGS SHALL BE TESTED AS SPECIFIED IN SECTION 802 OF THE LOS ANGELES BUILDING CODE, FOR EXITWAYS, HALLWAYS AND CORRIDORS MUST HAVE MAXIMUM FLAME SPREAD OF CLASS-II, ALL OTHER ROOMS MUST HAVE MAXIMUM FLAME SPREAD OF CLASS-III.
- REFERENCE POINT FOR WALL AND FLOOR TILE INSTALLATION SHALL START FROM THE CENTER OF THE FLOOR OR WALL SURFACE.
- PROVIDE RECESSED VALVE OUTLETS FOR REFRIGERATOR AND UTILITY LINES.

DOOR SCHEDULE

NO.	TYPE	DIMENSIONS			MATERIAL	FINISH	CORE	FRAME		DETAILS SHEET NO.		THRESHOLD	LOUVER	KICK PLATE	REMARKS
		WIDTH	HEIGHT	THICKNESS				MATERIAL	FINISH	HEAD	JAMB				
101	A	3'-0"	7'-0"	1 3/4"	HM	PF	HC	HM	PF	A9/A610	A13/A610			Yes	HARDWARE SCHEDULE: 1.a, 2.a.1, 3.a.b.c.f, 4.a.b
102	A	3'-0"	7'-0"	1 3/4"	HM	PF	HC	HM	PF	A9/A610	A13/A610			Yes	HARDWARE SCHEDULE: 1.a, 2.a.1, 3.a.b.c.f, 4.a.b
103	A	3'-0"	7'-0"	1 3/4"	HM	PF	HC	HM	PF	A9/A610	A13/A610			Yes	HARDWARE SCHEDULE: 1.a, 2.a.1, 3.a.b.c.f, 4.a.b
104	A	3'-0"	7'-0"	1 3/4"	HM	PF	HC	HM	PF	A9/A610	A13/A610			Yes	HARDWARE SCHEDULE: 1.a, 2.a.1, 3.a.b.c.f, 4.a.b
105	A	3'-0"	7'-0"	1 3/4"	HM	PF	HC	HM	PF	A9/A610	A13/A610			Yes	HARDWARE SCHEDULE: 1.a, 2.a.1, 3.a.b.c.f, 4.a.b
106	B	2'-0"	7'-0"	1 3/4"	HM	PF	HC	HM	PF	A9/A610	A13/A610			No	HARDWARE SCHEDULE: 1.b, 2.c
107	B	3'-0"	7'-0"	1 3/4"	HM	PF	HC	HM	PF	A9/A610	A13/A610	Yes	Yes	Yes	HARDWARE SCHEDULE: 1.b, 2.b.1, 3.d.e.f, 4.c. DOOR LOUVER: SEE MECH DWG

LEGEND

- HC HONEYCOMB CORE, PER MANUF.
- HM HOLLOW METAL
- PF PAINT FINISH, MATCH EXISTING DOOR COLOR

NOTES

- ALL SECURITY OPENINGS SHALL COMPLY WITH DIVISION 67 OF THE LOS ANGELES CURRENT BUILDING CODE INCLUDING THE FOLLOWING
 - ALL PIN TYPE HINGES WHICH ARE ACCESSIBLE FROM OUTSIDE THE SECURED AREA WHEN THE DOOR IS CLOSED SHALL HAVE NON-REMOVABLE HINGE PINS.
 - DEADBOLTS SHALL CONTAIN HARDENED INSERTS.
 - STRAIGHT DEADBOLTS SHALL HAVE A MINIMUM THROW OF 1" AND AN EMBEDMENT OF 1/4".
 - A HOOK SHAPED OR AN EXPANDING LUG DEADBOLT SHALL HAVE A MINIMUM THROW OF 1/4".
 - CYLINDER GUARDS SHALL BE INSTALLED IN ALL CYLINDER LOCKS WHENEVER THE CYLINDER PROJECTS BEYOND THE FACE OF THE DOOR OR IS OTHERWISE ACCESSIBLE TO GRIPPING TOOLS.
 - DOOR STOPS OF IN-SWINGING EXTERIOR DOORS SHALL BE ONE PIECE CONSTRUCTION.

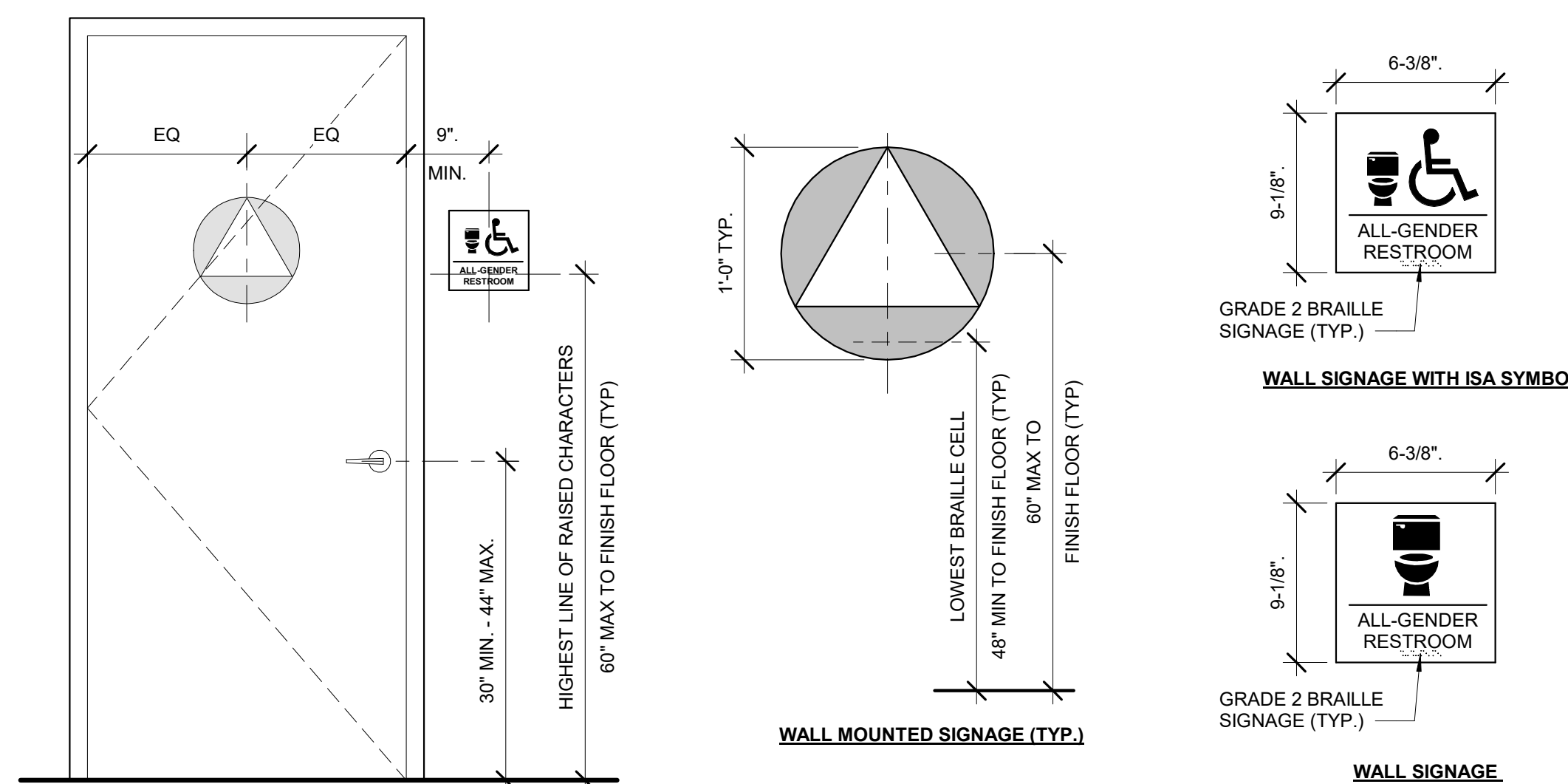
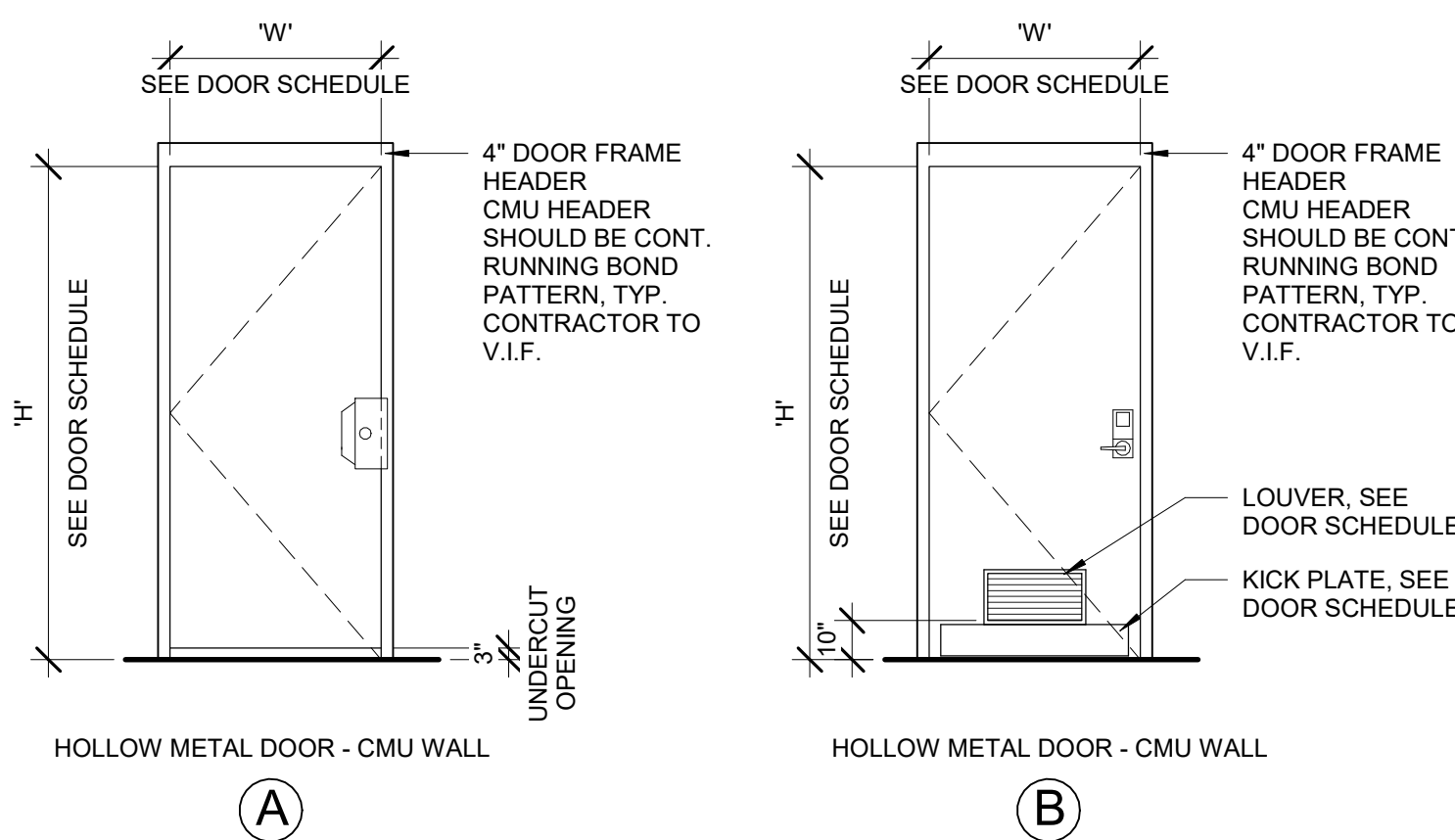
MATERIAL & FINISH LIST

- DOOR 14 GA. GALVANIZED HOLLOW METAL PAINT TO MATCH EXISTING DOOR COLOR OR U.N.O.
- DOOR FRAME 14 GA. GALVANIZED HOLLOW METAL, WELDED JAMBS PAINT TO MATCH EXISTING DOOR COLOR OR U.N.O.

HARDWARE SCHEDULE

- HINGE SPECS
 - CONT = PEMKO KCFM-83" HD CONTINUOUS GEAR HINGE W/ STAINLESS STEEL VANDAL RESISTANT SCREWS
 - FULL MORTISE HINGES: STANLEY, CB191 4-1/2"x4" NRP
- LOCKS
 - DEADBOLT: SCHLAGE 'B' SERIES 626 WITH SMALL FORMAT BEST COMPATIBLE 7 PIN INTERCHANGEABLE CORE
 - TRILGY T2: 1) DL2700-00-WP-IC-26D-S
 - STOREROOM LOCKSET: BEST, 9K3 7D15D L/C S3, CORE: OWNER STANDARD
- HARDWARE SPECS
 - CLOSER: LCN 4211 (add CUSH ARM FOR OUT SWING DOORS)
 - PUSH / PULL PLATES: ROCKWOOD VRT24C x 91CFC WITH BLACK COOL COATING HANDLE
 - RECESSED PULL: CUSTOM S.S.
 - TRESH: PEMKO 270A
 - SWEEP: PEMKO 321 SSN
 - KICKPLATE: ROCKWOOD K1050 10" HIGH 4BE CSK
- OTHER
 - PROVIDE MAGNETIC DOOR LOCK SYSTEM (Securitron M62, 1200 lbs. force)
 - PROVIDE EMERGENCY TOUCH PLATE (Securitron #SP-1)
 - PROVIDE CHECK CHAIN (Ives CS 115-25)

DOOR TYPE



- NOTES:
- DOOR SIGN SHALL BE CENTERED ON DOOR AND MOUNTED 60" ABOVE THE FLOOR (WITH ADHESIVE ONLY) AT THE CENTER OF THE SIGN
 - FINISH CONTRAST - THE CHARACTERS AND BACK GROUND OF SIGNS SHALL BE EGGSHELL, MATTE, OR OTHER NON-GLARE FINISH.
 - SIGNAGE BACKGROUND COLOR SHALL CONTRAST WITH DOOR COLOR

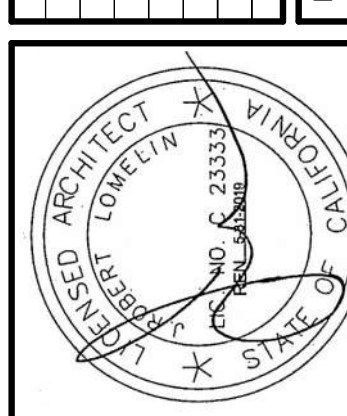
A9 RESTROOM DOOR SIGNAGE

1/2" = 1'-0"

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS BUREAU OF ENGINEERING



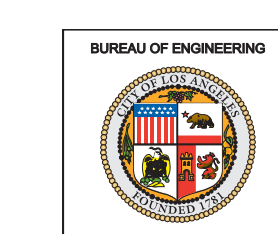
NO.	DATE	REVISION DESCRIPTION	BUILDING



DATE	CITY ENGINEER
05/07/2019	GARY LEE MOORE, PE, ENV SP
05/07/2019	ARCHITECTURAL DIVISION
05/07/2019	ARCHITECT: ROBERT LOWELIN LIC. NO.: 23333
05/07/2019	DESIGNED: MARCUS YEE
05/07/2019	DRAWN: MARCUS YEE
05/07/2019	CHECKED: ROBERT LOWELIN
05/07/2019	APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

SHEET	PROJECT	ADDRESS
DOOR & FINISH SCHEDULES	SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION	345 EAST 51ST STREET LOS ANGELES, CA 90011

WORK ORDER	PLAN FILE	DRAWING
E1908366		A600
SHEET 23	OF 45	



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THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN

GENERAL NOTES

- ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE FOLLOWING CODES:
A. 2017 CITY OF LOS ANGELES BUILDING CODE.
B. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION "SSPWC", ADOPTED BY THE BOARD OF PUBLIC WORKS OF THE CITY OF LOS ANGELES AS MODIFIED BY THE LATEST ISSUE OF THE BROWN BOOK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REVIEW AND COORDINATION OF ALL THE CONTRACT DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO STARTING ANY WORK. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES BEFORE COMMENCING WORK.
- THE ENGINEER DOES NOT WARRANT THE ACCURACY OF SCALED DIMENSIONS ON ANY PLAN. ALL DIMENSIONS SHALL BE AS DESIGNATED ON THE PLANS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND FIELD CONDITIONS AT THE SITE PRIOR TO COMMENCING WORK AND/OR FABRICATION AND PROCUREMENT OF ANY ITEM.
- NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NOTES AND DETAILS ON DRAWINGS AND GENERAL NOTES AND TYPICAL DETAILS ARE IN CONFLICT WITH THE CONTRACT SPECIFICATIONS, THE MOST STRINGENT SHALL APPLY. WHERE NO DETAILS ARE GIVEN, CONSTRUCTION SHALL BE AS SHOWN FOR SIMILAR WORK.
- A STAMPED SET OF PLANS AND SPECIFICATIONS SHALL BE KEPT AT THE JOBSITE AT ALL TIMES. THE CONTRACTOR SHALL ALSO MAINTAIN A SEPARATE FULL SIZE SET AND UPDATE WITH RECORD (I.E. AS-BUILT) INFORMATION. BOTH SETS SHALL BE MADE AVAILABLE TO THE INSPECTOR, BUILDING OFFICIAL OR CITY ENGINEER AT ALL TIMES.
- MANUFACTURED MATERIALS SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO THEIR USE. ALL REQUIREMENTS OF THOSE APPROVALS SHALL BE FOLLOWED.
- SEE ARCHITECTURAL DRAWINGS FOR THE FOLLOWING:
A. SIZE AND LOCATION OF ALL DOOR AND WINDOW OPENINGS.
B. SIZE AND LOCATION OF ALL NON-BEARING PARTITIONS.
C. SIZE AND LOCATION OF ALL CONCRETE CURBS, FLOOR DRAINS, SLOPES, DEPRESSED AREAS, CHANGES IN LEVEL, CHAMFERS, GROOVES, INSERTS, ETC.
D. SIZE AND LOCATIONS OF ALL FLOOR AND ROOF OPENINGS.
E. DIMENSIONS NOT SHOWN ON STRUCTURAL DRAWINGS.
- SEE MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR THE FOLOWING:
A. PIPE RUNS, SLEEVES, HANGERS, TRENCHES, WALL, ROOF AND FLOOR OPENINGS, ETC.
B. ELECTRICAL CONDUIT RUNS, BOXES, OUTLETS, IN WALLS AND SLABS.
C. ANCHORAGE AND BRACING FOR ELECTRICAL, MECHANICAL OR EQUIPMENT.
D. ANCHOR BOLTS FOR MOTOR MOUNTS.
E. SIZE AND LOCATION OF MACHINE AND EQUIPMENT BASES.
- PIPE SLEEVES, CONDUITS, DUCTS, INSERTS, AND OTHER SIMILAR EMBEDDED ITEMS SHALL BE IN PLACE PRIOR TO PLACEMENT OF CONCRETE.
- NO PIPES, DUCTS, SLEEVES, OR OTHER MECHANICAL, PLUMBING, AND ELECTRICAL TRADE ITEMS SHALL PASS THROUGH STRUCTURAL MEMBERS UNLESS SHOWN ON THE THE STRUCTURAL PLANS OR APPROVED BY THE CITY ENGINEER OF RECORD.
- SEWER AND UTILITY LINES ARE NOT SHOWN ON THE STRUCTURAL DRAWINGS. REFER TO PLUMBING, ELECTRICAL AND CIVIL DRAWINGS FOR LOCATION. THE CONTRACTOR SHALL COORDINATE ALL SEWER AND UTILITY LINES WITH THE FOUNDATION DRAWINGS. THE CITY ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES BEFORE PROCEEDING FURTHER WITH THE WORK.
- THE STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED WORK. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL THE MEASURES NECESSARY TO PROTECT THE SAFETY OF THE STRUCTURE, EMPLOYEES, AND THE PUBLIC DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE BUT NOT BE LIMITED TO THE BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION LOADING AND EQUIPMENT, ETC. OBSERVATION VISITS TO THE SITE BY THE CITY ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS AND DOES NOT IN ANY WAY RELIEVE THE CONTRACTOR FROM HIS/HER RESPONSIBILITIES FOR THE ABOVE ITEMS.
- THE CONTRACTOR SHALL NOT STACK CONSTRUCTION MATERIAL ON ANY ELEVATED ROOF OR FLOOR. THE MATERIAL SHALL BE SPREAD OUT AND THE LOAD SHALL NOT BE ALLOWED TO EXCEED 80% OF THE DESIGN LIVE LOAD. PROVIDE ADEQUATE SHORING AND/OR BRACING WHERE STRUCTURE HAS NOT ATTAINED DESIGN STRENGTH OR WHERE OVERLOAD IS ANTICIPATED.
- REVIEW OF SUBMITTAL WILL BE FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AND CONTRACT DOCUMENTS. NOTED MARKINGS OR COMMENTS SHALL NOT BE CONSTRUED AS RELIEVING THE CONTRACTOR FROM COMPLIANCE WITH THE PROJECT PLANS AND SPECIFICATIONS OR DEPARTURES THEREFROM. THE CONTRACTOR REMAINS RESPONSIBLE FOR DETAILS AND ACCURACY FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS FOR SELECTING FABRICATION PROCESSES, FOR TECHNIQUES OF ASSEMBLY FOR PERFORMING WORK IN A SAFE AND SATISFACTORY MANNER.
- THE CONTRACTOR SHALL PROVIDE PROTECTION FOR PEDESTRIANS AND VEHICLES ADJACENT TO THE PROJECT SITE DURING CONSTRUCTION.
- THE CONTRACTOR SHALL OBTAIN AND ARRANGE FOR ALL REQUIRED PERMITS AND INSPECTIONS.

EARTHWORK & FOUNDATION NOTES

- THE LOAD-BEARING VALUES OF SOIL USED IN DESIGN OF FOUNDATION SYSTEMS PER 2017 LABC TABLE 1806.2 ARE AS FOLLOWS:
A. VERTICAL FOUNDATION PRESSURE = 1,500 PSF
B. LATERAL BEARING PRESSURE = 100 PSF/FT
C. LATERAL SLIDING RESISTANCE = 130 PSF (COHESION)
- THE GEOTECHNICAL ENGINEER/ BUILDING INSPECTOR SHALL OBSERVE THE FOOTING EXCAVATIONS TO DETERMINE WHETHER THE FOUNDATIONS ARE FOUNDED ON ACCEPTABLE MATERIAL. IF ADVERSE SOIL CONDITIONS ARE ENCOUNTERED, A SOIL INVESTIGATION MAY BE REQUIRED.
- THE CONTRACTOR SHALL ARRANGE FOR INSPECTION BY THE CITY OF LOS ANGELES, DEPARTMENT OF BUILDING AND SAFETY, AT LEAST 48 HOURS IN ADVANCE.
- UNSURCHARGED VERTICAL CUTS INTO APPROVED NATURAL SOIL ARE ALLOWED TO A MAXIMUM DEPTH OF 3 FEET. EXCAVATION DEEPER THAN 3 FEET SHALL BE CUT BACK AT 1:1 SLOPE FROM THE EXCAVATION. EXCAVATION DEEPER THAN 10 FEET SHALL FOLLOW RECOMANDATIONS IN THE GEOTECHNICAL REPORT. ALL EXCAVATIONS SHALL PROCEED IN SUCH A MANNER THAT NO VOIDS ARE DEVELOPED BETWEEN THE BACK OF THE SOIL-RETAINING ELEMENT, SUCH AS SHEETING, AND THE SUPPORTED SOIL.
- UNLESS UNDERPINNING IS NOTED ON THE PLANS, SHORING SHALL BE PROVIDED WHERE THE PROPOSED EXCAVATION CUTS BELOW A PLANE PROJECTED OUTWARD AND DOWNWARD FROM THE EDGE OF ANY BUILDING FOOTINGS AT A SLOPE OF 2:1. ALL SHORING SHALL CONFORM TO SSPWC SECTION 306-1.1.
- PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL FURNISH THE CITY ENGINEER A WRITTEN DESCRIPTION OF THE PROPOSED PROCEDURES AND CALCULATIONS PREPARED, SIGNED, AND SEALED BY A CALIFORNIA REGISTERED CIVIL OR STRUCTURAL ENGINEER FOR INFORMATION ONLY. NEVERTHELESS, THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL SHORING WORK AND SUBMITTAL TO THE CITY ENGINEER SHALL NOT RELIEVE THE CONTRACTOR OF HIS/HER OBLIGATIONS.
- NO BACKFILL SHALL BE PLACED BEHIND RETAINING WALLS PRIOR TO THE CONCRETE/CMU REACHING ITS FULL DESIGN STRENGTH. THE CONTRACTOR SHALL PROTECT AND BRACE ALL BUILDING WALLS AND PITS BELOW GRADE AGAINST LATERAL LOADS UNTIL ATTACHING FLOORS ARE COMPLETELY IN PLACE AND HAVE REACHED THEIR FULL DESIGN STRENGTH. CONTRACTOR SHALL PROVIDE DESIGN, PERMIT, BRACING, AND INSTALLATION OF SUCH BRACING, AT NO ADDED COST TO THE CITY.
- THE CONTRACTOR SHALL SECURE AND PAY FOR ALL THE NECESSARY PERMITS FOR ALL TRENCHES AND EXCAVATIONS FIVE FEET OR MORE IN DEPTH, FROM THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY, PRIOR TO ISSUANCE OF A BUILDING OR GRADING PERMIT BY THE CITY OF LOS ANGELES, DEPARTMENT OF BUILDING AND SAFETY.
- ENGINEERED FILL SHALL BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 90%; COHENSIONLESS SOILS SUPPORTING STRUCTURAL FOUNDATIONS WITH LESS THAN 15% FINER THAN 0.005 MM REQUIRE 95% RELATIVE COMPACTION.
- NO FILL SHALL BE PLACED UNTIL THE GEOTECHNICAL ENGINEER AND BUILDING AND SAFETY GRADING INSPECTOR HAVE INSPECTED AND APPROVED THE BOTTOM EXCAVATION.
- FROM THE TIME THAT BUILDING AND SAFETY AND GEOTECHNICAL ENGINEER APPROVES THE FOOTING EXCAVATIONS TO THE TIME THAT THE CONCRETE IS PLACED, THE CONTRACTOR IS RESPONSIBLE FOR KEEPING THE FOOTINGS PROPERLY MOIST AND FREE OF LOOSE SOIL AND DEBRIS. IF EXCESSIVE SLOUGHING OR CAVING OCCURS OR IF MOISTURE IS ALLOWED INTO THE FOOTINGS PRIOR TO CONCRETE PLACEMENT, ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE FOOTINGS AND GEOTECHNICAL ENGINEER SHALL RE-INSPECT THE FOOTINGS PRIOR TO CONCRETE PLACEMENT.

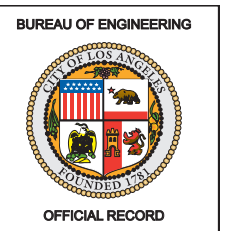
CONCRETE NOTES

- CONCRETE SHALL CONFORM TO SECTION 201 OF THE SSPWC U.N.O.
- ALL CEMENT SHALL CONFORM TO ASTM C-150, PORTLAND CEMENT TYPE V FOR CONCRETE IN CONTACT WITH SOIL AND TYPE I FOR TOPPING SLAB, U.N.O.
- ALL FLY ASH SHALL CONFORM TO C-618, CLASS F, U.N.O.
- FINE AND COARSE AGGREGATE SHALL BE NONREACTIVE AND CONFORM TO ASTM C-33 AND SECTION 201-1.2.2 OF THE SSPWC.
- UNLESS NOTED OTHERWISE, STRUCTURAL CONCRETE SHALL BE HARD ROCK - 145 LBS/ CU. FT. CONCRETE STRENGTH SHALL CONFORM TO THE FOLLOWING:
SLAB ON GRADE, FOUNDATIONS, AND OTHER MISC. CONCRETE..... 560-C-3250
- SUBMITTALS OF MIX DESIGN SHALL BE AS PER THE BUILDING CODE AND SHALL BE PREPARED BY A CALIFORNIA REGISTERED CIVIL OR STRUCTURAL ENGINEER, AND BE PROVIDED BY AN APPROVED LABORATORY. COPIES OF THE SUBMITTALS SHALL BE IN THE OFFICE OF THE BUILDING INSPECTOR, AT THE BATCH PLANT PRIOR TO BATCHING OF CONCRETE, AND AT THE JOB SITE PRIOR TO PLACING OF CONCRETE. MIX DESIGN SHALL BE SUBMITTED FOR REVIEW AND APPROVAL OF THE PROJECT STRUCTURAL ENGINEER PRIOR TO PLACING OF CONCRETE.
- CONTINUOUS INSPECTION OF CONCRETE BY A DEPUTY INSPECTOR IS REQUIRED FOR CONCRETE STRENGTHS OVER 2500 PSI - TO BE PROVIDED BY THE CITY.
- ALL CONCRETE CONSTRUCTION SHALL CONFORM TO THE 2017 EDITION OF THE LOS ANGELES CITY BUILDING CODE AND THE LATEST EDITION OF ACI BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE - ACI 318, INCLUDING BAR BENDS AND HOOKS, UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS.
- ANCHOR BOLTS, DOWELS, REINFORCING STEEL, INSERTS, ETC. SHALL BE SECURELY TIED IN PLACE PRIOR TO POURING CONCRETE. CONCRETE BLOCKS SHALL ONLY BE USED TO SUPPORT REINFORCING OFF GROUND.
- THE LOCATION OF CONSTRUCTION JOINTS OR POUR JOINTS SHALL BE AS SHOWN ON PLANS OR AS APPROVED BY THE CITY ENGINEER PRIOR TO POURING CONCRETE.
- NOTIFY THE CITY ENGINEER 48 HOURS PRIOR TO ALL POURS.
- ALL EXISTING CONCRETE SURFACES IN CONTACT WITH NEW CONCRETE AND ALL CONSTRUCTION JOINTS SHALL BE ROUGHENED TO 1/4" AMPLITUDE MINIMUM.
- ALL FOUNDATIONS AND PILES SHALL BE POURED AGAINST UNDISTURBED NATURAL SOIL, OR COMPACTED FILL. THE PROJECT GEOTECHNICAL ENGINEER SHALL INSPECT ALL FOUNDATIONS, PILES AND SOIL PRIOR TO PLACING REINFORCING STEEL. THE PROJECT GEOTECHNICAL ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF INSPECTION.
- ALL EXPOSED EDGES AND CORNERS SHALL BE CHAMFERED 3/4", OR RADIUSED TO 1/2" R.
- ALL CONCRETE SHALL BE CURED IN ACCORDANCE WITH SECTION 303-1.10 OF THE SSPWC UNLESS OTHERWISE NOTED. THE CITY ENGINEER MUST FIRST APPROVE THE USE OF MEMBRANE CURING COMPOUNDS. IF APPROVED FOR USE, THE CONTRACTOR SHALL SUBMIT SAMPLES OF MATERIALS AND LOCATION OF USE FOR FINAL APPROVAL BY THE CITY ENGINEER.
- BEFORE CONCRETE IS POURED, CHECK ALL TRADES TO INSURE PROPER PLACEMENT OF ALL OPENINGS, SLEEVES, CURBS, CONDUITS, EMBEDDED MATERIALS, ETC. RELATING TO THE WORK.
- THE CONTRACTOR SHALL COORDINATE FOR CONTINUOUS INSPECTION OF ANCHOR BOLTS OR HEADED STUDS EMBEDDED IN CONCRETE PRIOR TO AND DURING THE PLACEMENT OF CONCRETE TO BE PROVIDED BY THE CITY.
- ALL SLEEVES NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL BE LOCATED BY THE TRADES INVOLVED AND SHALL BE APPROVED BY THE CITY ENGINEER.
- NO STAKE, STEEL OR WOOD WILL BE PERMITTED IN ANY CONCRETE POUR, UNLESS OTHERWISE SHOWN ON THE PLANS TO REMAIN. SUSPEND FORMS FROM ABOVE THE POUR.
- FINAL SLABS SHALL BE LEVEL TO WITHIN 1/8" WHEN MEASURED WITH A 10 FEET STRAIGHT EDGE AND WITHIN 1/2" IN ANY 30 FEET BAY.
- NO FOUNDATIONS OR SLABS-ON-GRADE SUPPORTED IN NEW COMPACTED FILL SHALL BE POURED UNTIL THE COMPACTION REPORT IS SUBMITTED AND APPROVED BY THE GRADING DIVISION OF LADBS.
- NON-SHRINK GROUT SHALL HAVE A MINIMUM 28 DAYS STRENGTH OF 4,000 PSI. CONTRACTOR TO SUBMIT MIX DESIGN FOR APPROVAL TO THE CITY ENGINEER, PRIOR TO PLACEMENT.

THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

TTLB TEMPLATE REVISION DATE: 4/2016

REVISION DATES (DESIGN STAGE ONLY)



BUREAU OF ENGINEERING
ENGINEERING CITY OF LOS ANGELES

NO.	REVISION DESCRIPTION	DATE	BY

INDEX NO. **RP-300113** BUILDING NO. **-**

REGISTERED PROFESSIONAL ENGINEER
MANAN J. BHALJA
S 6673
CITY OF LOS ANGELES

DESIGN GROUP	DATE
GARY LEE MOORE, PE, ENV SP	06/29/19
ENGINEER: MANAN BHALJA, S.E.	06/29/19
DESIGNED BY: MANAN BHALJA, S.E., QUYNH HO, P.E.	06/29/19
DRAWN BY: EMIL YOUSSEF	06/29/19
CHECKED BY: MEL AGAGAS, S.E., MOURAD AZIZ P.E.	06/29/19
APPROVED BY: SHAILESH "SUNNY" PATEL, S.E.	

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

CLIENT: RECREATION AND PARKS GENERAL MANAGER: MICHAEL A. SHULL	WORK ORDER NO. E1908366
SHEET TITLE: GENERAL NOTES	PLAN FILE NO.
PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION	DRAWING NO. S001
ADDRESS: 345 EAST 51ST STREET LOS ANGELES, CA 90011	SHEET 25 OF 45 SHEETS

OFFICIAL RECORD

PLOTTED 6/5/2019 11:01:47 AM

REINFORCING STEEL

- 1. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615-60. ALL GRADE BEAM REBARS NEED TO BE A-706 REGARDLESS OF WELDED OR NON-WELDED.
2. WELDED WIRE REINFORCEMENT SHALL CONFORM TO ASTM A-1064. MESH SHALL BE LAPPED (9" MINIMUM).
3. ALL BARS SHALL BE CLEAN OF LOOSE FLAKY RUST, GREASE OR OTHER MATERIALS LIKELY TO IMPAIR BOND.
4. ALL BENDS SHALL BE MADE COLD.
5. REINFORCING BARS SHALL BE SPLICED AND BENT IN STRICT ACCORDANCE WITH THE CRSI PUBLICATION AND DETAIL DRAWINGS. NO KINKS SHALL BE PERMITTED.
6. FOR BARS #7 THROUGH #11, THE CITY ENGINEER SHALL APPROVE LAP SPLICE LENGTH NOT SHOWN. BARS SHOWN SPLICED SHALL BE CONTINUOUS AT ALL OTHER LOCATIONS. SPLICES IN ADJACENT BARS SHALL BE STAGGERED AT LEAST ONE SPLICE LENGTH. ALL DOWELS SHALL HAVE THE SAME SIZE AND SPACING AS THAT OF THE REINFORCING STEEL TO WHICH THEY ARE SPLICED.
7. NO WELDING OF REINFORCING BARS SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER. IF WELDING OF REINFORCING IS APPROVED, IT SHALL CONFORM TO THE STRUCTURAL WELDING CODE- REINFORCING STEEL AWS D1.4 (LATEST EDITION) ALL SHOP WELDING SHALL BE DONE IN A SHOP CERTIFIED BY THE CITY OF LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY. FIELD WELDING SHALL BE DONE BY WELDERS CERTIFIED BY THE DEPARTMENT OF BUILDING AND SAFETY FOR REINFORCING STEEL. CONTINUOUS INSPECTION BY A DEPUTY INSPECTOR IS REQUIRED.
8. MECHANICAL COUPLERS FOR REINFORCING BARS SHALL HAVE AND CONFORM TO A CURRENTLY APPROVED CITY OF LOS ANGELES RESERACH REPORT AND SHALL REQUIRE CONTINUOUS INSPECTION BY A DEPUTY INSPECTOR PROVIDED BY THE CITY.
9. PROVIDE DOWELS OF SAME SIZE AND NUMBER FROM ADJACENT POUR, BOTH VERTICALLY AND HORIZONTALLY TO MATCH TYPICAL REINFORCING SHOWN. LAPS SHALL BE IN ACCORDANCE WITH THE DRAWINGS AND DETAILS.
10. ALL DOWELS SHALL BE CLEANED AFTER POUR AND CARE SHALL BE TAKEN SO AS NOT TO BEND DOWELS EXTENDING FROM CONCRETE PREVIOUSLY POURED.
11. ALL HOOKS SHALL BE STANDARD HOOKS, UNLESS NOTED OTHERWISE.
12. ALL REINFORCING BARS SHALL BE ACCURATELY AND SECURELY PLACED BEFORE POURING CONCRETE OR APPLYING MORTAR OR GROUT.
13. SHOP DRAWINGS FOR REINFORCING STEEL SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
14. ALL REINFORCING SHALL BE ACCURATELY PLACED AND FIRMLY SUPPORTED AS RQUIRED BY THE ACI STANDARDS. REINFORCING SHALL HAVE THE FOLLOWING MINIMUM COVERAGE AND SHALL BE PLACED AS NEAR TO THE CONCRETE SURFACE AS THESE MINIMUMS WILL PERMIT UNLESS NOTED OR DETAILED OTHERWISE.
CONCRETE POURING AGAINST EARTH.....3"
FORMED CONCRETE IN CONTACT WITH EARTH OR WEATHER.....1-1/2"
SLABS, WALLS, JOISTS.....1-1/2"
BEAMS.....1-1/2"
COLUMNS (TO MAIN STEEL).....2"
15. BARS INTERRUPTED BY STRUCTURAL STEEL SHALL EXTEND TO WITHIN 1" OF THE STRUCTURAL STEEL FLANGE OR WEB AND HAVE A 90-DEGREE HOOK UNLESS NOTED OTHERWISE.

WOOD NOTES

- 1. ALL NEW LUMBER SHALL BE DOUGLAS FIR LARCH OF THE FOLLOWING GRADES, CONFORMING TO STANDARD GRADING RULES FOR WEST COAST LUMBER, NO. 16 UNLESS NOTED OTHERWISE:
RAFTERS, JOISTS.....NO. 1 OR BETTER
BEAMS.....NO. 1 OR BETTER
LOAD BEARING STUDS.....NO. 2
NAILERS AND LEDGERS.....NO. 1
NON-LOAD BEARING STUDS, BLOCKING.....NO. 2
GRADE AND SPECIES OF ALL LUMBER MUST BE GRADE MARKED.
2. ALL WOOD IN CONTACT WITH CONCRETE MASONRY UNITS (CMU) AND CONCRETE OR BEARING ON CONCRETE SHALL BE PRESSURE TREATED DOUGLAS FIR NO. 1.
3. ALL PRESSURE TREATED DOUGLAS FIR SHALL BEAR "WCLIB" GRADE STAMP AND QUALITY MARK. ALL PRESSURE TREATED WOOD SHALL BE TREATED USING THE SPECIFICATIONS IN THE APPROPRIATE ASTM STANDARDS AND AWPA STANDARDS. ALL HOLES AND CUTS SHALL ALSO BE TREATED PER AWPA STANDARDS.
4. ALL BLOCKING SHALL BE SOLID ONE PIECE, AND SHALL BE FULL DEPTH OF THE RAFTER OR JOIST.
5. PROVIDE 2X FULL DEPTH SOLID BLOCKING AT ALL SUPPORTS, UNLESS NOTED OTHERWISE.
6. DO NOT NOTCH OR CUT ANY STRUCTURAL TIMBER UNLESS SPECIFICALLY SHOWN OR NOTED ON THE PLANS OR APPROVED BY STRUCTURAL ENGINEER.
7. BORED HOLES SHALL BE LOCATED AT THE CENTER OF STUDS. NO EXCEPTION. BORED HOLES SHALL NOT BE LOCATED AT THE SAME SECTION OF A STUD AS A CUT OR A NOTCH.
8. BOLT HOLE DIAMETER SHALL BE 1/32" TO 1/16" LARGER THAN NOMINAL BOLT DIAMETER. ALL BOLTS SHALL HAVE STANDARD CUT WASHER UNDER HEAD AND NUT UNLESS NOTED OTHERWISE.
9. ANCHOR BOLTS SHALL BE RE-TIGHTENED PRIOR TO APPLICATION OF WALL SHEATHING, PLASTER, ETC.
10. PROVIDE NAILABLE CROSS BRIDGING AT 8'-0" O.C. MAXIMUM FOR ALL JOISTS AND RAFTERS MORE THAN 8' DEEP.
11. DO NOT CUT STRUCTURAL MEMBERS FOR PIPE, ETC. UNLESS SPECIFICALLY DETAILED AND APPROVED BY STRUCTURAL ENGINEER.
12. USE NAILING PER LABC TABLE 2304.10.1 AS MINIMUM. OTHER CONNECTIONS SPECIFICALLY DETAILED ON PLANS ARE ADDITIONAL. ALL NAILS SHALL BE COMMON WIRE.
13. ALL WOOD AND METAL FRAMING CONNECTORS SHALL HAVE LOS ANGELES RESEARCH REPORT (LARR) AND APPROVED BY ICC SUCH AS SIMPSON OR APPROVED EQUIVALENT. ALL HOLES SHALL BE FILLED WITH NAILS PER MANUFACTURER'S INSTRUCTIONS, UNLESS NOTED OTHERWISE.
14. AT THE TIME OF INSTALLATION THE WOOD MOISTURE CONTENT SHALL NOT EXCEED 19%.
15. EACH SHEET OF PLYWOOD SHALL BE IDENTIFIED BY A REGISTERED STAMP OR BRAND OF THE DOUGLAS FIR PLYWOOD ASSOCIATION.
16. PROVIDE DOUBLE JOISTS UNDER ALL PARTITIONS AND ENDS OF MECHANICAL EQUIPMENT, UNLESS NOTED OTHERWISE.
17. ALL WOOD EXPOSED TO WEATHER SHALL BE PRESSURE TREATED.
18. ALL PLYWOOD DIAPHRAGMS AND SHEARWALL NAILING SHALL UTILIZE COMMON NAILS UNLESS NOTED OTHERWISE.
19. THE CONTRACTOR SHALL PROVIDE OVERSIZE WASHERS UNDER ALL BOLTS AND LAG SCREWS CONNECTION TIMBER MEMBERS. WASHERS ARE NOT REQUIRED AT WOOD SCREWS.
20. WOOD SCREWS SHALL BE PREDRILLED. THE DIAMETER OF PREDREILLED HOLES SHALL BE 40%- 70% OF SHANK DIAMETER. THE THREADED PORTION OF THE SCREW SHALL BE INSERTED BY TURNING WITH A WRENCH, NOT BY DRIVING WITH A HAMMER. MINIMUM PENETRATION OF THREADED END INTO THE HOLDING PIECE SHALL BE 7 TIMES THE SHANK DIAMETER.
21. PROVIDE EXTERIOR TYPE I STRUCTURAL PLYWOOD FOR ROOF AND WALL SHEATHING. USE EXTERIOR TYPE C-C GRADE WHERE PLYWOOD IS EXPOSED TO WEATHER. ALL PLYWOOD SHALL BE GLUED WITH EXTERIOR TYPE GLUE.
22. ALL FASTENERS AND ANCHOR BOLTS, INCLUDING NUTS AND WASHERS, IN CONTACT WITH PRESERVATIVE TREATED WOOD, SHALL BE HOT-DIPPED GALVANIZED STEEL IN ACCORDANCE WITH ASTM A 153.

MASONRY

- 1. CONCRETE MASONRY (CMU) SHALL BE MEDIUM-WEIGHT UNITS FOR BUILDING AND NORMAL WEIGHT UNIT FOR RETAINING WALLS. USE OPEN END BLOCKS AT VERTICAL REINFORCING BARS AND BOND BEAM BLOCKS AT HORIZONTAL BARS.
2. STRENGTH OF MASONRY (f'm) AT 28 DAYS SHALL BE 1,500 PSI (U.N.O. ON DRAWINGS), AND TESTED IN ACCORDANCE WITH LABC SECTION 2105 (CONTINUOUS INSPECTION REQ'D).
3. UNITS SHALL BE LAID IN RUNNING BOND U.N.O.
4. ALL CELLS AND SPACES SHALL BE GROUTED SOLID U.N.O. COMPLY WITH THE REQUIREMENTS OF 2017 LABC SECTION 2103.
5. ALL BARS SHALL HAVE A MINIMUM DISTANCE CLEAR TO THE MASONRY SURFACE OF ONE BAR DIAMETER OR ONE-HALF INCH, WHICHEVER IS GREATER. BOLTS AND EMBEDS SHALL HAVE A MINIMUM OF 1 INCH GROUT COVER ALL AROUND.)
6. VERTICAL REINFORCING IN WALLS SHALL BE ON THE WALL CENTER LINE U.N.O.
7. GROUT SHALL BE PER LABC SECTION 2103 AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT 28 DAYS.
8. MORTAR SHALL CONFORM TO ASTM C270, TYPE "S".
9. CONSTRUCTION SHALL COMPLY WITH SECTION 3 OF ACI 530.1-13.
A. REINFORCEMENT SHALL BE SUPPORTED TO PREVENT DISPLACEMENTS BEYOND THE TOLERANCES ALLOWED BY 3.4 OF ACI 530.1 PRIOR TO GROUTING; (3.4B OF ACI 530.1-13)
B. CLEANOUTS SHALL BE PROVIDED IN THE BOTTOM COURSE OF MASONRY FOR ALL GROUT POUR HEIGHT EXCEEDING 5'-4"; (3.2F OF ACI 530.1-13)
C. HIGH LIFT GROUTING IS SUBJECT TO THE FOLLOWING: 1. APPROVAL BY THE ENGINEER 2. GROUT LIFT HEIGHT SHALL NOT EXCEED 12.67 FT WHEN THE MASONRY HAS CURED FOR 4- HOURS., 3. THE GROUT SLUMP IS MAINTAINED BETWEEN 10 AND 11 IN., AND 4. NO INTERMEDIATE REINFORCED BOND BEAMS ARE PLACED BETWEEN THE TOP AND BOTTOM OF THE POUR HEIGHT. OTHERWISE GROUT LIFT HEIGHT SHALL NOT EXCEED 5'-4". (3.5D OF ACI 530.1-13)
D. ALL CELLS AND SPACES CONTAINING REINFORCEMENT SHALL BE FILLED WITH GROUT.
10. QUALITY ASSURANCE MEASURES SHALL COMPLY WITH SECTION 2105 OF LOS ANGELES BUILDING CODE AND ACI 530.
11. FIVE MASONRY PRISM TESTS SHALL BE BUILT AND TESTED PRIOR TO CONSTRUCTION.
12. THREE MASONRY PRISM TESTS (PER 5000 SQ. FT. AREA, 3 MIN.) SHALL BE BUILT AND TESTED DURING CONSTRUCTION WHEN STRESSES ARE USED IN DESIGN.
13. CONTINUOUS INSPECTION SHALL BE PROVIDED FOR ALL MASONRY CONSTRUCTION BY A DEPUTY INSPECTOR CERTIFIED BY THE LOS ANGELES CITY DEPARTMENT OF BUILDING AND SAFETY.
14. PIPES AND CONDUITS EMBEDDED IN MASONRY SHALL NOT REDUCE THE REQUIRED STRENGTH.
15. JOINT REINFORCEMENT USED IN EXTERIOR WALLS AND CONSIDERED IN THE DETERMINATION OF SHEAR STRENGTH, SHALL BE HOT DIPPED GALVANIZED.
16. THE TOP OF UNFINISHED MASONRY WORK SHALL BE COVERED TO PROTECT THE MASONRY FROM THE WEATHER.
17. MORTAR BED AND HEAD JOINTS SHALL BE PER ARCHITECTURAL REQUIREMENTS. IN ABSENCE OF SUCH ARCHITECTURAL REQUIREMENT, THE JOINTS SHALL BE EITHER CONCAVE OR V SHAPE AND PROVIDE SUPERIOR WEATHER PROTECTION.

DESIGN DATA

MATERIAL DATA:

GRADE BEAMS, FOOTINGS, FOUNDATION WALLS.....fc=3250 psi
TYPICAL REBAR.....fy=60 ksi
MASONRY BLOCKS.....fm=1500 psi
CMU GROUT.....fc=2000 psi
LIGHT GAUGE STEEL 18GA.....fy=33 ksi
LIGHT GAUGE STEEL 16GA.....fy=50 ksi

LOAD DATA:

ROOF DEAD LOAD 16.0 psf
ROOF LIVE LOAD..... 20.0 psf
8" MASONRY WALL W/ VENEER.....84.0 psf

WIND DATA:

1. BASIC WIND SPEED110 mph
2. WIND EXPOSUREB
3. RISK CATEGORY.....II
4. INTERNAL PRESSURE.....± 0.18

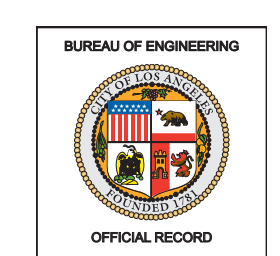
SEISMIC DESIGN DATA:

1. SEISMIC IMPORTANCE FACTOR1.0
2. RISK CATEGORY II
3. SITE CLASS D
4. MAPPED SPECTRAL RESPONSE ACCELERATIONSs = 1.966, S1 = 0.698
5. SPECTRAL RESPONSE COEFFICIENTS.....Sps = 1.311, Sps = 0.689
6. SEISMIC DESIGN CATEGORY.....D
7. LATERAL FORCE RESISTING SYSTEM.....SPECIAL REINFORCED MASONRY SHEAR WALL
8. RESPONSE MODIFICATION FACTOR.....R = 5.0
9. SEISMIC RESPONSE COEFFICIENT (STRENGTH LEVEL).....Cs = 0.262
10. REDUNDANCY FACTORp = 1.0

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TTLB TEMPLATE REVISION DATE: 4/2016

Engineering logo, City of Los Angeles, Bureau of Engineering, Department of Public Works, Gary Lee Moore, PE, Env Sp, Design Group, Engineer: Manan Bhalja, S.E., Lic. No. S-8573, Designated by Manan Bhalja, S.E., Quynh Ho, P.E., Drawn by: Emil Yousef, Checked by: Mel Agagas, S.E., Mourad Aziz, P.E., Approved by: Shailesh Sunny Patel, S.E., Project: South Park Renovation - Public Restroom Renovation, Address: 345 East 51st Street, Los Angeles, CA 90011, Work Order No. E1908366, Plan File No., Drawing No. S002, Sheet 26 of 45, Plotted 6/5/2019 11:01:47 AM



GENERAL NOTES FOR STRUCTURAL OBSERVATION

- STRUCTURAL OBSERVATION IS REQUIRED FOR THE STRUCTURAL SYSTEM IN ACCORDANCE WITH THE INFORMATION BULLETIN NO. P/BC 2017-024. STRUCTURAL OBSERVATION IS THE VISUAL OBSERVATION AT THE CONSTRUCTION SITE OF THE ELEMENTS AND CONNECTIONS OF THE STRUCTURAL SYSTEM AT SIGNIFICANT CONSTRUCTION STAGES AND THE COMPLETE STRUCTURE FOR GENERAL CONFORMANCE TO THE APPROVED PLANS AND SPECIFICATIONS. STRUCTURAL OBSERVATION DOES NOT WAIVE THE RESPONSIBILITY FOR THE INSECTIONS REQUIRED OF THE BUILDING INSPECTOR OR THE DEPUTY INSPECTOR.
- THE OWNER SHALL EMPLOY A STATE OF CALIFORNIA REGISTERED CIVIL OR STRUCTURAL ENGINEER OR LICENSED ARCHITECT TO PERFORM THE STRUCTURAL OBSERVATION. THE DEPARTMENT OF BUILDING AND SAFETY (LADBS) RECOMMENDS THE USE OF THE ENGINEER OR ARCHITECT RESPONSIBLE FOR THE STRUCTURAL DESIGN WHO ARE INDEPENDENT OF THE CONTRACTOR.
- THE STRUCTURAL OBSERVER SHALL PROVIDE EVIDENCE OF EMPLOYMENT BY THE OWNER OR THE OWNER'S REPRESENTATIVE. A LETTER FROM THE OWNER, THE OWNER'S REPRESENTATIVE, OR A COPY OF THE AGREEMENT FOR SERVICE SHALL BE SENT TO THE BUILDING INSPECTOR BEFORE THE FIRST SITE VISIT.
- THE OWNER OR OWNER'S REPRESENTATIVE SHALL COORDINATE AND CALL FOR A MEETING BETWEEN THE ENGINEER OR ARCHITECT RESPONSIBLE FOR THE STRUCTURAL DESIGN, STRUCTURAL OBSERVER, CONTRACTOR, AFFECTED SUBCONTRACTORS AND DEPUTY INSPECTORS. THE PURPOSE OF THE MEETING SHALL BE TO IDENTIFY THE MAJOR STRUCTURAL ELEMENTS AND CONNECTIONS THAT AFFECT THE VERTICAL AND LATERAL LOADS SYSTEMS OF THE STRUCTURE AND TO REVIEW SCHEDULING OF THE REQUIRED OBSERVATIONS. A RECORD OF THE MEETING SHALL BE INCLUDED IN THE FIRST OBSERVATION REPORT SUBMITTED TO THE BUILDING INSPECTOR
- THE STRUCTURAL OBSERVER SHALL PERFORM SITE VISITS AT THOSE STEPS IN THE PROGRESS OF THE WORK THAT ALLOW FOR CORRECTION OF DEFICIENCIES WITHOUT SUBSTANTIAL EFFORT OR UNCOVERING OF THE WORK INVOLVED. AT A MINIMUM, THE LISTED SIGNIFICANT CONSTRUCTION STAGES ON THE FOLLOWING STRUCTURAL OBSERVATION/SIGNIFICANT CONSTRUCTION STAGES TABLE REQUIRE A SITE VISIT AND AN OBSERVATION REPORT FROM THE STRUCTURAL OBSERVER.
- THE STRUCTURAL OBSERVER SHALL PREPARE A REPORT OF THE STRUCTURAL OBSERVATION REPORT FORM IN/FORM.08 (PART 1) FOR EACH SIGNIFICANT STAGE OF CONSTRUCTION OBSERVED. THE ORIGINAL OF THE STRUCTURAL OBSERVATION REPORT SHALL BE SENT TO THE BUILDING INSPECTOR'S OFFICE AND SHALL BE SIGNED AND SEALED (WET STAMP) BY THE RESPONSIBLE STRUCTURAL OBSERVER. ONE COPY OF THE OBSERVATION REPORT SHALL BE ATTACHED TO THE APPROVED PLANS. THE COPY ATTACHED TO THE PLANS SHALL BE SIGNED AND SEALED (WET STAMP) BY THE RESPONSIBLE STRUCTURAL OBSERVER OR THEIR DESIGNEE. COPIES OF THE REPORT SHALL ALSO BE GIVEN TO THE OWNER, CONTRACTOR, AND DEPUTY INSPECTOR. ANY DEFICIENCY NOTED ON THE OBSERVATION REPORT WILL BECOME THE RESPONSIBILITY OF THE STRUCTURAL ENGINEER OF RECORD TO VERIFY ITS COMPLETION BY HIM/HER OR BY A REGISTERED DEPUTY INSPECTOR AT THE DISCRETION OF THE STRUCTURAL OBSERVER.
- A FINAL OBSERVATION REPORT AND THAT OF THE REGISTERED DEPUTY INSPECTOR MUST BE SUBMITTED WHICH SHOWS THAT ALL OBSERVED DEFICIENCIES WERE RESOLVED AND STRUCTURAL SYSTEM GENERALLY CONFORMS WITH THE APPROVED PLANS AND SPECIFICATIONS. THE DEPARTMENT OF BUILDING AND SAFETY (LADBS) WILL NOT ACCEPT THE STRUCTURAL WORK WITHOUT THIS FINAL OBSERVATION REPORT AND THAT OF THE REGISTERED DEPUTY INSPECTOR (WHEN PROVIDED) AND THE CORRECTION OF SPECIFIC DEFICIENCIES NOTED DURING NORMAL BUILDING INSPECTION.
- THE STRUCTURAL OBSERVER SHALL PROVIDE THE ORIGINAL STAMPED AND SIGNED STRUCTURAL OBSERVATION REPORT TO THE CITY OF LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY BUILDING INSPECTOR.
- WHEN THE OWNER ELECTS TO CHANGE THE STRUCTURAL OBSERVER OF RECORD, THE OWNER SHALL:
 - NOTIFY THE BUILDING INSPECTOR IN WRITING BEFORE THE NEXT INSPECTION BY SUBMITTING COMPLETED "STRUCTURAL OBSERVATION PROGRAM AND DESIGNATION OF THE STRUCTURAL OBSERVER FORM IN/FORM.08 (PART 2).
 - CALL AN ADDITIONAL PRECONSTRUCTION MEETING, AND
 - FURNISH THE REPLACEMENT STRUCTURAL OBSERVER WITH A COPY OF ALL PREVIOUS OBSERVATION REPORTS.

THE REPLACEMENT STRUCTURAL OBSERVER SHALL APPROVE THE CORRECTION OF THE ORIGINAL OBSERVED DEFICIENCIES UNLESS OTHERWISE APPROVED BY PLAN CHECK SUPERVISION. THE POLICY OF THE DEPARTMENT SHALL BE TO CORRECT ANY PROPERLY NOTED DEFICIENCIES WITHOUT CONSIDERATION OF THEIR SOURCE.
- THE ENGINEER OR ARCHITECT OF RECORD SHALL DEVELOP ALL CHANGES RELATING TO THE STRUCTURAL SYSTEM. THE BUILDING DEPARTMENT SHALL REVIEW AND APPROVE ALL CHANGES TO THE APPROVED PLANS AND SPECIFICATIONS.

STRUCTURAL OBSERVATION/ SIGNIFICANT CONSTRUCTION STAGES (ONLY CHECKED ITEMS ARE REQUIRED)		
FIRM OR INDIVIDUAL TO BE RESPONSIBLE FOR THE " STRUCTURAL OBSERVATION "		
NAME: MANAN BHALJA, S.E. <input type="checkbox"/> LICENSED ARCHITECT <input checked="" type="checkbox"/> REGISTERED ENGINEER PHONE: (213) 485-5363 CALIFORNIA REGISTRATION NUMBER: S-6573		
CONSTRUCTION STAGE	CONSTRUCTION TYPE	ELEMENTS/ CONNECTIONS TO BE OBSERVED
FOUNDATION	<input checked="" type="checkbox"/> WALL FOOTING <input checked="" type="checkbox"/> SLAB ON GRADE <input type="checkbox"/> GRADE BEAMS <input type="checkbox"/> STEPPING/ RETAINING FOUNDATION, HILLSIDE SPECIAL ANCHORS <input type="checkbox"/> OTHERS:	WALL FOOTING: FOOTING LOCATION, LENGTH, WIDTH & THICKNESS, REBAR SIZE, SPACING, & DETAILING SLAB ON GRADE: LOCATION, LENGTH, WIDTH & THICKNESS, REBAR SIZE & SPACING ANCHOR BOLT: SIZE, LENGTH, LOCATION
WALL	<input type="checkbox"/> CONCRETE <input checked="" type="checkbox"/> MASONRY <input type="checkbox"/> WOOD <input type="checkbox"/> OTHERS:	CMU WALL REINFORCEMENT: SIZE, ANCHOR BOLT EMBEDMENT, REBAR SPACING AND DETAILING
ROOF FRAMING	<input type="checkbox"/> STEEL MOMENT FRAME <input type="checkbox"/> STEEL BRACED FRAME <input type="checkbox"/> CONCRETE MOMENT FRAME <input type="checkbox"/> MASONRY MOMENT FRAME <input type="checkbox"/> STEEL TRUSS CONNECTION <input checked="" type="checkbox"/> OTHERS:	ROOF FRAMING CONNECTIONS, STRAPS, DRAG BEAM CONNECTIONS
DIAPHRAGM	<input type="checkbox"/> CONCRETE <input type="checkbox"/> STEEL DECK <input checked="" type="checkbox"/> WOOD <input type="checkbox"/> OTHERS:	PLYWOOD NAILING
OTHERS		

DECLARATION BY OWNER OR OWNER'S REPRESENTATIVE

I, THE OWNER OF THE PROJECT THE OWNER'S REPRESENTATIVE, DECLARE THAT THE ABOVE LISTED FIRM OR INDIVIDUAL IS HIRED BY ME TO BE THE STRUCTURAL OBSERVER.

SIGNATURE _____ DATE _____

DECLARATION BY ARCHITECT OR ENGINEER OF RECORD (REQUIRED IF THE STRUCTURAL OBSERVER IS DIFFERENT FROM THE ARCHITECT OR ENGINEER OF RECORD)

I, THE ARCHITECT OR ENGINEER OF RECORD FOR THE PROJECT, DECLARE THAT THE ABOVE LISTED FIRM OR INDIVIDUAL IS DESIGNATED BY ME TO BE RESPONSIBLE FOR THE " STRUCTURAL OBSERVATION ".

SIGNATURE _____ LICENSE NO. _____ DATE _____

STRUCTURAL OBSERVATION PROGRAM AND DESIGNATION OF THE STRUCTURAL OBSERVER	
PROJECT ADDRESS: 345 E. 51ST STREET, LOS ANGELES CA	PERMIT APPL NO: _____
DESCRIPTION OF WORK: SOUTH PARK RESTROOM RENOVATION	
OWNER: CITY OF L.A.	ARCHITECT: ROBERT LOMELIN ENGINEER: MANAN BHALJA

STRUCTURAL OBSERVATION (ONLY CHECKED ITEMS ARE REQUIRED)			
FIRM OR INDIVIDUAL TO BE RESPONSIBLE FOR THE STRUCTURAL OBSERVATION:			
NAME: MANAN BHALJA PHONE: (213) 485-5363 CALIF REGISTRATION: S-6573			
FOUNDATION	WALL	FRAME	DIAPHRAGM
<input checked="" type="checkbox"/> FOOTINGS	<input type="checkbox"/> CONCRETE	<input type="checkbox"/> STEEL MOMENT FRAME	<input type="checkbox"/> CONCRETE
<input checked="" type="checkbox"/> SLAB ON GRADE	<input checked="" type="checkbox"/> MASONRY	<input type="checkbox"/> STEEL BRACED FRAME	<input type="checkbox"/> STEEL DECK
<input type="checkbox"/> GRADE BEAMS	<input type="checkbox"/> WOOD	<input type="checkbox"/> CONCRETE MOMENT FRAME	<input checked="" type="checkbox"/> WOOD
<input type="checkbox"/> STEPP'G / RETAIN'G FOUNDATION HILLSIDE SPECIAL ANCHORS	<input type="checkbox"/> OTHERS:	<input type="checkbox"/> MASONRY WALL FRAME	<input type="checkbox"/> OTHERS:
<input type="checkbox"/> OTHERS:		<input checked="" type="checkbox"/> OTHERS: ROOF FRAMING	

DECLARATION BY OWNER

I, THE OWNER OF THE PROJECT, DECLARE THAT THE ABOVE LISTED FIRM OR INDIVIDUAL IS HIRED BY ME TO BE THE STRUCTURAL OBSERVER.

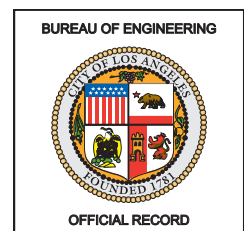
SIGNATURE _____ DATE _____

DECLARATION BY ARCHITECT OR ENGINEER OF RECORD

(REQUIRED IF THE STRUCTURAL OBSERVER IS DIFFERENT FROM THE ARCHITECT OR ENGINEER OF RECORD)

I, THE ARCHITECT OR ENGINEER OF RECORD FOR THE PROJECT, DECLARE THAT THE ABOVE LISTED FIRM OR INDIVIDUAL IS DESIGNATED BY ME TO BE RESPONSIBLE FOR THE STRUCTURAL OBSERVATION.

SIGNATURE _____ LICENSE NO. _____ DATE _____



CITY OF LOS ANGELES

BUREAU OF ENGINEERING

DEPARTMENT OF PUBLIC WORKS

CLIENT: RECREATION AND PARKS
GENERAL MANAGER: MICHAEL A. SHULL

SHEET TITLE: GENERAL NOTES

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM
RENOVATION

ADDRESS: 345 EAST 51ST STREET
LOS ANGELES, CA 90011

ENGINEER: MANAN BHALJA, S.E. LIC. NO. S-6573

DESIGNED BY: MANAN BHALJA, S.E., QUYNH HO, P.E.

DRAWN BY: EMIL YOUSSEF

CHECKED BY: MEL AGAGAS, S.E., MOURAD AZIZ P.E.

APPROVED BY: SHAILESH 'SUNNY' PATEL, S.E.

NO.

DATE

REVISION DESCRIPTION

BUILDING NO.

INDEX NO.

RP-300113

WORK ORDER NO.
E1908366

PLAN FILE NO.

DRAWING NO.

SHEET
27

OF

SHEETS
45

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TTLB TEMPLATE REVISION DATE: 4/2016

REVISION DATES
(DESIGN STAGE ONLY)

DEPUTY INSPECTION - CITY OF LOS ANGELES

- THIS SECTION APPLIES TO STRUCTURAL PORTION OF THE WORK REQUIRING SPECIAL INSPECTION IN ACCORDANCE WITH LABC SECTION 1704 & 1707.
- CONTINUOUS INSPECTION REFERS TO ON-SITE INSPECTION ON A CONTINUOUS BASIS OBSERVING ALL WORK REQUIRING SPECIAL INSPECTION.
- PERIODIC INSPECTION REFERS TO INTERMITTENT INSPECTION ON A PERIODIC BASIS, SATISFYING THE REQUIREMENTS OF CONTINUOUS INSPECTION AND PERFORMED AS OUTLINED ON THE PROJECT CONSTRUCTION DOCUMENTS, AND APPROVED BY THE BUILDING OFFICIAL.
- SPECIAL INSPECTION IS NOT REQUIRED WHEN THE WORK IS DONE ON THE PREMISES OF A CITY OF LOS ANGELES APPROVED FABRICATION SHOP APPROVED TO PERFORM THE WORK.
- SPECIAL INSPECTION SHALL BE PERFORMED BY A DEPUTY INSPECTOR REGISTERED IN THE CITY OF LOS ANGELES FOR THE PORTIONS OF THE WORK REQUIRING INSPECTION. THE DEPUTY INSPECTOR SHALL BE EMPLOYED BY THE OWNER, AND SHALL BE APPROVED BY AND BE RESPONSIBLE TO THE ENGINEER IN CHARGE OF THE STRUCTURAL DESIGN FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.
- THE EMPLOYMENT AND DUTIES OF THE DEPUTY INSPECTOR SHALL BE IN CONFORMANCE WITH THE LABC AND COLA INFORMATION BULLETIN P/BC 2014-34.
- THE SPECIAL INSPECTOR SHALL FURNISH DEPUTY INSPECTION REPORTS (LADBS FORM 07) TO THE DEPARTMENT OF BUILDING AND SAFETY, THE CONTRACTOR, THE OWNER'S REPRESENTATIVE, AND THE ENGINEER OF RECORD. REPORTS SHALL BE FILLED OUT AT THE TIME OF INSPECTION AND SUBMITTED TO LADBS DAILY. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. THEN IF UNCORRECTED, TO THE OWNER'S REPRESENTATIVE, THE ENGINEER OF RECORD, AND THE BUILDING OFFICIAL.
- AT THE TIME OF COMPLETION OF THE PROJECT, THE STRUCTURAL OBSERVER OF RECORD SHALL COMPLETE A CERTIFICATE OF COMPLIANCE INDICATING THAT THE DEPUTY INSPECTORS WERE RESPONSIBLE TO THEM.
- AT THE COMPLETION OF THE STRUCTURAL WORK, THE SPECIAL INSPECTORS SHALL SUBMIT A FINAL SIGNED REPORT STATING THAT ALL WORK WAS PERFORMED IN CONFORMANCE WITH THE CONTRACT DOCUMENTS AND THE APPLICABLE WORKMANSHIP PROVISIONS OF THE LABC.
- CONTINUOUS INSPECTION BY A DEPUTY INSPECTOR IS REQUIRED FOR ALL CONCRETE DESIGNED WITH f_c GREATER THAN 2500 PSI.
- CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF A WIND OR SEISMIC FORCE RESISTING SYSTEM/COMPONENT LISTED IN "STATEMENT OF SPECIAL INSPECTION" SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE LADBS INSPECTORS AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK ON SUCH SYSTEM OR COMPONENT PER SEC 1706.1.
- SEE TABLE ON SAME PAGE FOR ITEMS REQUIRING SPECIAL INSPECTION.

WORK REQUIRING SPECIAL INSPECTION AND STRUCTURAL OBSERVATION:		SPECIAL * INSPECTION	
		CONT.	PERIODIC
CONCRETE	A. CONCRETE PLACEMENT. 1. FOUNDATION / FOOTINGS. 2. SLAB-ON-GRADE. 3. ALL OTHER STRUCTURAL CONCRETE.	✓	
	B. MOLDING OF COMPRESSION TEST SAMPLES.	✓	
	C. PLACEMENT OF HIGH STRENGTH NON SHRINK GROUT AND TAKING SAMPLES.	✓	
	D. PLACEMENT OF REINFORCING PRIOR TO CLOSING THE FORM.		✓
REINFORCING STEEL	A. PLACEMENT OF REINFORCING BARS.		✓
	B. SAMPLING FOR TESTING.		✓
	C. MILL REPORT VERIFICATION AND MATERIAL IDENTIFICATION.	✓	
EXT. PLYWOOD SHEATHING	PLACEMENT AND CONNECTION OF SHEATHING TO ROOF FRAMING WHERE NAIL SPACING IS 4" O.C. AND LESS.	N/A	
MASONRY	A. PROPORTIONS OF SITE-PREPARED MORTAR		✓
	B. GRADE, TYPE AND SIZE OF REINFORCEMENT CONNECTIONS, ANCHOR BOLTS AND ANCHORAGES		✓
	C. GROUT SPACE		✓
	D. PLACEMENT OF REINFORCEMENT CONNECTORS, AND ANCHOR BOLTS		✓
	E. MATERIALS AND PROCEDURES WITH APPROVED SUBMITTALS		✓
	F. PLACEMENT OF MASONRY UNITS AND MORTAR JOINT CONSTRUCTION		✓
	G. SIZE AND LOCATION OF STRUCTURAL MEMBERS		✓
	H. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION		✓
	I. WELDING OF REINFORCEMENT	✓	
	J. OBSERVE PREPARATION OF GROUT SPECIMENTS, MORTAR SPECIMENS, AND/OR PRISM		✓

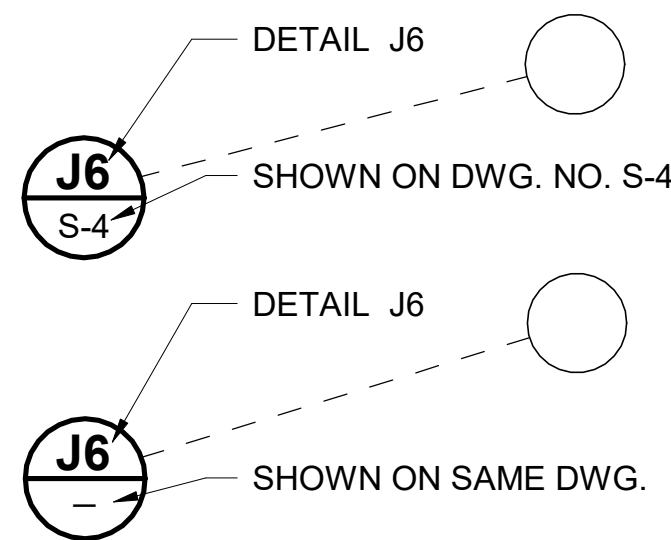
*FOR QUALIFICATION OF INSPECTOR REFER TO LABC SECTION 1704.2.1

ABBREVIATIONS

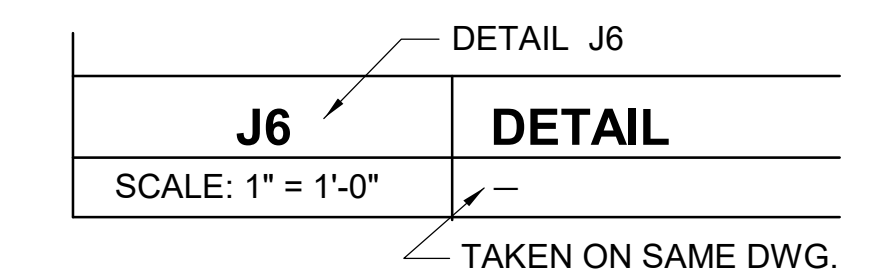
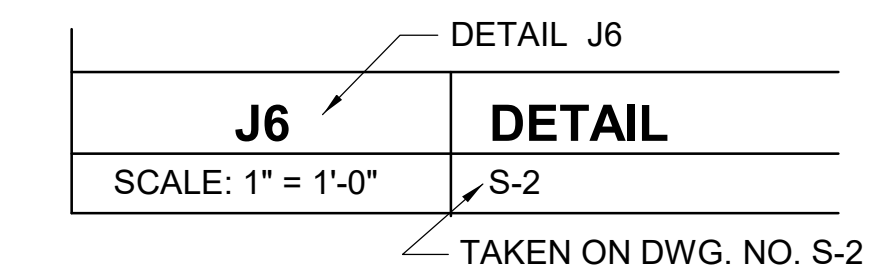
AB	ANCHOR BOLTS
ADDL	ADDITIONAL
BLDG	BUILDING
BLKG	BLOCKING
BM	BEAM
BN	BOUNDARY NAILING
BP	BASE PLATE
C	CHANNEL
CJ	CEILING JOIST
CJP	COMPLETE JOINT PENETRATION
COLA	CITY OF LOS ANGELES
CONT	CONTINUOUS
CTR	CENTER
DEMO	DEMOLISH / DEMOLITION
DIA	DIAMETER
DIAG	DIAGONAL
DIAPH	DIAPHRAGM
DIM	DIMENSION
DIST	DISTANCE
EMBED	EMBEDMENT
EN	EDGE NAILING
EOR	ENGINEER OF RECORD
EQ	EQUAL
EW	EACH WAY
EXIST.	EXISTING
FF	FINISH FLOOR
FS	FAR SIDE
FT	FEET OR FOOT
GALV.	GALVANIZE
HS	HEADED STUD
HSS	HOLLOW STRUCTURAL STEEL
HT	HEIGHT
IN	INCH
K	KIPS
LADBS	LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY
LARR	LOS ANGELES RESEARCH REPORT
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
MC	MISCELLANEOUS CHANNEL
MIN	MINIMUM
MB	MACHINE BOLTS

ABBREVIATIONS: (CONT)

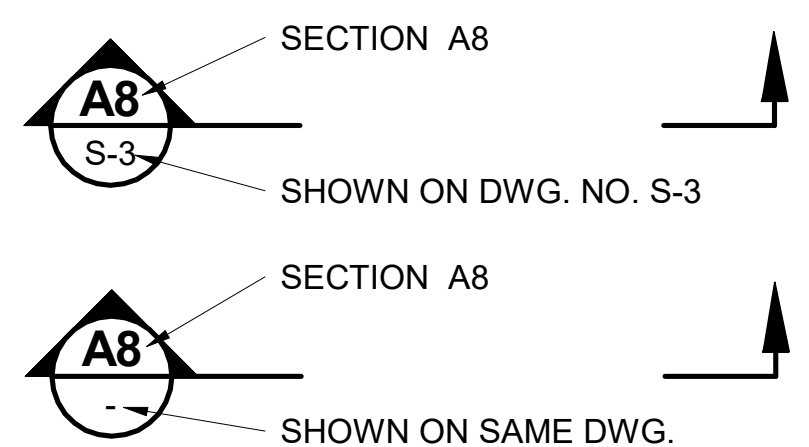
N	NORTH
NS	NEAR SIDE
NTS	NOT TO SCALE
OC	ON CENTER
PAF	POUNDER ACTUATED FASTENERS
PCF	POUNDS PER CUBIC FOOT
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PLF	POUNDS PER LINEAR FOOT
PROJ	PROJECTION
PSF	POUNDS PER SQUARE FOOT
PT	PRESSURE TREATED
QA	QUALITY ASSURANCE
QC	QUALITY CONTROL
QTY	QUANTITY
RECT	RECTANGULAR
REQD	REQUIRED
REV	REVISION
RJ	ROOF JOIST
REF	REFERENCE
SE	STRUCTURAL ENGINEER
SHT	SHEET
SIM	SIMILAR
SMS	SHEET METAL SCREWS
SOG	SLAB ON GRADE
SQ	SQUARE
STL	STEEL
SYMM	SYMMETRICAL
t	THICKNESS
T&B	TOP AND BOTTOM
TOF	TOP OF FOUNDATION
TOW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
W/	WITH
W/O	WITHOUT
WP	WORKING POINT
WT	WEIGHT
YD	YARD



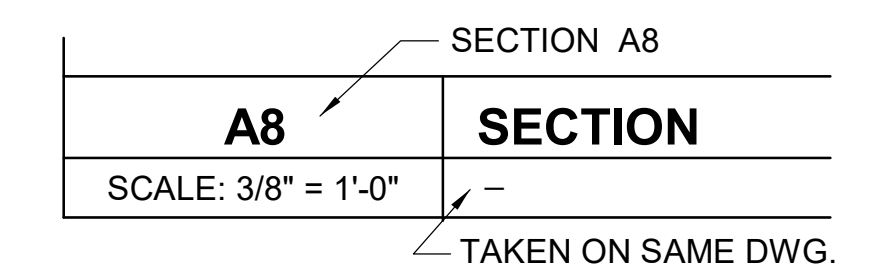
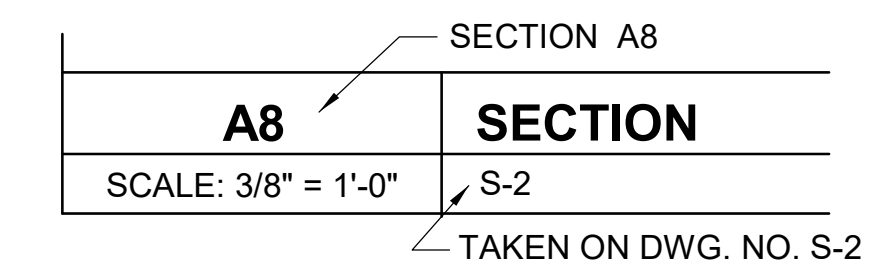
DETAIL CALLOUT



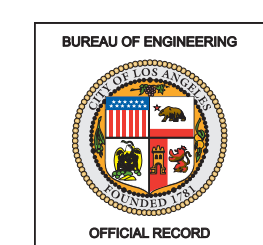
DETAIL TITLE



SECTION CALLOUT



SECTION TITLE



DEPARTMENT OF PUBLIC WORKS

BUREAU OF ENGINEERING

CITY OF LOS ANGELES

CLIENT: RECREATION AND PARKS
GENERAL MANAGER: MICHAEL A. SHULL

SHEET TITLE: GENERAL NOTES

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION

ADDRESS: 345 EAST 51ST STREET
LOS ANGELES, CA 90011

ENGINEER: MANAN BHALJA, S.E. LIC. NO. S-8573
DESIGNED BY: MANAN BHALJA, S.E., QUYNH HO, P.E.
DRAWN BY: EMIL YOUSSEF
CHECKED BY: MEL AGAGAS, S.E., MOURAD AZIZ P.E.
APPROVED BY: SHAILESH 'SUNNY' PATEL, S.E.

NO. _____ DATE _____

REVISION DESCRIPTION _____

INDEX NO. _____ BUILDING NO. _____

RP-300113

WORK ORDER NO. E1908366
PLAN FILE NO. _____
DRAWING NO. **S004**
SHEET 28 OF 45 SHEETS

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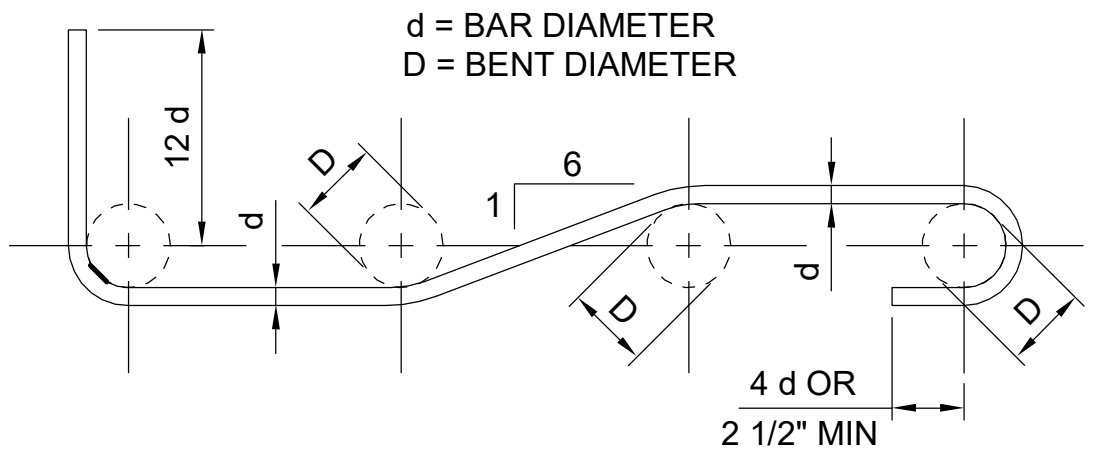
TTLB TEMPLATE REVISION DATE: 4/2016

- NOTES:
- ALL BENDS SHALL BE MADE COLD.
 - #14 & #18 BARS SHALL BE BEND-TESTED AT LAB AND APPROVED PRIOR TO BENDING.
 - FOR SIZE AND SPACING OF ALL TIES AND STIRRUPS, REFER TO SCHEDULE AND/OR DETAILS, TYP.

D = 4 db FOR #3 - #5
 D = 6 db FOR #6 - #8
 D = 8 db FOR #9 - #11

BAR DIAMETER DISTANCES IN INCHES										
BAR NO.	#3	#4	#5	#6	#7	#8	#9	#10	#11	
BAR DIA. (IN)	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	
3db=	1 1/8	1 1/2	1 7/8	2 1/4	2 5/8	3	3 3/8	3 3/4	4 1/4	
4db=	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	
6db=	2 1/4	3	3 3/4	4 1/2	5 1/4	6	6 3/4	7 5/8	8 1/2	
8db=	3	4	5	6	7	8	9	10 1/8	11 1/4	
12db=	4 1/2	6	7 1/2	9	10 1/2	12	13 1/2	15 1/4	16 7/8	

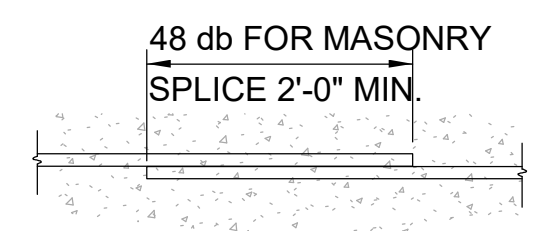
HOOPS AND TIE BEND DETAIL TABLE										
BAR NO.	#3	#4	#5	#6	#7	#8	#9	#10	#11	
BAR DIA. (IN)	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	
90° TEXT	6	6	8	10	12	12	14	16	18	
135° TEXT	4	4	4	6	6	6	8	8	10	
180° TEXT	4	4	4	4	4	4	6	6	6	



LIGHT WEIGHT CONCRETE LAP SPLICE LENGTH										
BAR NO.	#3	#4	#5	#6	#7	#8	#9	#10	#11	
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	
GRADE (ksi)	60	60	60	60	60	60	60	60	60	
CLASS A	1000	14	26	46	54	80	90	90	90	90
	1500	12	30	38	44	64	74	74	74	74
	2000	12	30	36	44	50	58	58	58	58
	2500	12	26	32	38	56	64	64	64	64
	3000	12	24	30	34	50	58	58	58	58

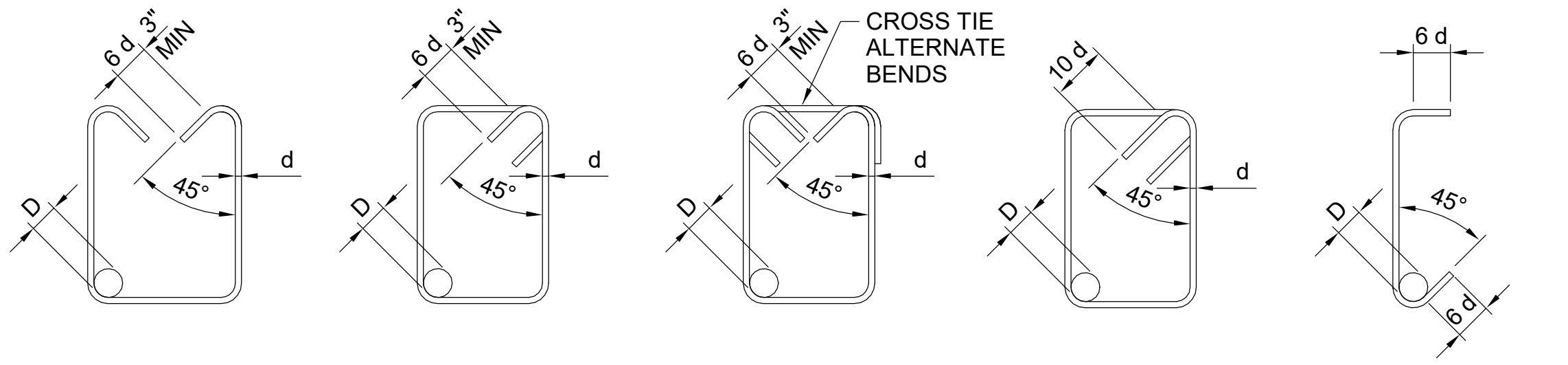
NOTES:

- VERTICAL WALL REINFORCING SHALL BE SPLICED AS TOP BARS. HORIZONTAL WALL REINFORCING SHALL BE SPLICED AS BOTTOM BARS, BUT NOT LESS THAN 30 BAR DIAMETER.
- IF CONCRETE COVER IS LESS THAN ONE BAR DIAMETER AND / OR IF CENTER TO CENTER SPACING IS LESS THAN THREE BAR DIAMETERS, THEN INCREASE THE LAP SPLICE LENGTHS IN THE TABLE BY 50%.



J9 TYPICAL REINFORCEMENT BAR LAP SPLICE LENGTH FOR MASONRY

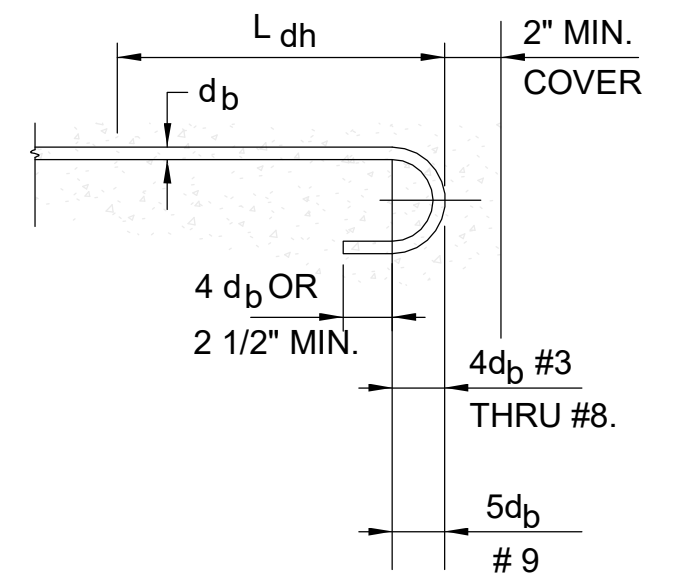
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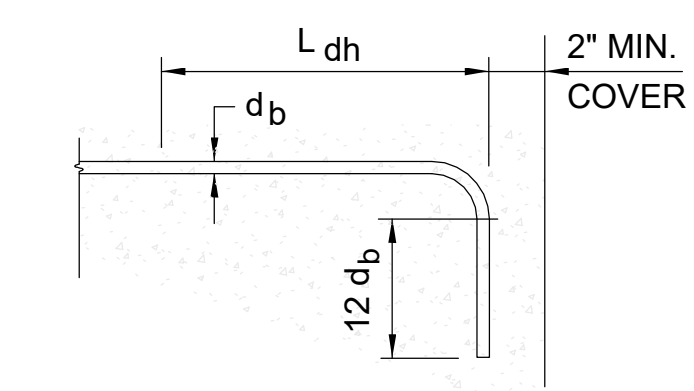
STD. BEAM STIRRUP **BEAM HOOP STIRRUP BENDS (WHERE OCCURS)** **BEAM HOOP - ALTERNATE (WHERE OCCURS)** **COLUMN TIE** **CROSS TIE**

LIGHT WEIGHT CONCRETE MIN LENGTH FOR Ldh STANDARD HOOKS									
BAR NO.	#3	#4	#5	#6	#7	#8	#9		
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	1 1/8		
GRADE (ksi)	60	60	60	60	60	60	60		
GENERAL USE	2500	12	16	20	24	28	32	38	
	3000	12	16	20	22	26	30	34	
	3250	12	16	18	22	26	30	32	
	4000	10	14	16	20	24	26	30	
SPECIAL CONFINEMENT HOOK IS WITHIN TIES OR STIRRUPS <3db	2500	10	14	16	20	24	26	30	
	3000	10	12	16	18	22	24	28	
	3250	10	12	16	18	20	24	26	
	4000	8	12	14	16	18	22	24	

NORMAL WEIGHT CONCRETE MIN LENGTH FOR Ldh STANDARD HOOKS									
BAR NO.	#3	#4	#5	#6	#7	#8	#9		
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	1 1/8		
GRADE (ksi)	60	60	60	60	60	60	60		
GENERAL USE	2500	10	12	16	18	22	24	28	
	3000	10	12	14	18	20	22	26	
	3250	8	10	14	16	20	22	24	
	4000	8	10	12	16	18	20	22	
SPECIAL CONFINEMENT HOOK IS WITHIN TIES OR STIRRUPS <3db	2500	8	10	12	16	18	20	22	
	3000	8	10	12	14	16	18	20	
	3250	8	10	12	14	16	18	20	
	4000	6	8	10	12	14	16	18	



STANDARD 180° HOOK



STANDARD 90° HOOK

- NOTES:
- SIDE COVER SHALL BE 2 1/2" MINIMUM.
 - L dh SHALL BE INCREASED 33% (L dh X 1.33) FOR DOWELS EMBEDDED IN LIGHT WEIGHT CONCRETE.

E9 MINIMUM EMBEDMENT LENGTH Ldh FOR STANDARD HOOKS

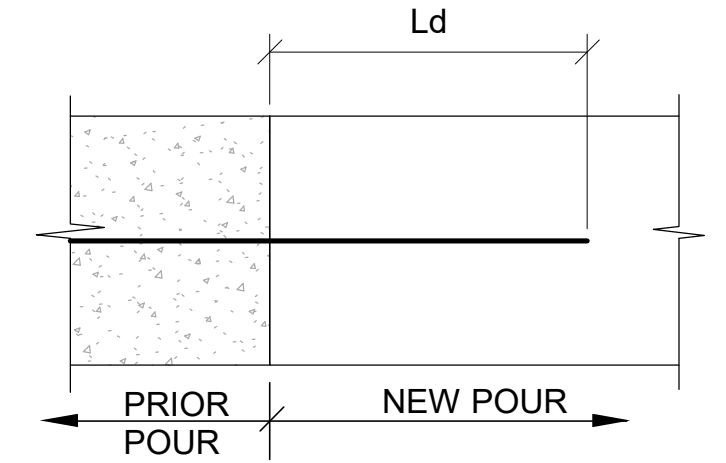
NOT TO SCALE

BAR SIZE	DEVELOPMENT LENGTH l_d (in)	
	NWC	NWC
#3	16	16
#4	20	24
#5	24	28
#6	28	32
#7	40	48
#8	48	56

LIGHT WEIGHT CONCRETE DEVELOPMENT LENGTH							
BAR NO.	#3	#4	#5	#6	#7	#8	
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	
GRADE (ksi)	60	60	60	60	60	60	
f'c (psi)	2000	28	36	46	54	80	90
	3000	22	30	38	44	64	74
	3250	22	30	36	44	50	58
	4000	20	26	32	38	56	64
	5000	18	24	30	34	50	58
	6000	16	22	26	32	46	52

NORMAL WEIGHT CONCRETE DEVELOPMENT LENGTH							
BAR NO.	#3	#4	#5	#6	#7	#8	
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	
GRADE (ksi)	60	60	60	60	60	60	
f'c (psi)	2000	22	28	34	42	60	68
	3000	18	22	28	34	48	56
	3250	16	22	28	32	38	44
	4000	16	20	24	30	42	48
	4500	14	18	24	28	32	36
	5000	14	18	22	26	38	44

REINFORCED CONCRETE REINFORCED MASONRY



REINFORCED MASONRY DEVELOPMENT LENGTH										
BAR NO.	#3	#4	#5	#6	#7	#8	#9	#10	#11	
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	
GRADE (ksi)	60	60	60	60	60	60	60	60	60	
f'c (psi)	1000	14	26	40	74	100	148	190	240	296
	1500	12	22	32	60	82	122	154	196	242
	2000	10	18	28	52	70	106	134	170	210
	2500	10	16	26	46	64	94	120	152	188
	3000	10	16	24	42	58	86	110	138	170



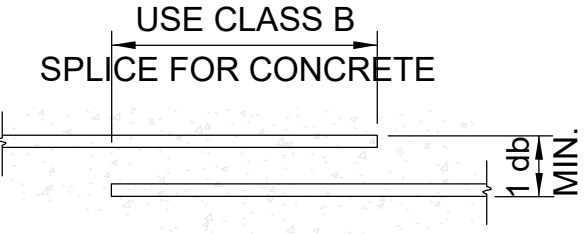
F1 TYPICAL STIRRUP, HOOP AND TIE BENDS DETAILS

NOT TO SCALE

LIGHT WEIGHT CONCRETE LAP SPLICE LENGTH							
BAR NO.	#3	#4	#5	#6	#7	#8	
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	
GRADE (ksi)	60	60	60	60	60	60	
CLASS A	2000	28	36	46	54	80	90
	3000	22	30	38	44	64	74
	3250	22	30	36	44	50	58
	4000	20	26	32	38	56	64
	5000	18	24	30	34	50	58
CLASS B	2000	36	48	60	70	102	118
	3000	30	38	48	58	84	96
	3250	28	38	46	56	64	74
	4000	26	34	42	50	72	84
	5000	24	30	38	46	66	74

NORMAL WEIGHT CONCRETE LAP SPLICE LENGTH							
BAR NO.	#3	#4	#5	#6	#7	#8	
BAR DIA. (in)	3/8	1/2	5/8	3/4	7/8	1	
GRADE (ksi)	60	60	60	60	60	60	
CLASS A	2000	22	28	34	42	60	68
	3000	18	22	28	34	48	56
	3250	16	22	28	32	38	44
	4000	16	22	28	30	42	48
	4500	14	18	24	28	32	36
CLASS B	2000	12	16	20	24	34	40
	3000	22	30	36	44	64	72
	3250	22	28	36	42	48	56
	4000	20	26	32	38	54	62
	4500	18	24	30	36	42	48

- NOTES:
- TOP BAR IS A HORIZONTAL BAR WHERE THE DEPTH OF THE CONCRETE CAST IN ONE LIFT BENEATH THE BAR EXCEEDS 12 INCHES. ALL OTHER BARS SHALL BE CONSIDERED BOTTOM BARS.
 - VERTICAL WALL REINFORCING SHALL BE SPLICED AS TOP BARS. HORIZONTAL WALL REINFORCING SHALL BE SPLICED AS BOTTOM BARS, BUT NOT LESS THAN 30 BAR DIAMETER.
 - IF CONCRETE COVER IS LESS THAN ONE BAR DIAMETER AND / OR IF CENTER TO CENTER SPACING IS LESS THAN THREE BAR DIAMETERS, THEN INCREASE THE LAP SPLICE LENGTHS IN THE TABLE BY 50%.



A1 TYPICAL REINFORCEMENT BAR LAP SPLICE LENGTH FOR CONCRETE

NOT TO SCALE

A9 TYPICAL REBAR DEVELOPMENT LENGTH

NOT TO SCALE

BUREAU OF ENGINEERING

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

ENGINEER: MANAN BHALLA, S.E. LIC. NO. S-8573

DESIGNED BY: MANAN BHALLA, S.E., QUYNH HO, P.E.

DRAWN BY: EML YOUSSEF

CHECKED BY: MEL AGAGAS, S.E., MOURAD AZIZ P.E.

APPROVED BY: SHAILESH 'SUNNY' PATEL, S.E.

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION

ADDRESS: 345 EAST 51ST STREET LOS ANGELES, CA 90011

SHEET TITLE: TYPICAL DETAILS

WORK ORDER NO. E1908366

PLAN FILE NO.

DRAWING NO. S005

SHEET 29 OF 45

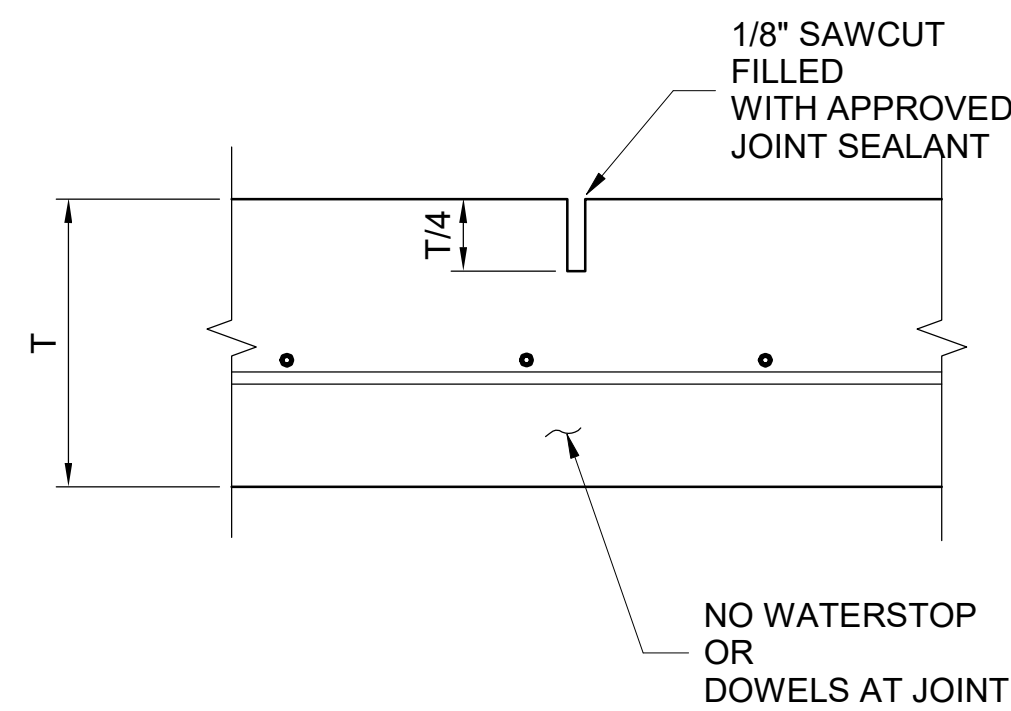
BUILDING NO. -

INDEX NO. RP-300113

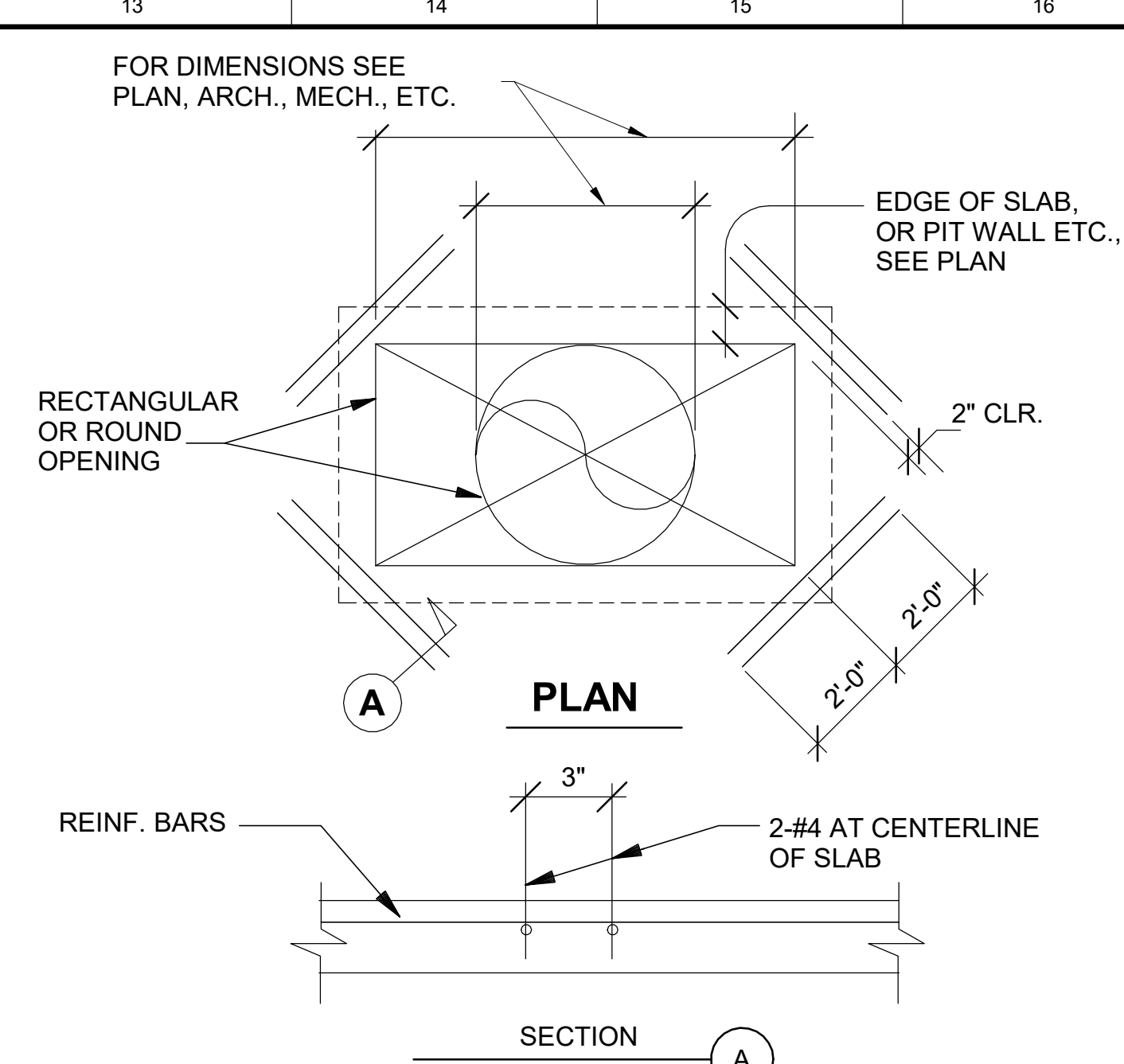
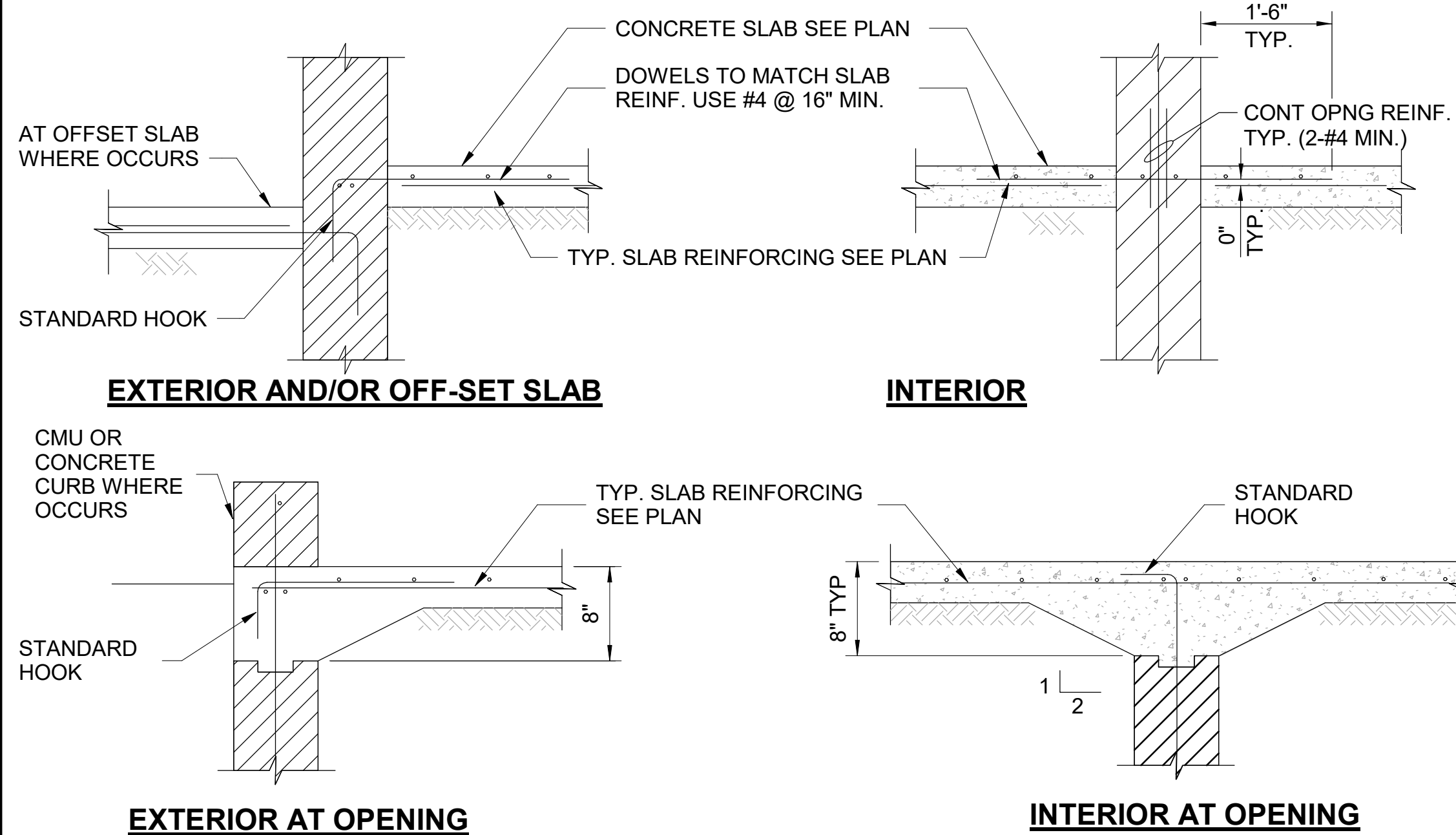
PLOTTED 05/29/19 11:01:53 AM

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TTLB TEMPLATE REVISION DATE: 4/2016



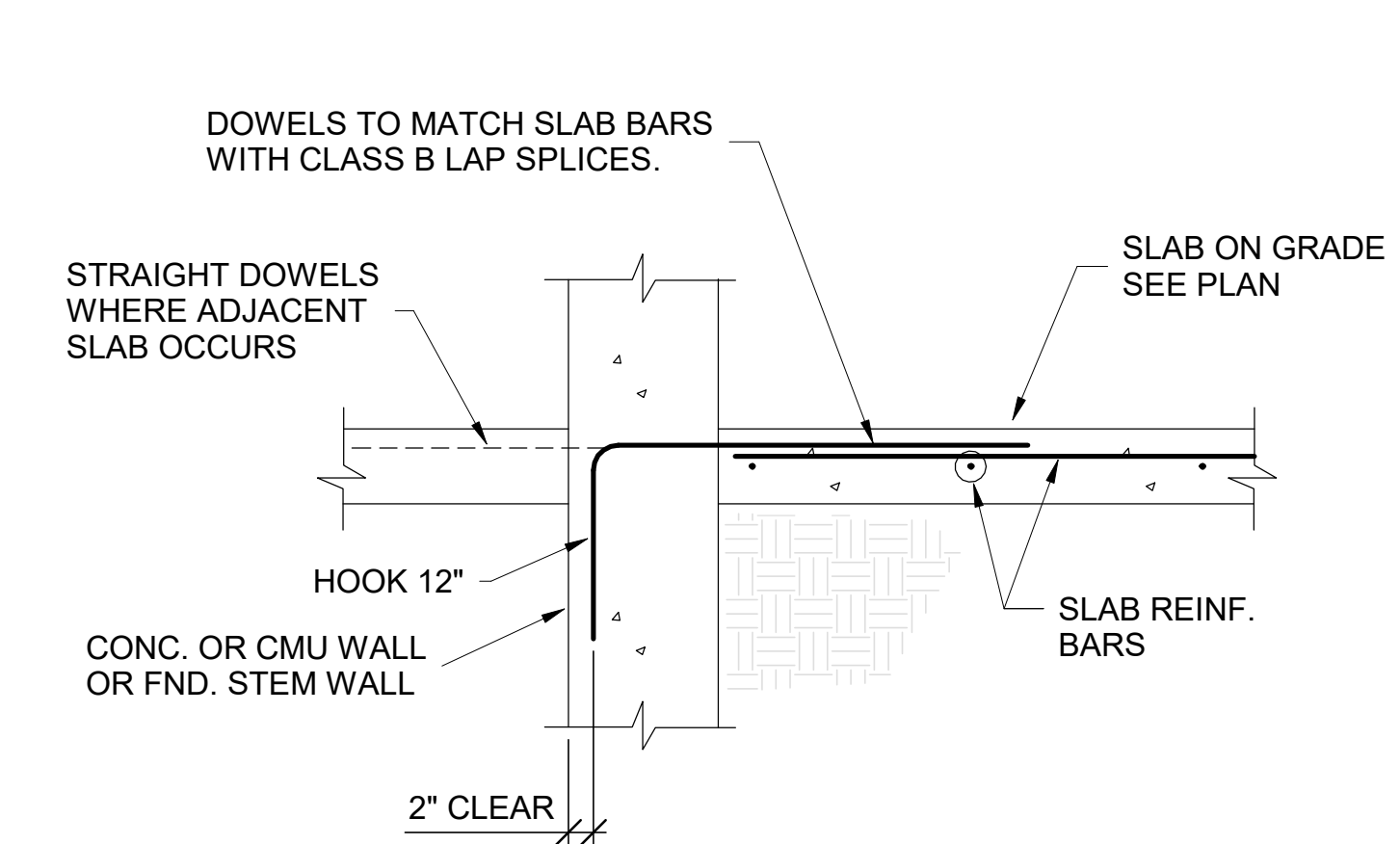
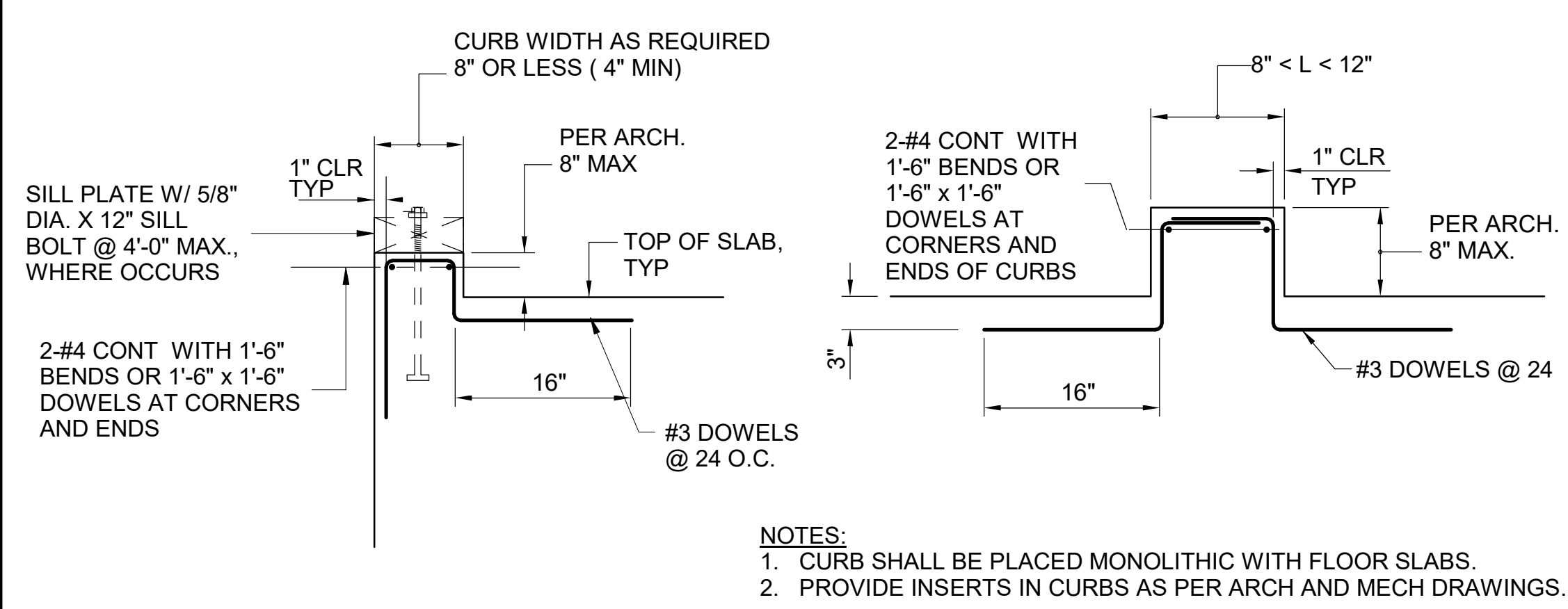
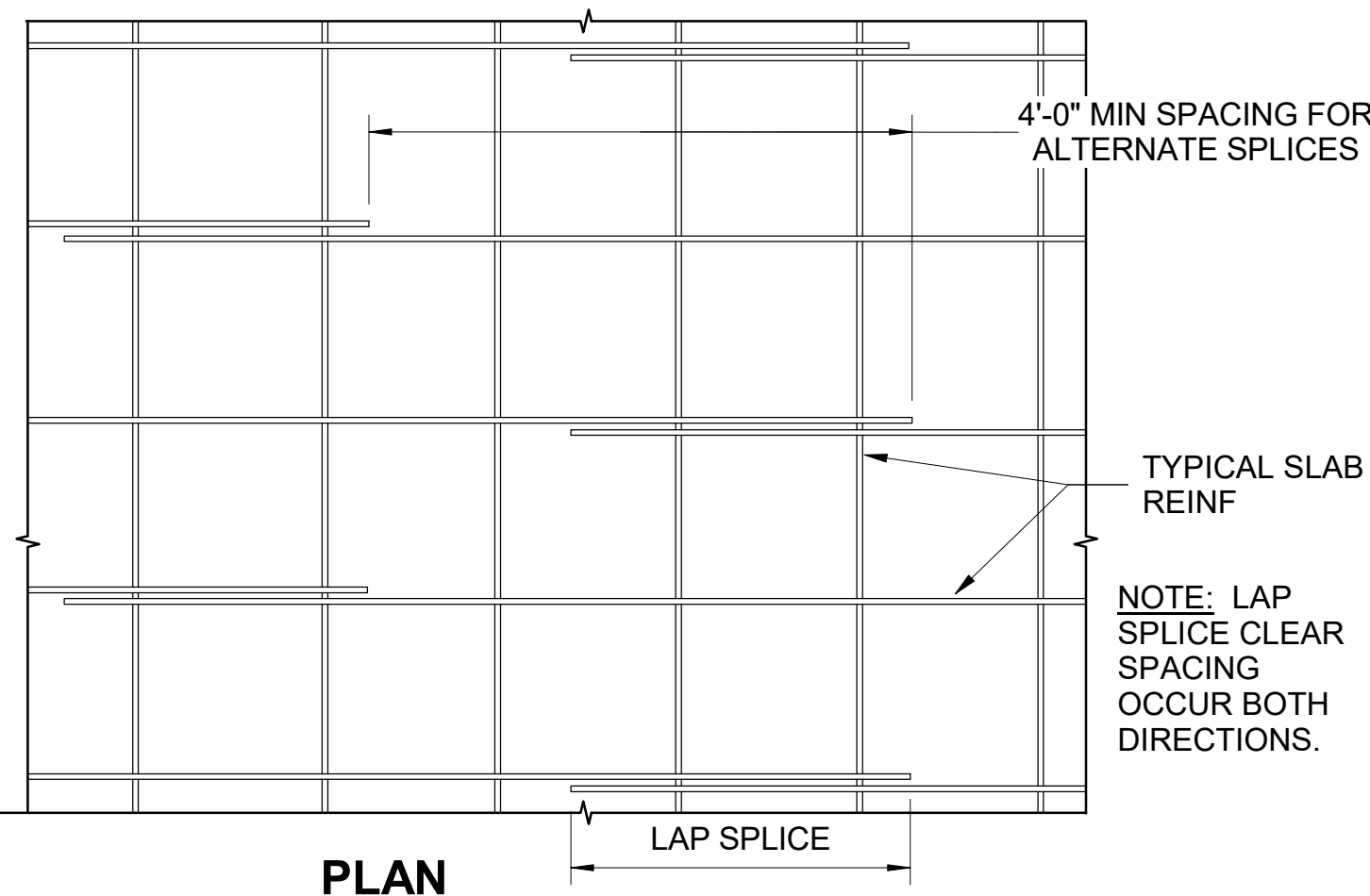
- NOTES:**
1. JOINT FORMED WITH TOOL OR INSERT STRIP MAY BE SUBSTITUTED FOR SAWED TYPE ONLY WITH PRIOR ACCEPTANCE BY THE ENGINEER.
 2. SAWING SHALL BE PERFORMED AFTER 7 DAYS.
 3. IF SINGLE LAYER OF REINFORCEMENT, EVERY OTHER BAR IS DISCONTINUOUS AT JOINT. IF 2 LAYER REINFORCEMENT, TOP LAYER IS COMPLETELY DISCONTINUOUS AT JOINT.



J1 TYPICAL CONTROL JOINT DETAIL

J7 TYPICAL SLAB ON GRADE DOWELING TO MASONRY WALL

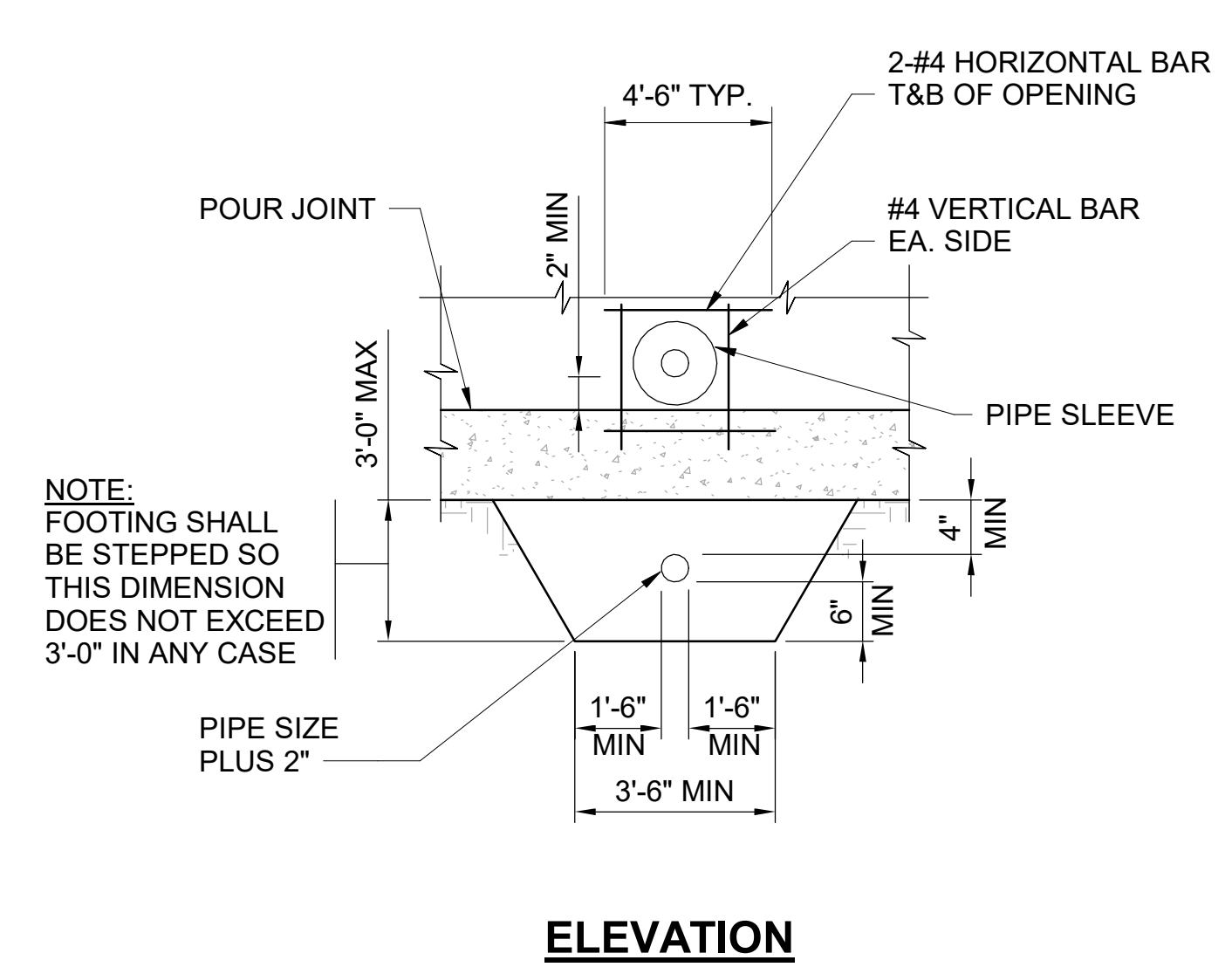
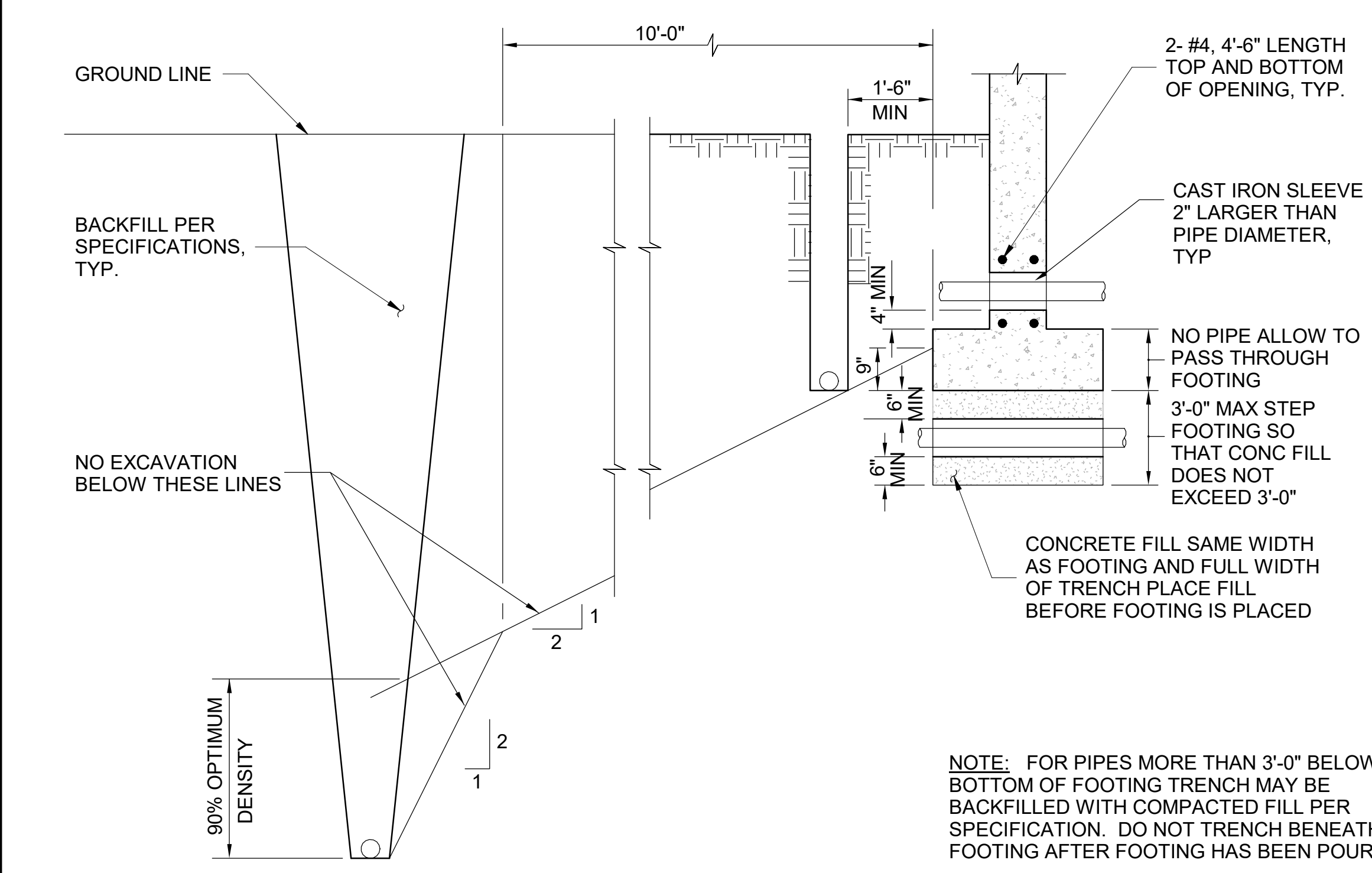
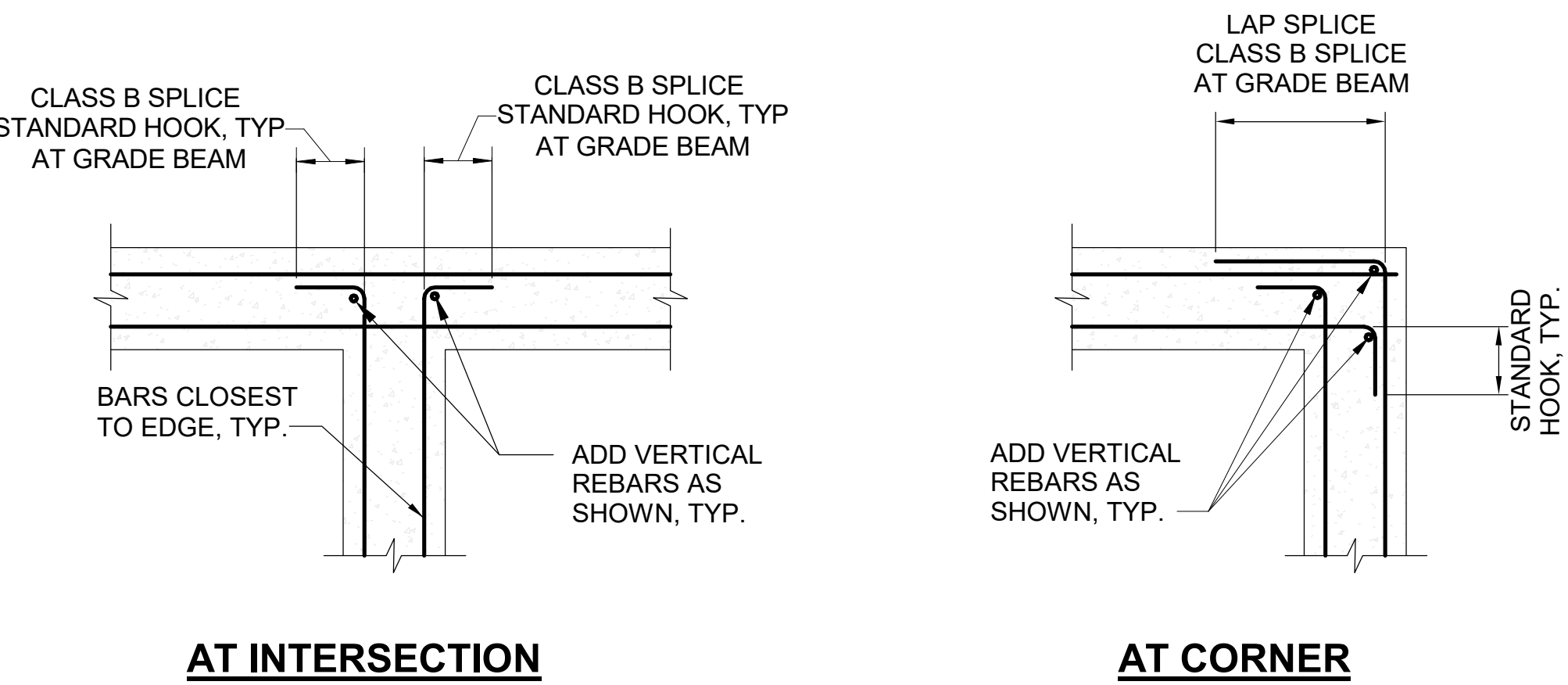
J13 TYP OPENING IN SLAB ON GRADE



F1 TYPICAL LAP SPLICE SLAB REINFORCING DETAIL

F7 TYPICAL CONCRETE CURB DETAILS

F13 SLAB DOWEL DETAIL



A1 TYPICAL CONTINUOUS FOOTING DETAIL

A7 TYPICAL PIPE AND TRENCH DETAIL

BUREAU OF ENGINEERING
 CITY OF LOS ANGELES
 ENGINEERING
 DATE: _____
 REVISION DESCRIPTION: _____
 NO. _____
 BUILDING NO. _____
 INDEX NO. **RP-300113**

DEPARTMENT OF PUBLIC WORKS
GARY LEE MOORE, PE, ENV SP
 CITY ENGINEER
 DATE: _____
 DESIGN GROUP: _____
 ENGINEER: MANAN BHALJA, S.E. LIC. NO. S-8573
 DESIGNED BY: MANAN BHALJA, S.E., QUYNH HO, P.E.
 DRAWN BY: EMIL YOUSSEF
 CHECKED BY: MEL AGAGAS, S.E., MOURAD AZIZ P.E.
 APPROVED BY: SHAILESH 'SUNNY' PATEL, S.E.

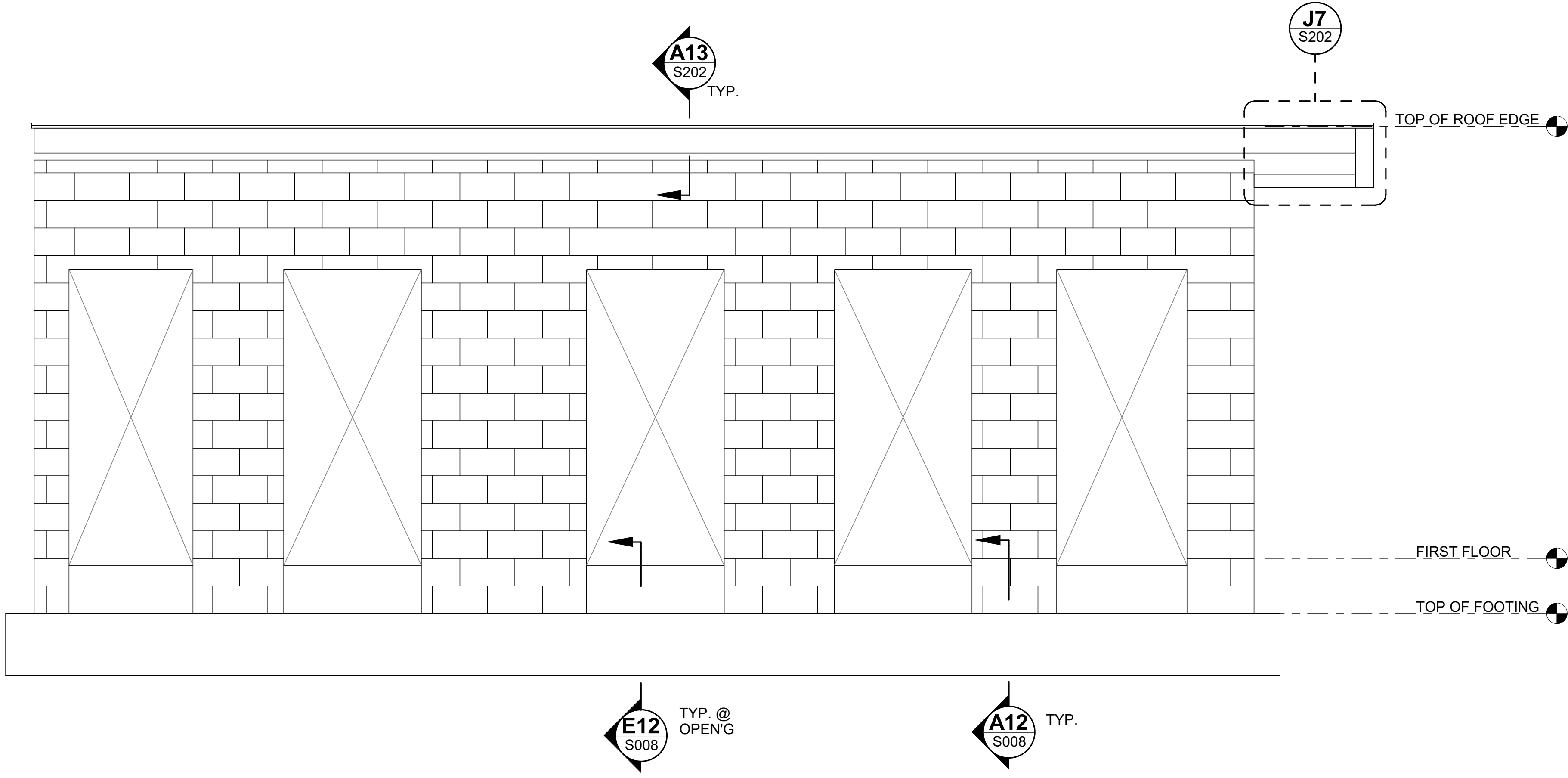
CITY OF LOS ANGELES
 CLIENT: RECREATION AND PARKS
 GENERAL MANAGER: MICHAEL A. SHULL
 SHEET TITLE: TYPICAL DETAILS
 PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
 ADDRESS: 345 EAST 51ST STREET
 LOS ANGELES, CA 90011

WORK ORDER NO. E1908366
 PLAN FILE NO. _____
 DRAWING NO. **S006**
 SHEET 30 OF 45
 PLOTTED 05/29/19 11:01:54 AM

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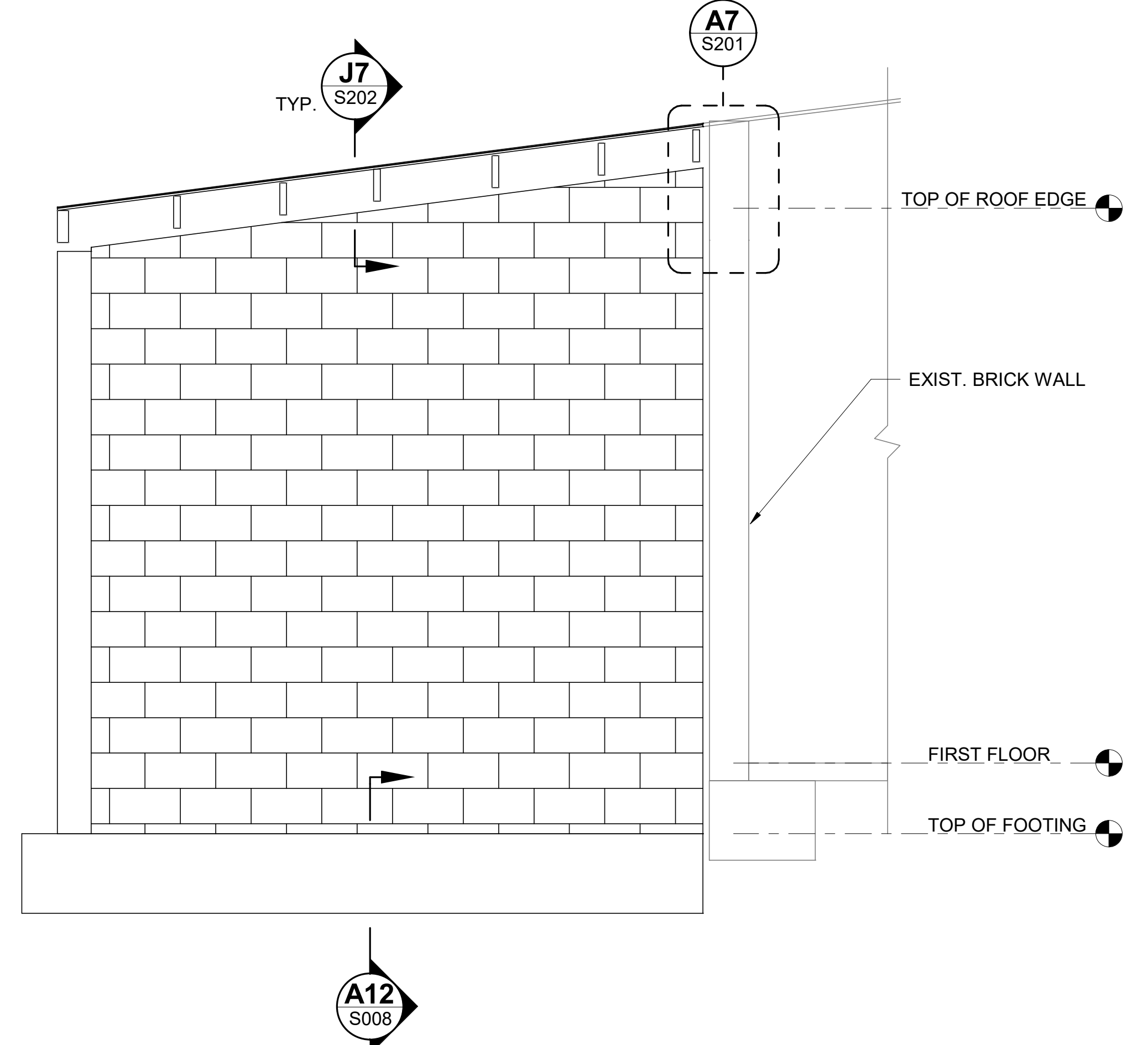
TTLB TEMPLATE REVISION DATE: 4/2016

NOTE:
 1. FOR TYPICAL WALL REINFORCEMENT AT OPENING, REFER TO DETAIL J1/S007.
 2. AT WALL PIER, PROVIDE TIES AND REINFORCEMENT PER DETAIL J6/S008.



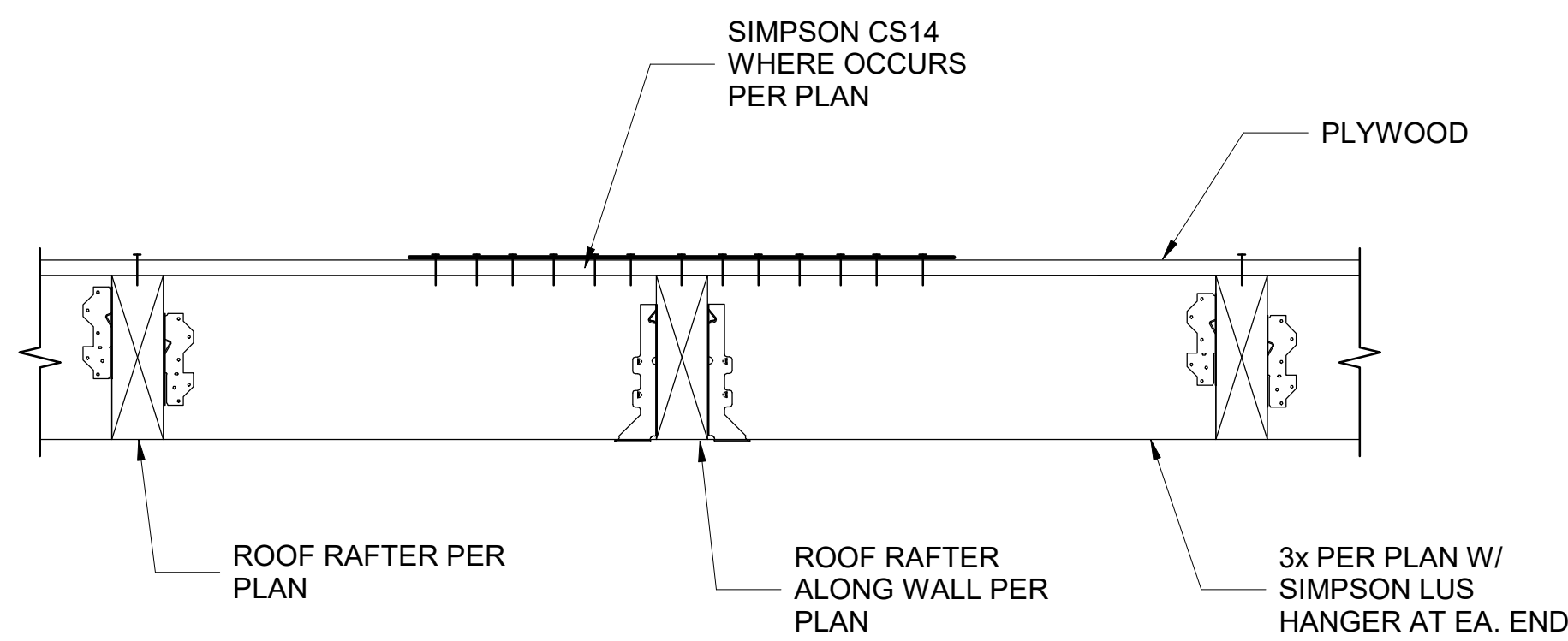
G1 SOUTH WALL ELEVATION

NOT TO SCALE



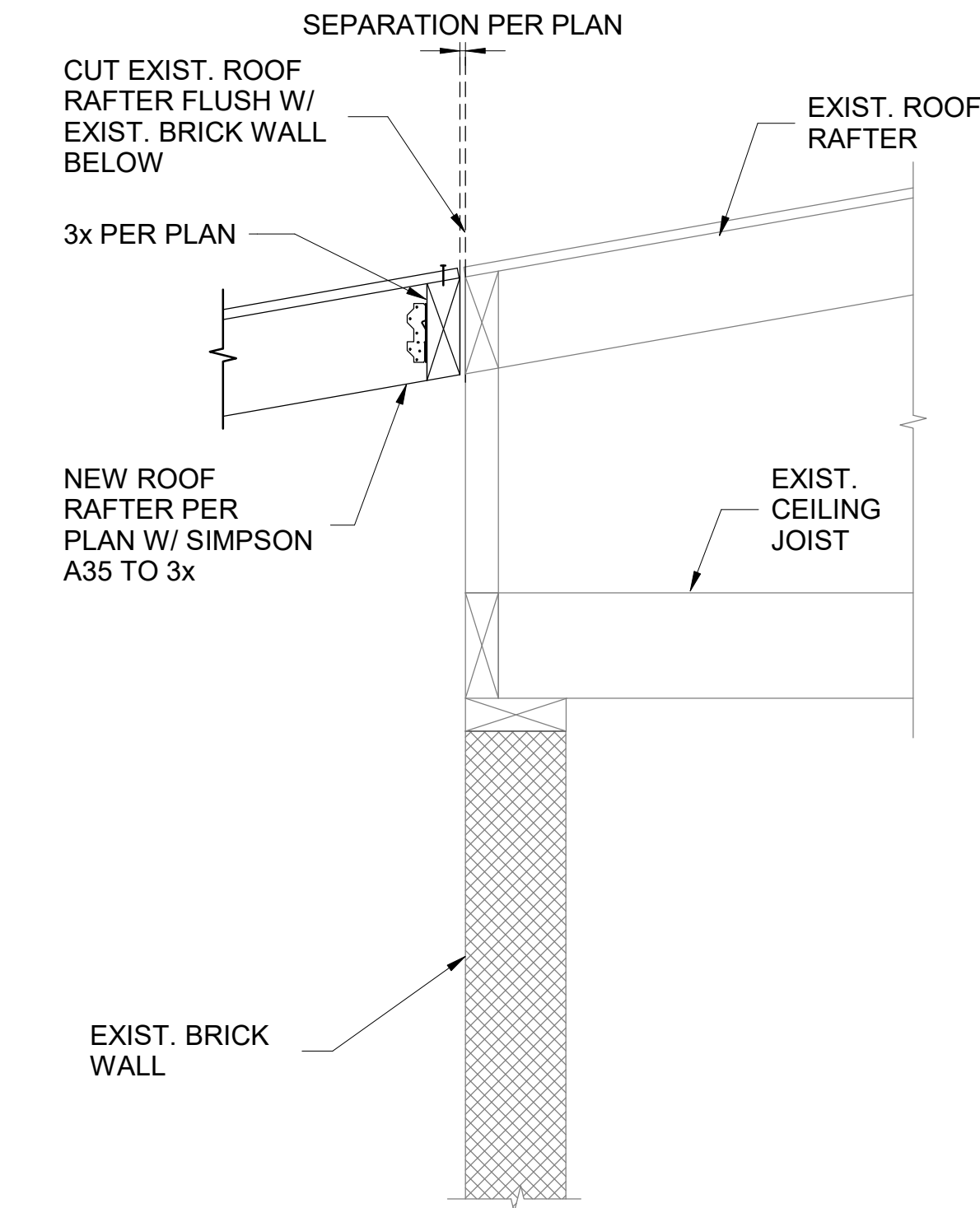
G11 EAST WALL ELEVATION

NOT TO SCALE



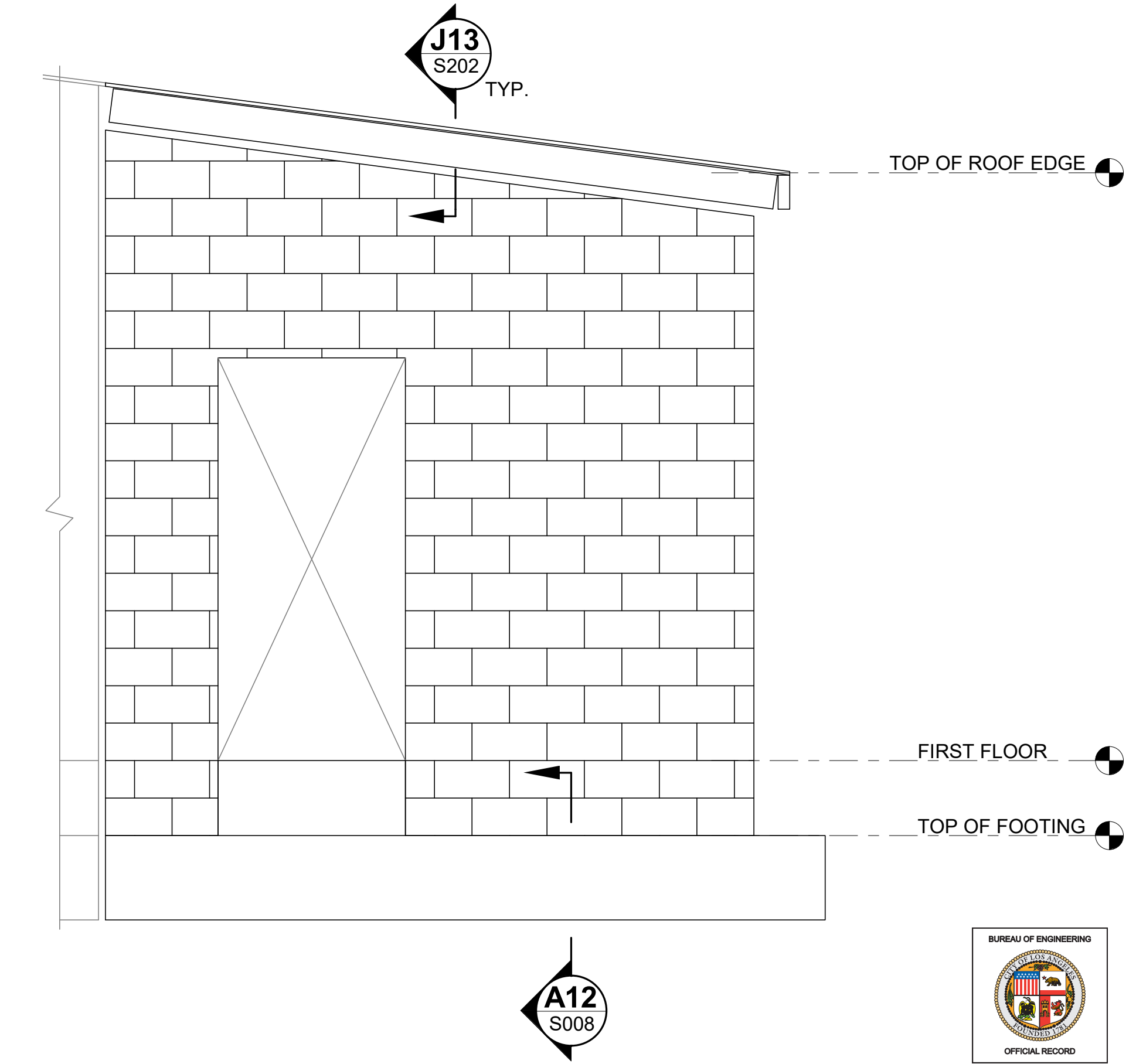
A1 FRAMING CONNECTION DETAIL

NOT TO SCALE 2/ S101



A7 EDGE OF NEW ROOF

NOT TO SCALE 2/ S101




A11 WEST WALL ELEVATION

NOT TO SCALE

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TTLB TEMPLATE REVISION DATE: 4/2016

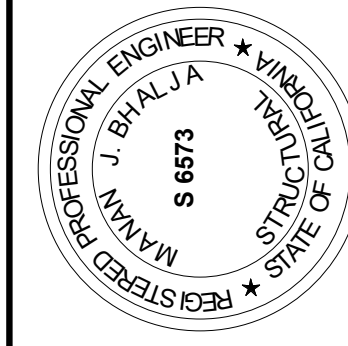
BUREAU OF ENGINEERING



ENGINEERING
CITY OF LOS ANGELES

NO.	REVISION/DESCRIPTION	DATE	BY

DEPARTMENT OF PUBLIC WORKS



GARY LEE MOORE, PE, ENV SP
CITY ENGINEER
LIC. NO. S-8573

ENGINEER	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
MANAN BHALJA, S.E.	MANAN BHALJA, S.E., QUYNH HO P.E.	EMIL YOUSSEF	MEL AGAGAS S.E., MOURAD AZIZ P.E.	SHAILESH 'SUNNY' PATEL, S.E.

CITY OF LOS ANGELES

SHEET TITLE: ELEVATIONS, SECTIONS, & DETAILS

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION

ADDRESS: 345 EAST 51ST STREET, LOS ANGELES, CA 90011

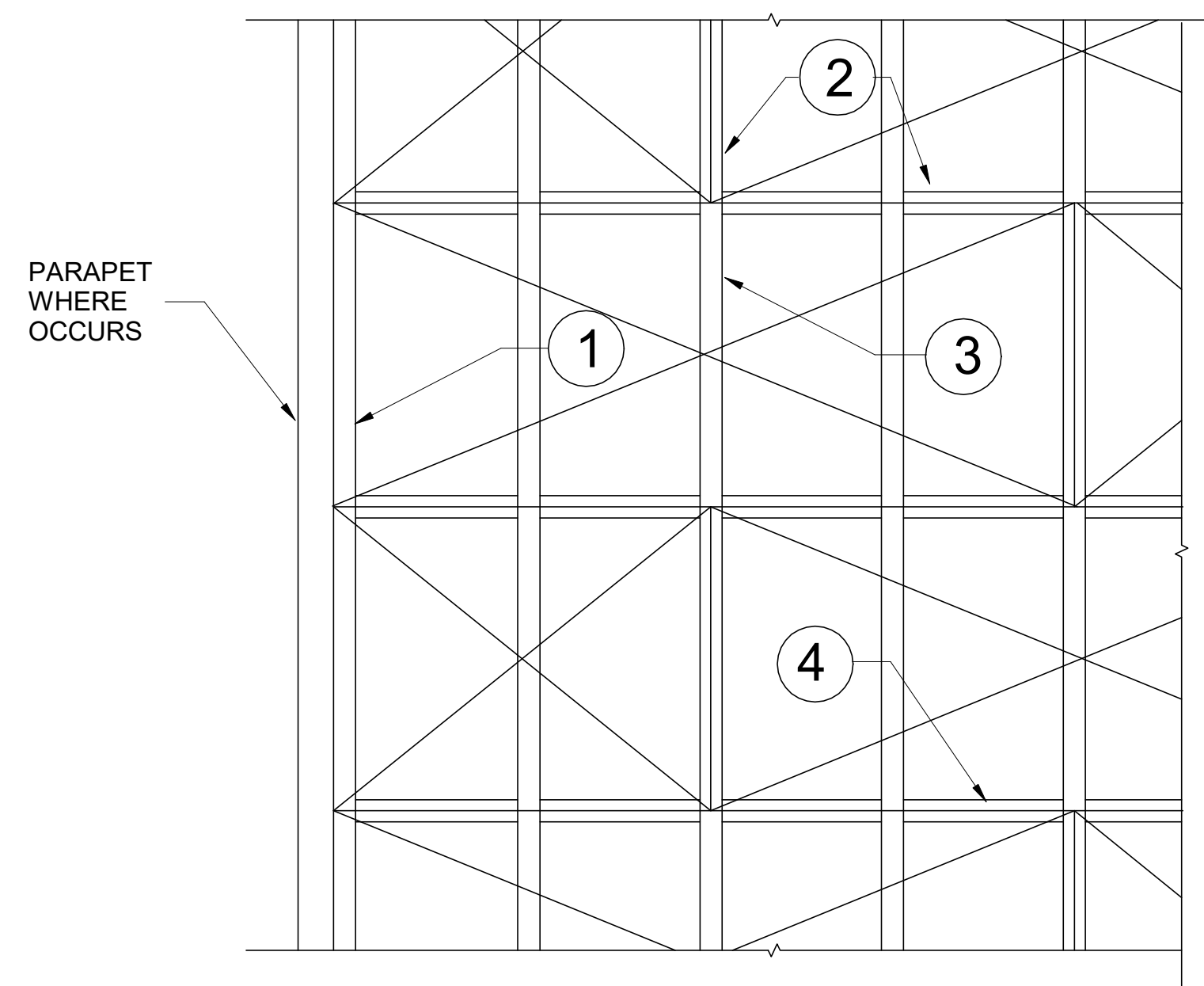
WORK ORDER NO.	PLAN FILE NO.	DRAWING NO.
E1908366		S201

SHEET 34 OF 45

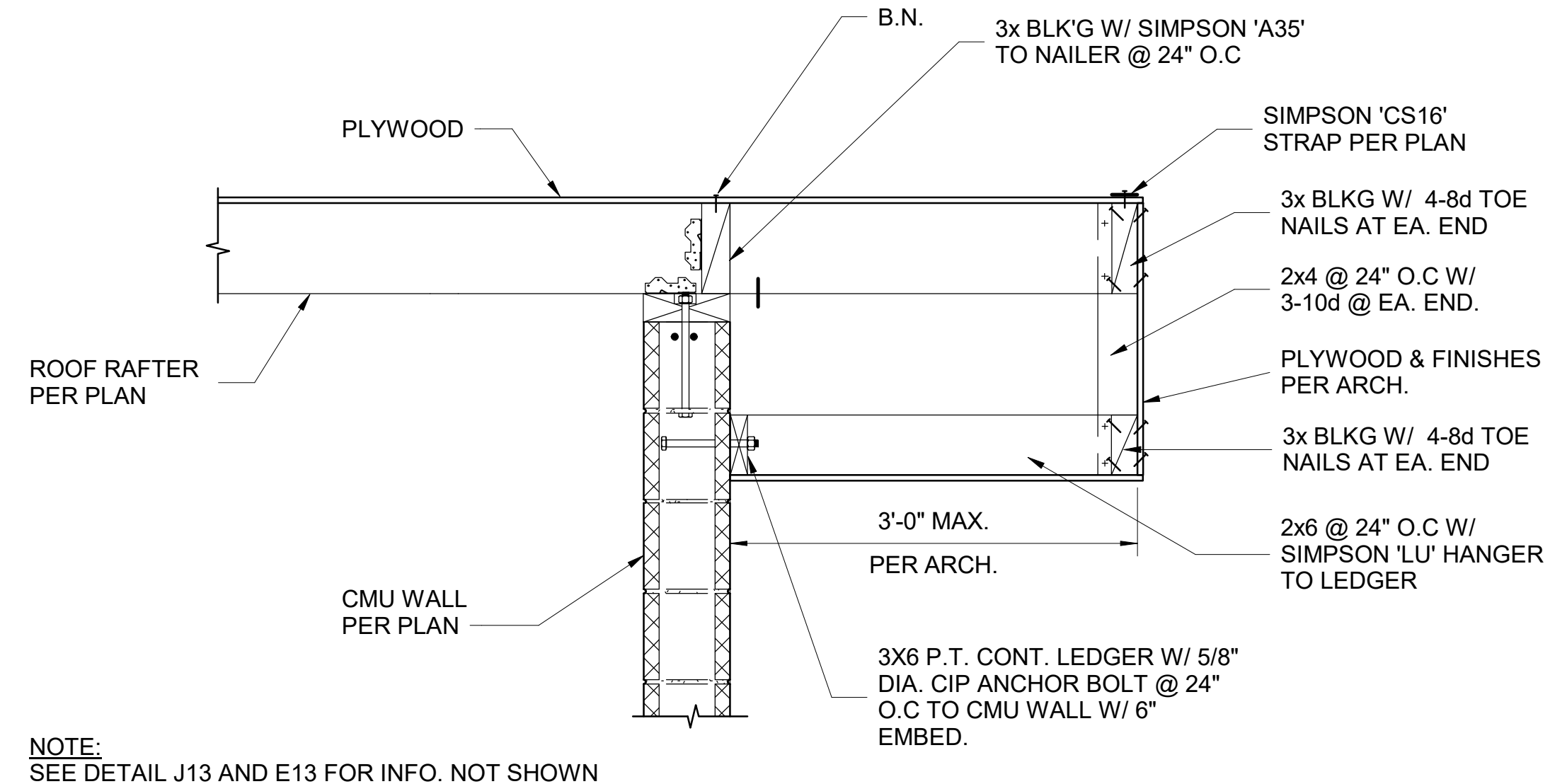
PLOTTED 6/5/2019 11:01:59 AM

THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

- 1 BOUNDARY NAILING: B.N.
- 2 EDGE NAILING: E.N.
- 3 FIELD NAILING: F.N.
- 4 3x4 MIN. FLAT BLOCKING, U.N.O

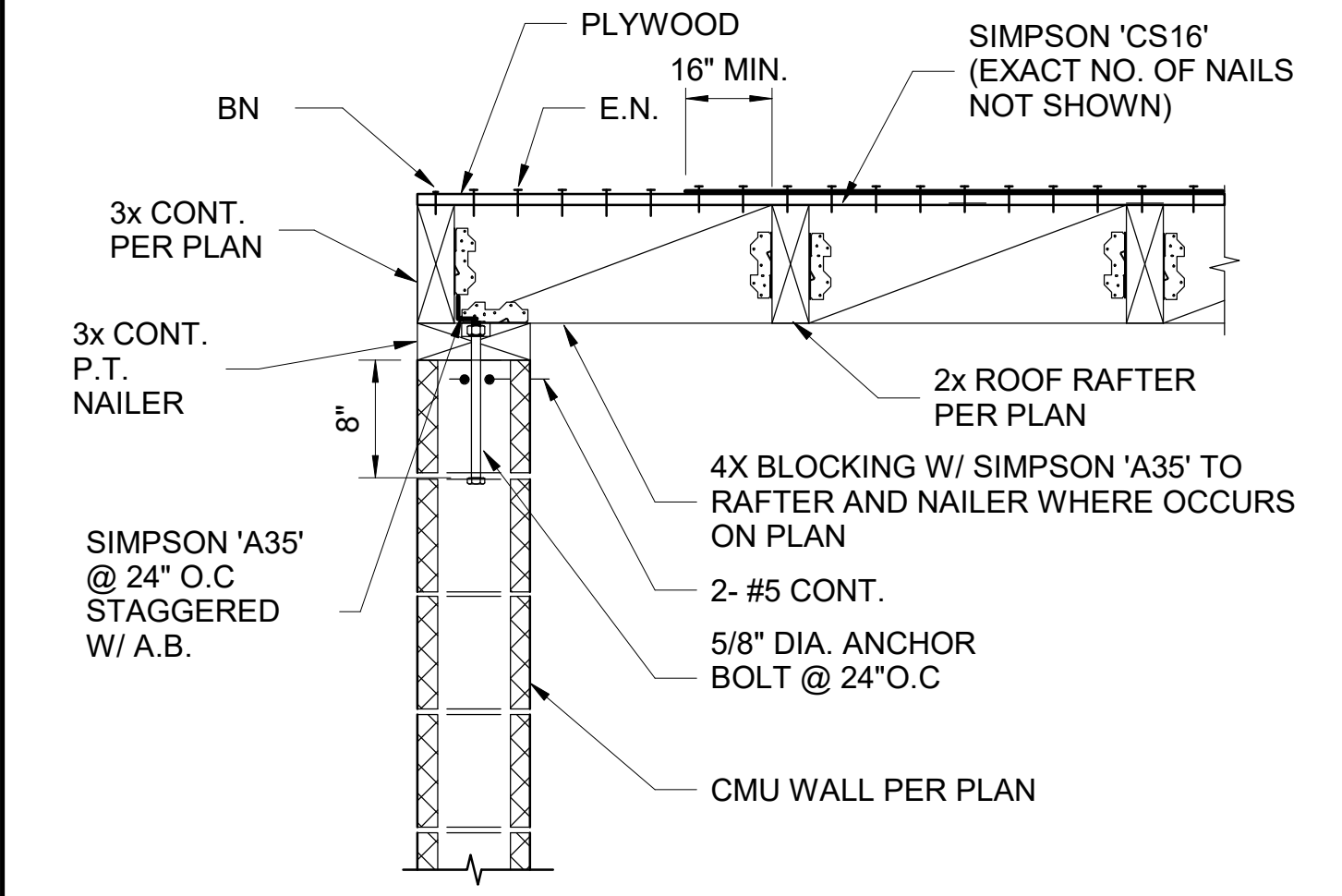


- NOTES:**
- SEE PLAN FOR PLYWOOD THICKNESS AND NAILING
 - 4'-0" X 8'-0" MIN. SIZE OF PLYWOOD SHEET.
 - LONG DIMENSION OF PLYWOOD SHEATHING SHALL RUN ACROSS JOINT OR TRUSS JOINT.
 - NAILS SHALL HAVE MINIMUM 3/8" EDGE DISTANCE AND SHALL NOT BE OVER DRIVEN THROUGH OUTER PLY.
 - STAGGER PLYWOOD JOINTS.
 - STAGGER NAILS AT ADJACENT PANELS.



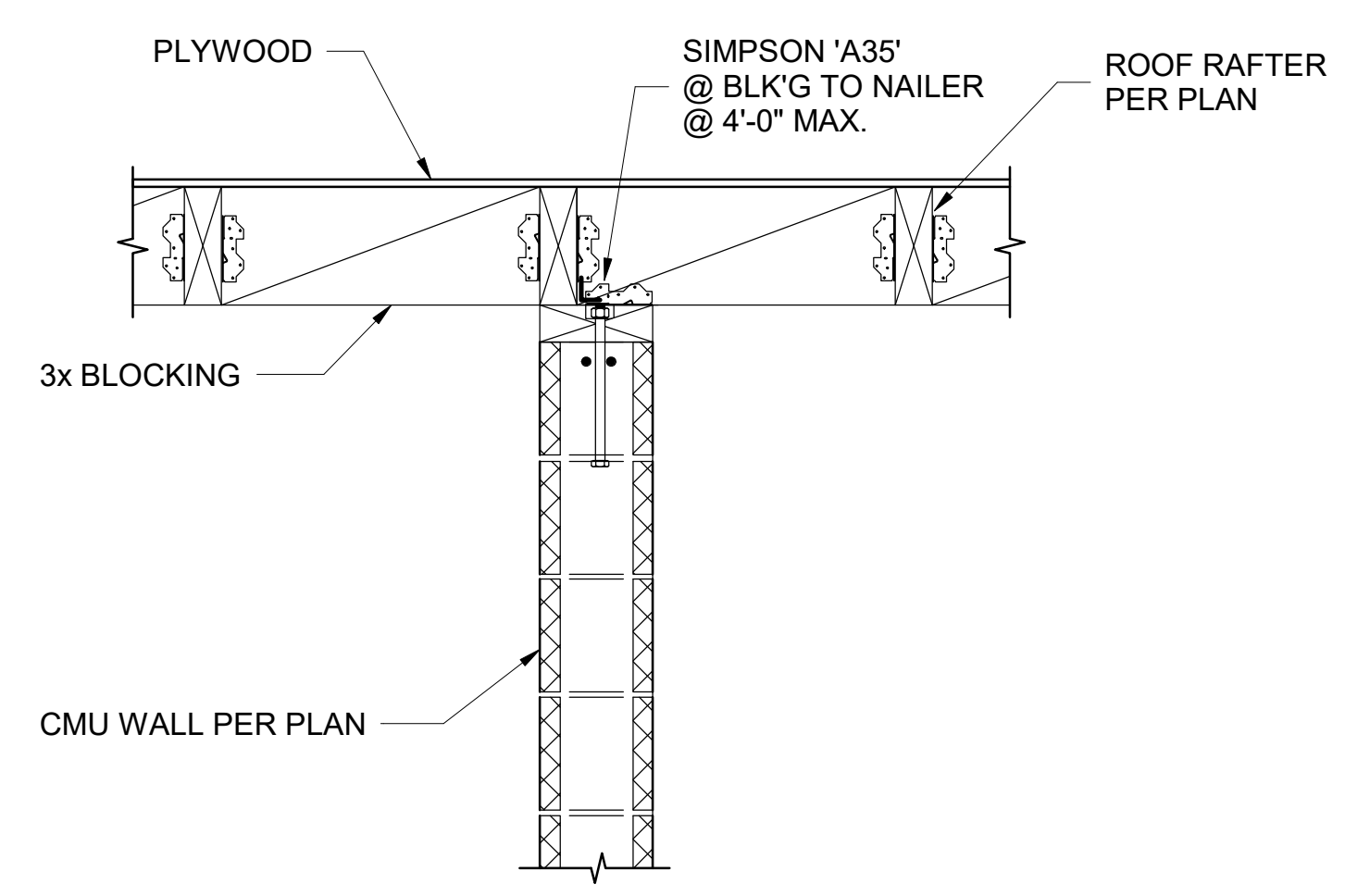
NOTE:
SEE DETAIL J13 AND E13 FOR INFO. NOT SHOWN

J7 ROOF OVERHANG DETAIL
NOT TO SCALE 2/ S101



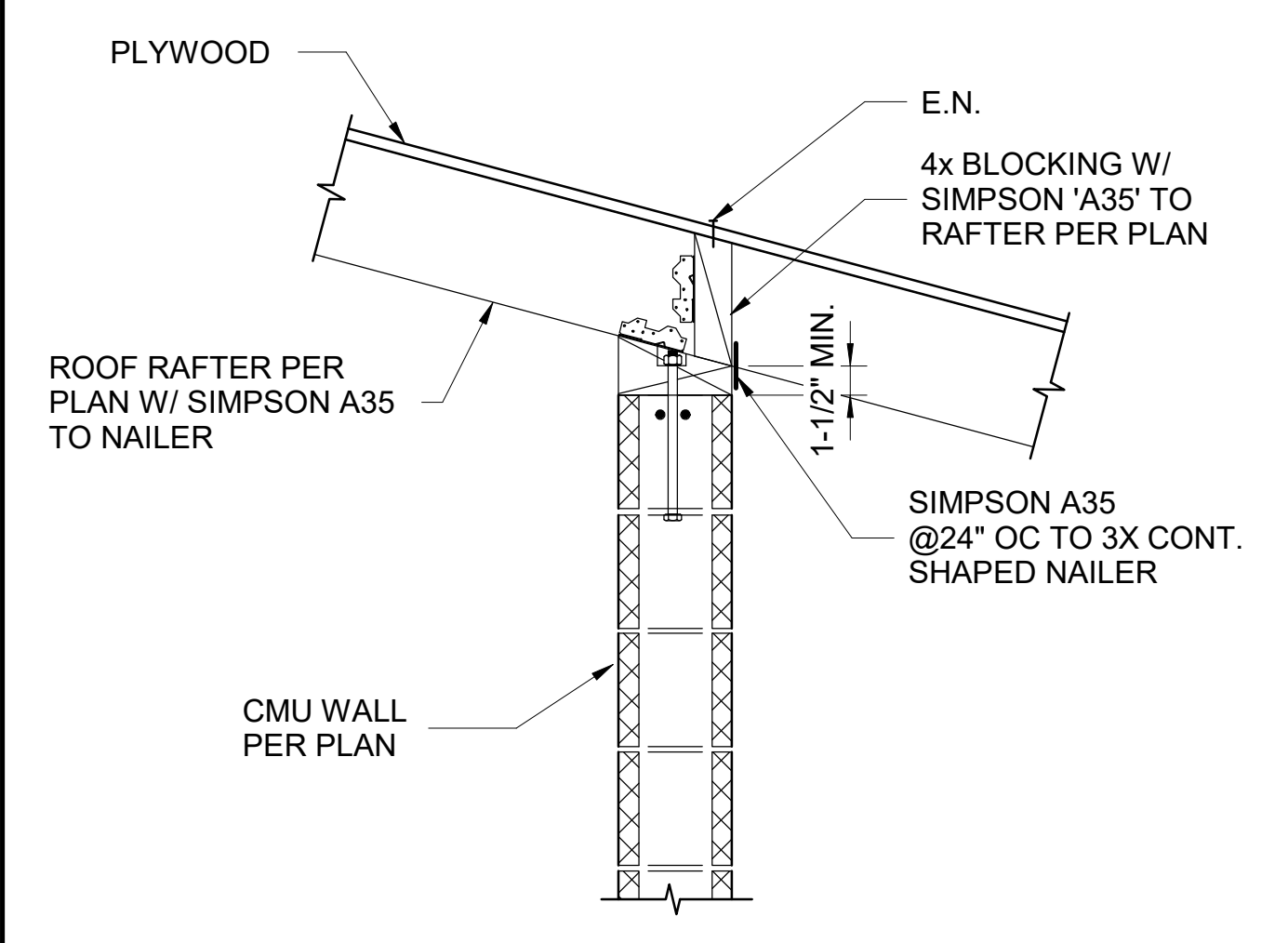
NOTE:
SIMPSON 'A35' (LARR-#25716)
SIMPSON 'CS16' (LARR-#25713)

J13 WALL ANCHORAGE DETAIL
NOT TO SCALE 2/ S101



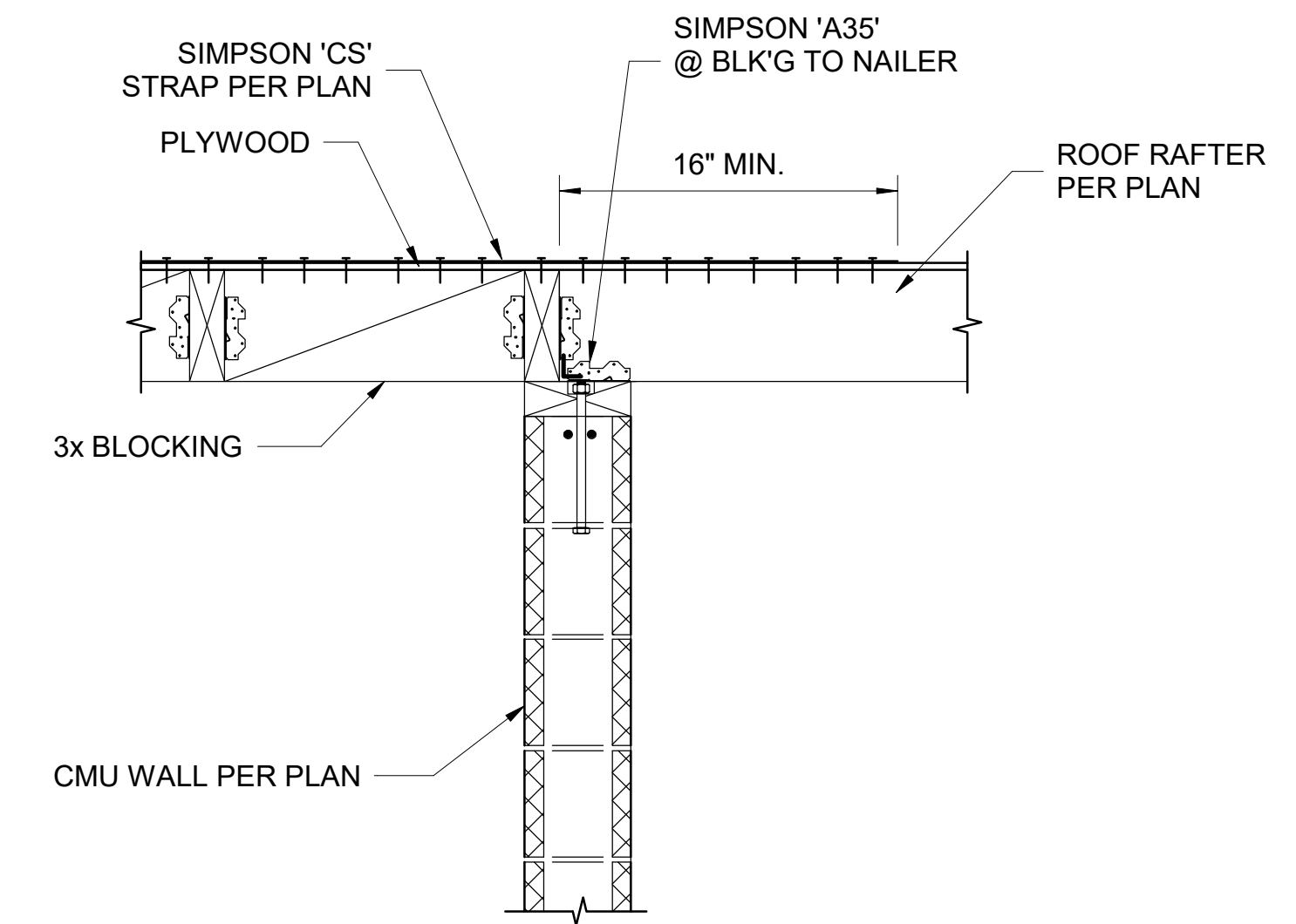
NOTE:
SEE DETAIL J13 AND E13 FOR INFO. NOT SHOWN

E7 INTERIOR WALL ANCHORAGE DETAIL
NOT TO SCALE 2/ S101



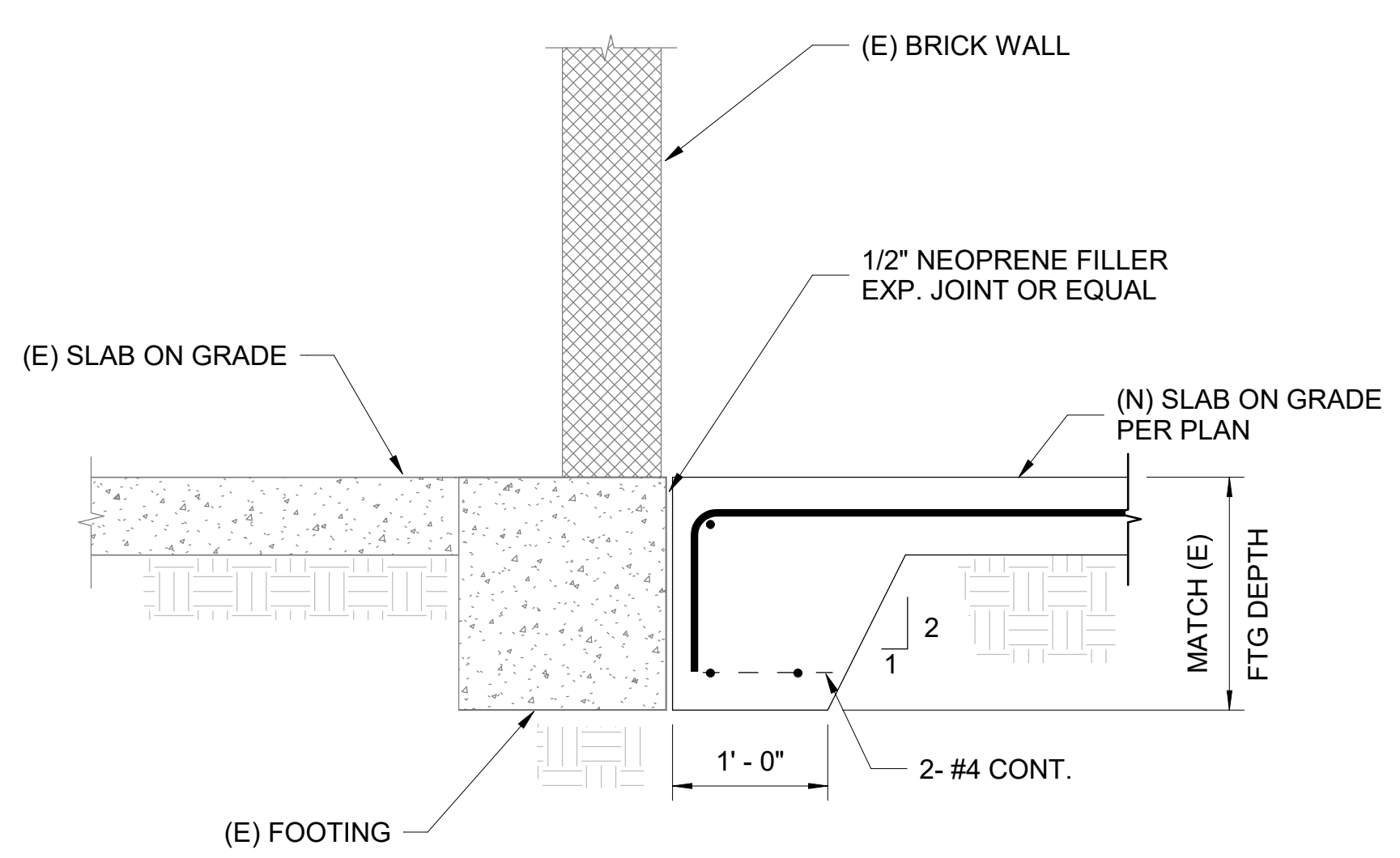
NOTE:
SEE DETAIL J13 FOR INFO. NOT SHOWN

E13 INTERIOR TOP OF WALL
NOT TO SCALE 2/ S101

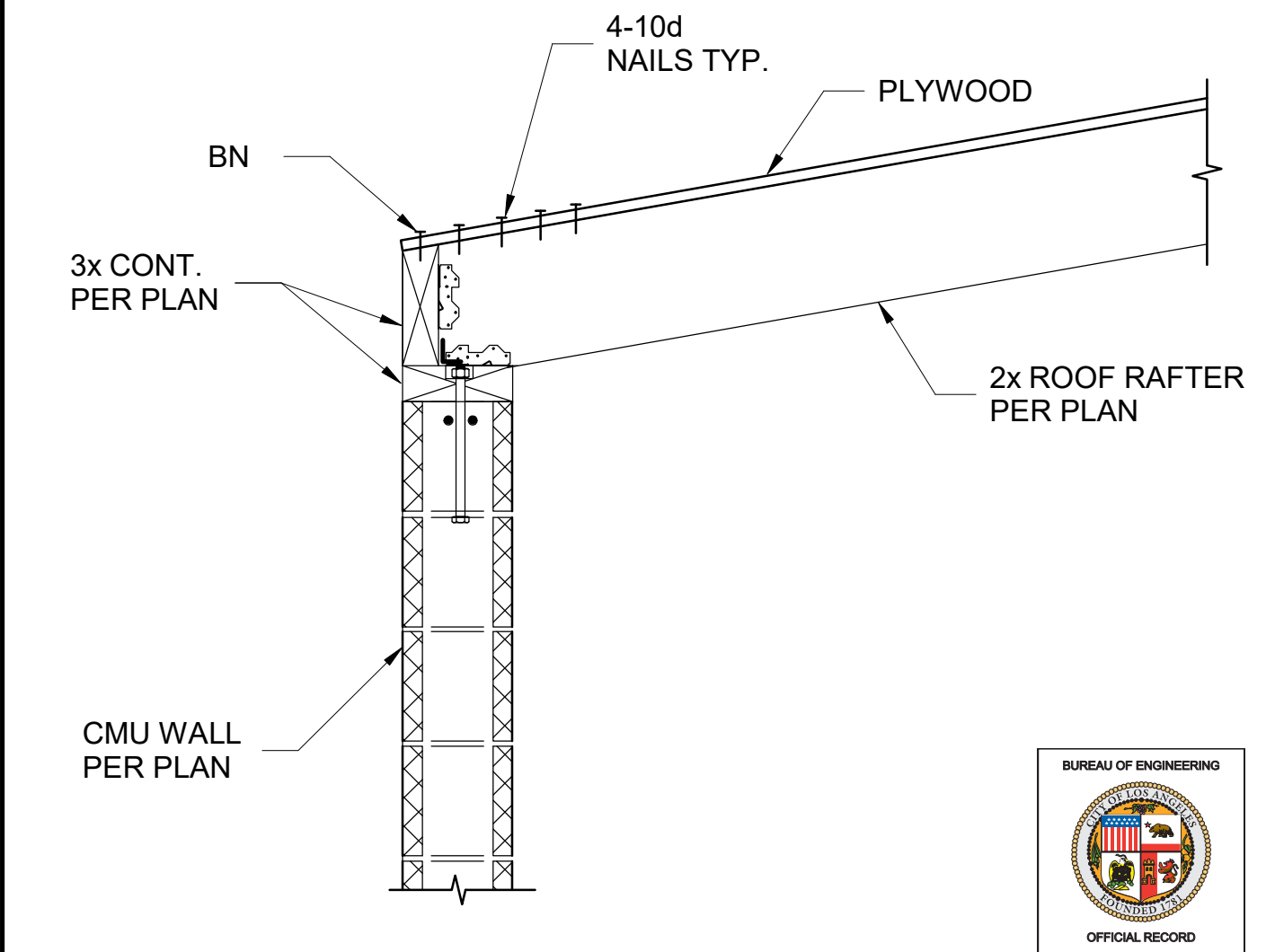


NOTE:
SEE DETAIL J13 AND E13 FOR INFO. NOT SHOWN

A1 DRAG CONNECTION DETAIL
NOT TO SCALE 2/ S101



A7 NEW SLAB ON GRADE AT EXISTING FOOTING
NOT TO SCALE 1/ S101

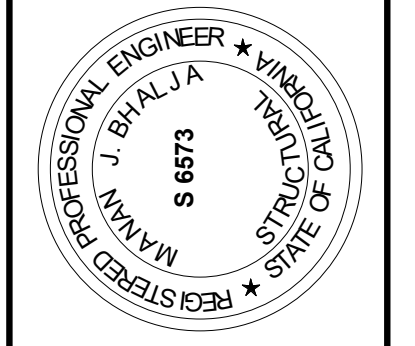


NOTE:
SEE DETAIL J13 FOR INFO. NOT SHOWN

A13 WALL ANCHORAGE DETAIL
NOT TO SCALE 2/ S101



NO.	REVISION DESCRIPTION	DATE	BY



ENGINEER:	MANAN BHALJA, S.E.	LIC. NO.:	S-8573
DESIGNED BY:	MANAN BHALJA, S.E., QUYNH HO P.E.	DATE:	05/29/19
DRAWN BY:	EMIL YOUSSEF	DATE:	05/29/19
CHECKED BY:	MEL AGAGAS S.E., MOURAD AZIZ P.E.	DATE:	05/29/19
APPROVED BY:	SHAILESH "SUNNY" PATEL, S.E.	DATE:	05/29/19

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

CLIENT: RECREATION AND PARKS
GENERAL MANAGER: MICHAEL A. SHULL

SHEET TITLE: WOOD & MASONRY DETAILS

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION

ADDRESS: 345 EAST 51ST STREET
LOS ANGELES, CA 90011

WORK ORDER NO. E1908366

PLAN FILE NO.

DRAWING NO. **S202**

SHEET 35 OF 45

PLOTTED 05/29/19 11:02:00 AM

PLUMBING LEGEND		
SYMBOL	ABBREV.	DESCRIPTION
---	W	WASTE/SEWER BELOW FLOOR/GRADE
---	W	WASTE/SEWER ABOVE FLOOR/GRADE
---	S	GREY WATER SOIL LINE BELOW GRADE
---	V	SANITARY VENT ABOVE GRADE
---	CW	COLD WATER PIPE
---	GCW	GREY COLD WATER PIPE
---	HW	HOT WATER PIPE
---	FD	FLOOR DRAIN
---	FCO/COTG	FLOOR CLEANOUT OR CLEANOUT THRU GRADE
---	WCO	WALL CLEANOUT
---	GV	GATE VALVE
---	WHA	WATER HAMMER ARRESTOR
---	ABV	ABOVE
---	AFB	ABOVE FINISHED FLOOR
---	BEL. GR.	BELOW GRADE
---	CLG	CEILING
---	CONN	CONNECTION
---	CONT	CONTINUATION
---	CYB	CONCRETE YARD BOX
---	DFU	DRAINAGE FIXTURE UNITS
---	DN	DOWN
(E)	EXIST	EXISTING
---	FU	FIXTURE UNIT
---	HDR	HEADER
---	HB	HOSE BIB
---	IE	INVERT ELEVATION
---	L	LAVATORY
(N)	N	NEW
---	NTS	NOT TO SCALE
---	NIC	NOT IN CONTRACT
---	POC	POINT OF CONNECTION
---	PRV	PRESSURE REDUCING VALVE
---	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
---	SOV	SHUT-OFF VALVE
---	TDL	TOTAL DEVELOPMENT LENGTH
---	TPV	TRAP PRIMER VALVE
---	U/G	UNDERGROUND
---	UR	URINAL
---	VTR	VENT THRU ROOF
---	WC	WATER CLOSET

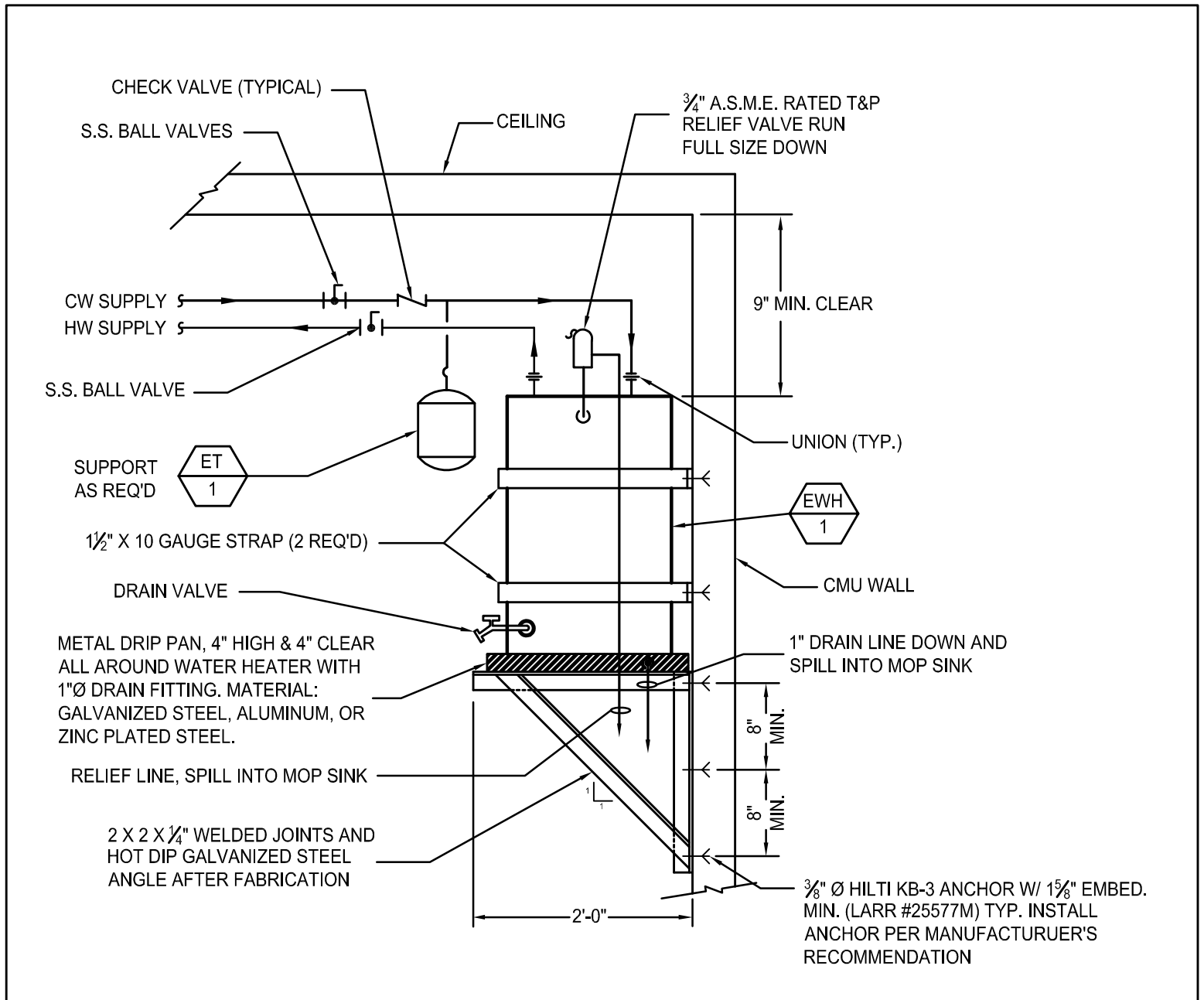
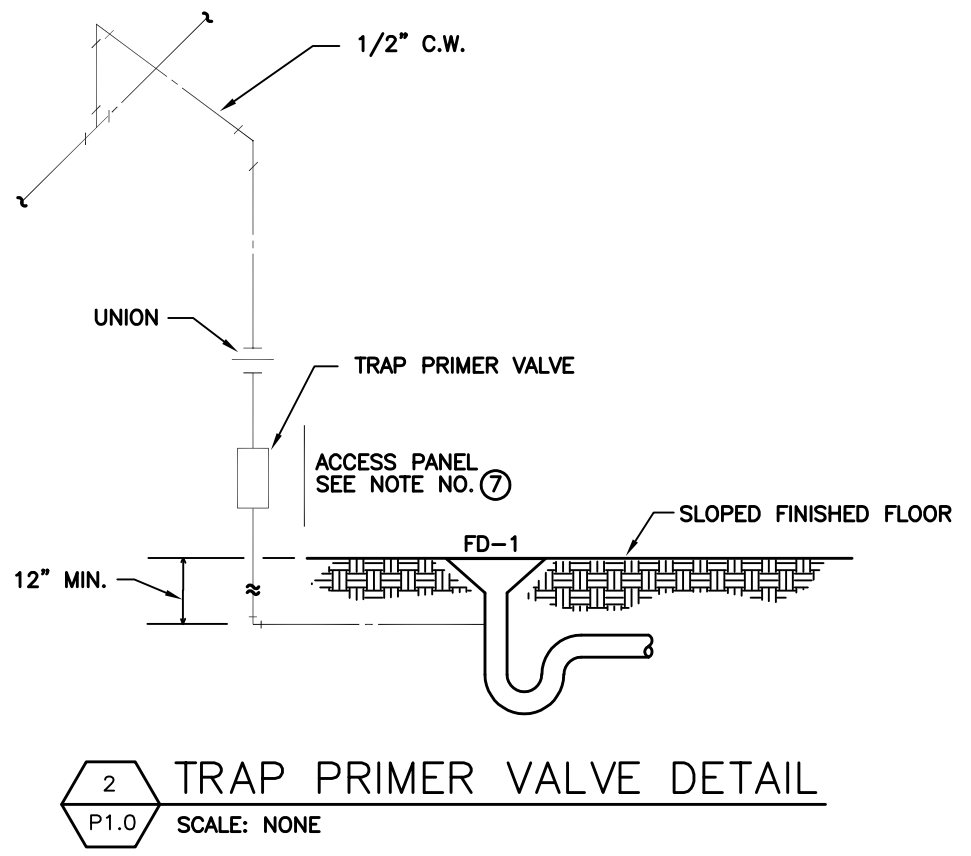
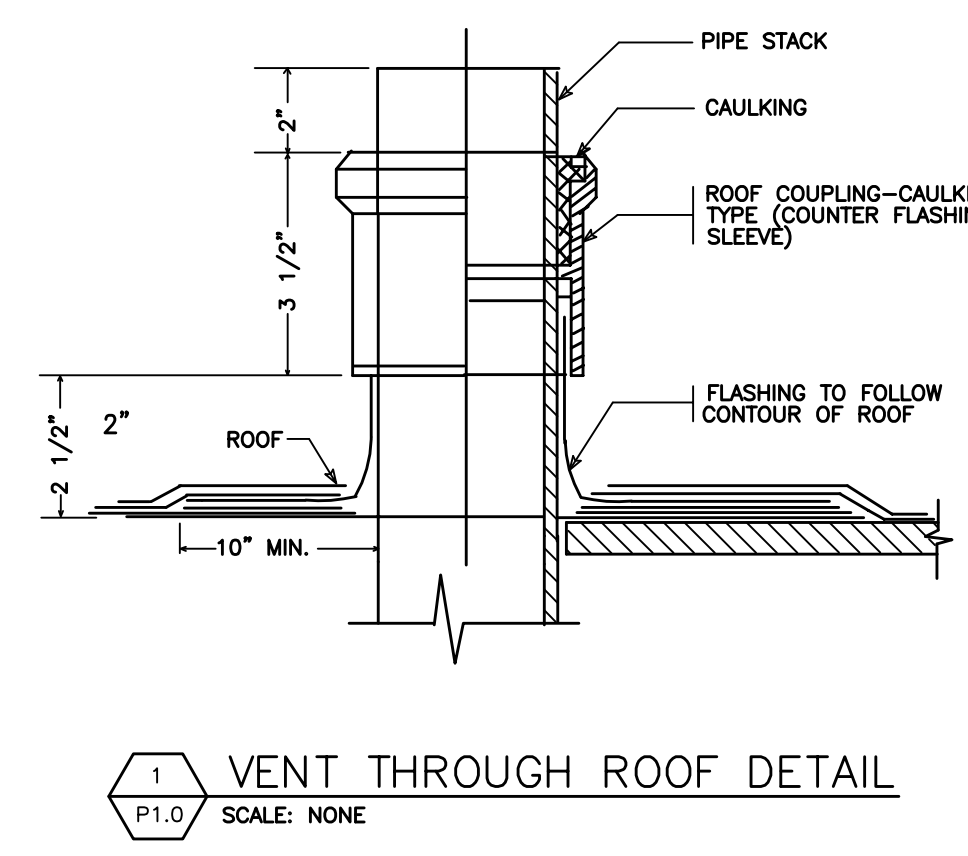
PLUMBING FIXTURE SCHEDULE										
UNIT NO.	DESCRIPTION	ROUGH-IN CONNECTION SIZES					BRANCH SIZES		REMARKS	
		TRAP	S/W	V	DFU	CW	HW	CW		HW
WC 1	WATER CLOSET (WALL MOUNTED)	INT.	4"	2"	4	1"	---	1-1/2"	---	ACORN PENAL-WARE MODEL NO.1675-W-1-HET-FVBO-PFS-FVT; WALL SUPPLY, OFF FLOOR, CONCEALED BLOWOUT JET TYPE, ELONGATED BOWL OPEN FRONT SEAT COVER, BEMIS MODEL NO. 1955CT BLACK, FABRICATED FROM 14 GAGE, TYPE 304 STAINLESS STEEL. FLUSH VALVE, SLOAN CONCEALED FLUSHMETER MODEL NO. ROYAL 9603-1.28. ACTUATION USING METAL PUSHBUTTON, @ 25 PSI WORKING PRESSURE.
WC 1H	WATER CLOSET (WALL MOUNTED)	INT.	4"	2"	4	1"	---	1-1/2"	---	ACORN PENAL-WARE MODEL NO.1675-W-1-ADA-HET-FVBO-PFS-FVT; WALL SUPPLY, OFF FLOOR, CONCEALED BLOWOUT JET TYPE, ELONGATED BOWL FABRICATED FROM 14 GAGE, TYPE 304 SS. FLUSH VALVE, SLOAN CONCEALED FLUSHMETER MODEL NO. ROYAL 9603-1.28-11-12-3/4-LDIM ADA. ACTUATION USING METAL PUSHBUTTON OPERATION, 1.28 GALS/FLUSH @ 25 PSI WORKING PRESSURE, ADA COMPLIANT, 18" HEIGHT.
L 1H	LAVATORY (WALL-HUNG)	1-1/2"	2"	1-1/2"	1	1/2"	1/2"	3/4"	3/4"	ACORN PENAL-WARE NO. 1953-1-9-H1-GE-EE; FRONT ACCESS, WALL-HUNG TYPE, 14 GAGE, TYPE 304 STAINLESS STEEL, AND SEAMLESS WELDED CONSTRUCTION, 18" WIDE. VALVE TIMING ADJUSTABLE FROM 5 TO 60 SECS, 0.5 GPM FLOW. PROVIDE WITH SINGLE TEMPERATURE AIR-CONTROL VALVE & ACORN ET71-1 UNDER-THE-COUNTER COMBINATION TEMPERING VALVES. FAUCET: CHICAGO FAUCETS MODEL 3500-E39VPABCF
MS 1	MOP SINK	3"	3"	2"	3	3/4"	3/4"	3/4"	3/4"	MOP SINK; MUSTEE MODEL 17F UTILATUB SERVICE SINK; 19 GAL CAPACITY, 1-1/2" OUTLET, 1.8 GALS/FLUSH MODEL, 34" X 23". FURNISHED WITH GAUGE STEEL LEGS, FLAT GRID DRAIN DRAIN MODEL #B125
FD 1	FLOOR DRAIN	2"	2"	1-1/2"	2	---	---	---	---	ZURN MODEL NO. Z460-5B-2NH, WITH NO-HUB OUTLET, SIZE 2", 5" DIA., POLISHED NICKEL BRONZE STRAINER, DURA-COATED CAST IRON BODY WITH SIDE OUTLET, TRAP PRIMER CONNECTION, VANDAL PROOF SCREWS.
TPV 1	TRAP PRIMER VALVE	---	---	---	---	1/2"	---	---	---	TRAP PRIMER: PRECISION PLUMBING PRODUCTS MODEL P1-500, PRESSURE DROP ACTIVATED FOR TWO OR MORE DRAINS. PROVIDE WITH DU-4/DU-U DISTRIBUTION UNITS FOR 2 AND 3 DRAINS, WITH 1/2" INLET AND OUTLET, AND BRASS MATERIAL.
WHA 1	WATER HAMMER ARRESTOR	---	---	---	---	---	---	---	---	WATER HAMMER ARRESTOR: PRECISION PLUMBING PRODUCTS MODEL SWA-1250D, PDI SYMBOL "F", 1" THREADED CONNECTION, ALL COPPER CONSTRUCTION.
HB 1	HOSE BIB	---	---	---	---	1/2"	---	3/4"	---	HOSE BIB; WOODFORD MODEL NO. M224, WITH VACUUM BREAKER. STAINLESS STEEL DOOR AND FASCIA RK'S, MODEL NO. RK-24MBDR.
EQV 1	EARTHQUAKE VALVE	---	---	---	---	---	---	---	---	EARTHQUAKE VALVE; PACIFIC SEISMIC PRODUCTS MODEL 317F, HORIZONTAL EARTHQUAKE VALVE, NOMINAL PIPE SIZE 6", MAXIMUM PRESSURE 60 PSI, CALIFORNIA SEISMIC VALVES SHALL BE UL LISTED, CERTIFIED BY THE CALIFORNIA STATE ARCHITECT'S OFFICE, AND APPROVED BY THE CITY OF LOS ANGELES.

WATER HEATER SCHEDULE									
SYMBOL	MFR. & MODEL NO.	QTY.	LOCATION	SERVICE	STORAGE CAPACITY (GAL.)	WEIGHT	ELECTRICAL		REMARKS
							VOLTS-PH-HZ	WATTS	
EW 1	BRADFORD WHITE ELECTRIFLX LD COMMERCIAL UTILITY ELECTRIC WATER HEATER MODEL NO. LE115U3-1	1	JANITORS ROOM	DOMESTIC HOT WATER	15	60 LBS	208-1-60	4500	ELECTRIC WATER HEATER, STORAGE TANK TYPE, 20-3/4" H X 18" DIA., WITH T&P RELIEF VALVE INSTALLED AND NON-SIMULTANEOUS OPERATING ELEMENTS. PROVIDE THERMO-X-TROL THERMAL EXPANSION TANK, MODEL ST-5C

PLUMBING CALCULATIONS		
1. ADDRESS: 345 51st Street Los Angeles, CA		
2. STREET PRESSURE: MAX. 94 MIN. 71 P.S.I.		
3. SIZE OF METER: 4 INCH WITH 115 G.P.M. BUILDING CAPACITY		
4. PRESSURE SET AT PRV	71	P.S.I.
5. PRESSURE LOSS THROUGH METER @ 115 G.P.M.:	3.0	P.S.I.
6. PRESSURE LOSS THROUGH PIPE RUN FROM METER TO PRV:	3.0	P.S.I.
7. PRESSURE LOSS THROUGH R.P.B.F.P. (WILKINS Model 575):	14	P.S.I.
8. FALL OFF PRESSURE THROUGH P.R.V., SIZE: 4 in.	---	P.S.I.
9. Elevation from water meter or P.R.V. to highest fixture = 10 ft.	---	P.S.I.
10. LOSS DUE TO ELEVATION: 10 ft. x 0.434 =	4.34	P.S.I.
11. RESIDUAL PRESSURE REQUIRED FOR FLUSHMETER VALVE:	25	P.S.I.
12. PRESSURE AVAILABLE FOR FRICTION LOSS, P.A.F.L.:	21.66	P.S.I.
13. Length from water meter or P.R.V. to furthest fixture = 650 ft.	---	P.S.I.
14. DEVELOPED LENGTH, DL: 650 ft. x 150% =	975 ft.	P.S.I.
15. AVERAGE PERMISSIBLE FRICTION LOSS PER 100 FT. OF PIPE:	---	P.S.I./100FT
A.P.F.L. = P.A.F.L. / 21.66 x 100 / D.L. 975 =	2.22	P.S.I./100FT
16. TOTAL C.W. FIXTURE UNITS:	294	F.U. = 115 G.P.M.
17. MISC. C.W. DEMAND (Future demand):	---	0 G.P.M.
18. TOTAL BUILDING C.W. DEMAND:	---	115 G.P.M.
19. SIZE OF BUILDING C.W. SERVICE:	4" inch	---

FIXTURE UNIT CALCS.		
	CW	WASTE
NEW PIPE SIZE	2-1/2"	4"
NEW F.U.	33.5	36
TOTAL NEW F.U.	33.5	36

FIXTURE UNIT COUNTS				
TYPE OF FIXTURES	NO.	CW F.U./Fix.	WASTE F.U./Fix.	TOTAL CW F.U. WASTE F.U.
Water Closet	5	5	4	25 20
Lavatory	3	1	1	3 3
Mop Sink	1	3	3	3 3
Floor Drain	5	0	2	0 10
Hose Bibb	1	2.5	0	2.5 0
BUILDING TOTAL:				33.5 36



- ### GENERAL NOTES
- VERIFY ALL CONDITIONS AND DIMENSIONS AT JOBSITE PRIOR TO START OF WORK.
 - LOCATIONS OF PLUMBING APPARATUS AND EQUIPMENT INDICATED ON DRAWINGS ARE ONLY APPROXIMATE AND SHALL BE CHANGED TO MEET THE ARCHITECTURAL AND STRUCTURAL CONDITIONS AS REQUIRED.
 - DRAWINGS ARE ESSENTIALLY DIAGRAMIC TO THE EXTENT THAT ALL OFFSET, BENDS, SPECIAL FITTINGS, AND EXACT LOCATIONS ARE NOT INDICATED. EXAMINE DRAWINGS AND PREMISES IN ORDER TO DETERMINE BUILDING OBSTRUCTIONS, EXACT LOCATIONS, PIPE ROUTES, AND THE BEST METHODS FOR INSTALLATION OF APPARATUS AND EQUIPMENT.
 - DIMENSIONS ARE APPROXIMATE. BEFORE PROCEEDING WITH ANY WORK, CHECK AND VERIFY DIMENSIONS AND SIZES, AND ASSUME FULL RESPONSIBILITY FOR FITTING IN OF EQUIPMENT AND MATERIALS TO OTHER PARTS OF EQUIPMENT, OTHER TRADES AND TO THE STRUCTURE. WHERE APPARATUS AND EQUIPMENT HAVE BEEN INDICATED ON DRAWINGS, DIMENSIONS HAVE BEEN TAKEN FROM TYPICAL EQUIPMENT OF THE CLASS INDICATED. CHECK DRAWINGS TO SEE THAT EQUIPMENT CONTEMPLATED FOR USE WILL FIT INTO SPACE PROVIDED WITH AMPLE SPACE FOR MAINTENANCE REQUIREMENTS.
 - ALL PLUMBING FIXTURES, PIPING MATERIALS, AND WORK SHALL BE IN ACCORDANCE WITH THE LOS ANGELES AND CALIFORNIA PLUMBING CODES.
 - ALL PLUMBING PIPING, FIXTURES, VALVES, AND EQUIPMENT SHALL BE NEW.
 - ALL PLUMBING FIXTURES AND EQUIPMENT SHALL HAVE ISOLATING VALVES ON WATER SUPPLY LINES. ISOLATING VALVES SHALL BE BALL VALVES WITH BRONZE CONSTRUCTION.
 - ALL FLUSH VALVES, WATER HAMMER ARRESTORS, SHUT-OFF VALVES, TRAP PRIMER VALVES, AND OTHER PLUMBING EQUIPMENT AND ACCESSORIES SHALL BE ACCESSIBLE.
 - CLEANOUTS:
 - A. MATERIAL
 - A.1 ABOVE GROUND: CAST IRON, CITY OF LOS ANGELES APPROVED.
 - A.2 OUTSIDE BUILDING: EXTRA HEAVY CAST IRON BODY AND NON CORROSIVE WITH COUNTERSUNK BRONZE PLUG AND STAINLESS STEEL COVER PLATE.
 - B. STAINLESS STEEL ACCESS COVER AND FRAME: REQUIRED WHERE CLEANOUTS OCCUR IN FINISHED INTERIOR AND EXTERIOR WALLS AND FLOORS.
 - C. IN PAVED AREAS: J.R. SMITH FIG. 4020-U VANDAL PROOF ROUND TOP AND SPIGOT CONNECTION.
 - D. IN UNPAVED AREAS: J.R. SMITH FIG. 4220-U WITH EXTENSIONS TO FINISH GRADE WITH VANDAL PROOF TOP.
 - E. WALL CLEANOUTS: J.R. SMITH FIG. 4532-U SHALL BE VANDAL PROOF WITH STAINLESS STEEL ROUND ACCESS COVER.
 - 10 ALL WATER CLOSETS AND URINALS SHALL BE PROVIDED WITH ADDITIONAL CLEANOUTS ABOVE THE EACH FIXTURE.
 - 11 WASTE, SOIL, AND VENT PIPING MATERIALS SHALL BE CAST IRON, GALVANIZED STEEL, COPPER, OR BRASS.
 - 12 HORIZONTAL SEWAGE DRAINAGE PIPE 4"Ø AND LARGER MAY HAVE A MINIMUM SLOPE OF 1/8" PER FOOT. 3"Ø AND SMALLER DRAINAGE PIPE SHALL HAVE A MINIMUM 1/8" PER FOOT SLOPE.
 - 13 COLD WATER:
 - A. BELOW GROUND: 2" AND SMALLER, TYPE K HARD COPPER, CAST-COPPER-ALLOY SOLDER-JOINT PRESSURE FITTINGS, AND SOLDERED JOINTS.
 - B. ABOVE GROUND: TYPE L HARD COPPER, WROUGHT-COPPER OR CAST-COPPER-ALLOY PRESSURE FITTINGS, COPPER UNIONS, BRONZE FLANGES, AND SOLDERED JOINTS.
 - 14 EACH VENT PIPE OR STACK SHALL EXTEND THROUGH ITS FLASHING AND SHALL TERMINATE VERTICALLY NOT LESS THAN 6" INCHES ABOVE THE ROOF NOR LESS THAN 1 FOOT FROM A VERTICAL SURFACE. EACH VENT SHALL TERMINATE NOT LESS THAN 10 FEET FROM, OR NOT LESS THAN 3 FEET ABOVE, AN OPENABLE WINDOW, DOOR, OPENING, AIR INTAKE, OR VENT SHAFT, OR NOT LESS THAN 3 FEET IN EVERY DIRECTION FROM A LOT LINE, ALLEY AND STREET.
 - 15 LAVATORY FAUCETS AND SINK FAUCETS (NOT INCLUDING SERVICE OR MOP SINKS) SHALL MEET THE FLOW REQUIREMENTS OUTLINED IN THE APPLIANCE EFFICIENCY STANDARDS (TITLE 24).
 - 16 WATER CLOSETS SHALL BE CITY OF LOS ANGELES MECHANICAL TEST LAB OR IAPMO APPROVED. WATER CLOSETS SHALL USE A MAXIMUM OF 1.28 GALLONS PER FLUSH.
 - 17 HORIZONTAL STORM DRAIN PIPING AT CEILING SHALL HAVE 1/8" INCH PER FOOT SLOPE.
 - 18 GAS SUPPLY PIPING SHALL BE SCHEDULE 40 BLACK STEEL. FITTINGS SHALL BE BEADED, STANDARD WEIGHT, GALVANIZED, MALLEABLE IRON WITH THREADED CONNECTIONS.
 - 19 WATER HEATER SHALL BE CERTIFIED AND LISTED BY THE CALIFORNIA ENERGY COMMISSION.
 - 20 THE CONTRACTOR SHALL PAY FOR INSTALLATION COSTS AND CONNECTION FEES FOR ALL UTILITIES.
 - 21 THERMOSTATIC MIXING VALVE SHALL COMPLY WITH ASSE 1071.

BUREAU OF ENGINEERING

CITY ENGINEER

DATE: 8/7/19 B.M.

ADDENDUM #1

NO. REVISIONS:

INDEX NO. XXIX

ENGINEER: SHAHRAM FARZAN, P.E.

LIC. NO. M24512

DESIGNED BY: BRANDON MCKNIGHT

LIC. NO. M24012

DRAWN BY: BRANDON MCKNIGHT

LIC. NO. M24012

CHECKED BY: SHAHRAM FARZAN, P.E.

LIC. NO. M24012

APPROVED BY: MAHMOOD KARIMZADEH, A.I.A., DEPUTY CITY ENGINEER

INDEX NO. RP-300113

GENERAL MANAGER: MICHAEL A. SHULL

LIC. NO. M24012

SHEET TITLE: PLUMBING SCHEDULES AND NOTES

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATIONS

ADDRESS: 345 E. 51ST STREET

LOS ANGELES, CA 90011

WORK ORDER NO. E1908366

PLAN FILE NO.

DRAWING NO. P101

SHEETS 37 OF 45

THE CITY OF LOS ANGELES OR ITS OFFICERS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

REVISION LAYERS (DESIGN STAGE ONLY)

DWP CONTACT: Aida @ (213) 367-1216
 STATIC WATER PRESSURE: HIGH: 94 PSI, LOW: 71 PSI @ EL. 171 FT.
 DATE CALLED: 01-04-17

CALCULATIONS BASED ON 2.0 PSI PER 100 FT. AND 8 FT/SEC VELOCITY FOR HOT WATER
 MATL: TYPE "L" COPPER

CALCULATIONS BASED ON 2.0 PSI PER 100 FT. AND 8 FT/SEC VELOCITY FOR COLD WATER
 MATL: TYPE "L" COPPER

PIPE SIZE	FIXTURE UNITS
F.T.	F.V.
1/2"	0
3/4"	3
1"	8
1 1/4"	18
1 1/2"	32
2"	107
2 1/2"	245
3"	406
3 1/2"	585
4"	840

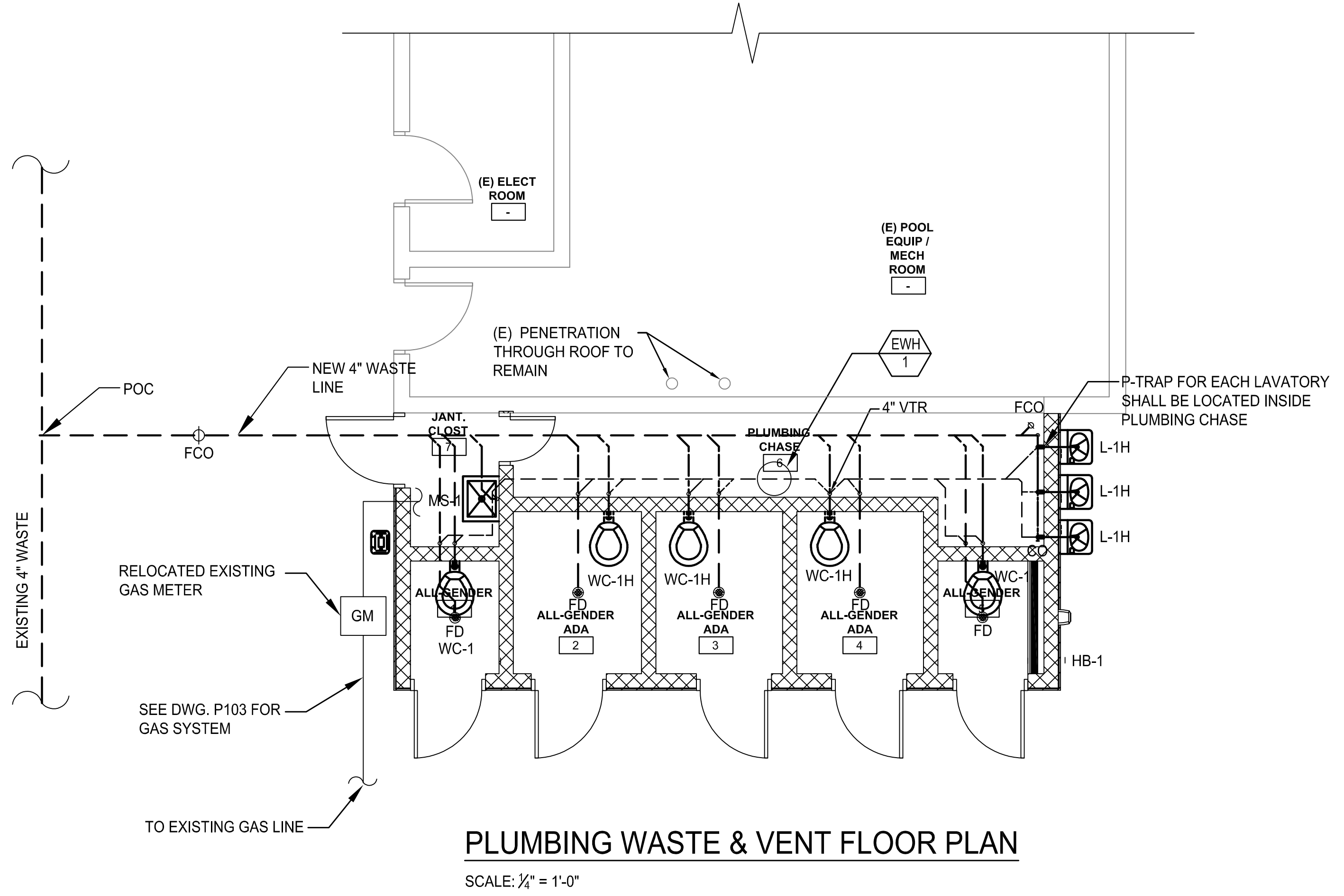
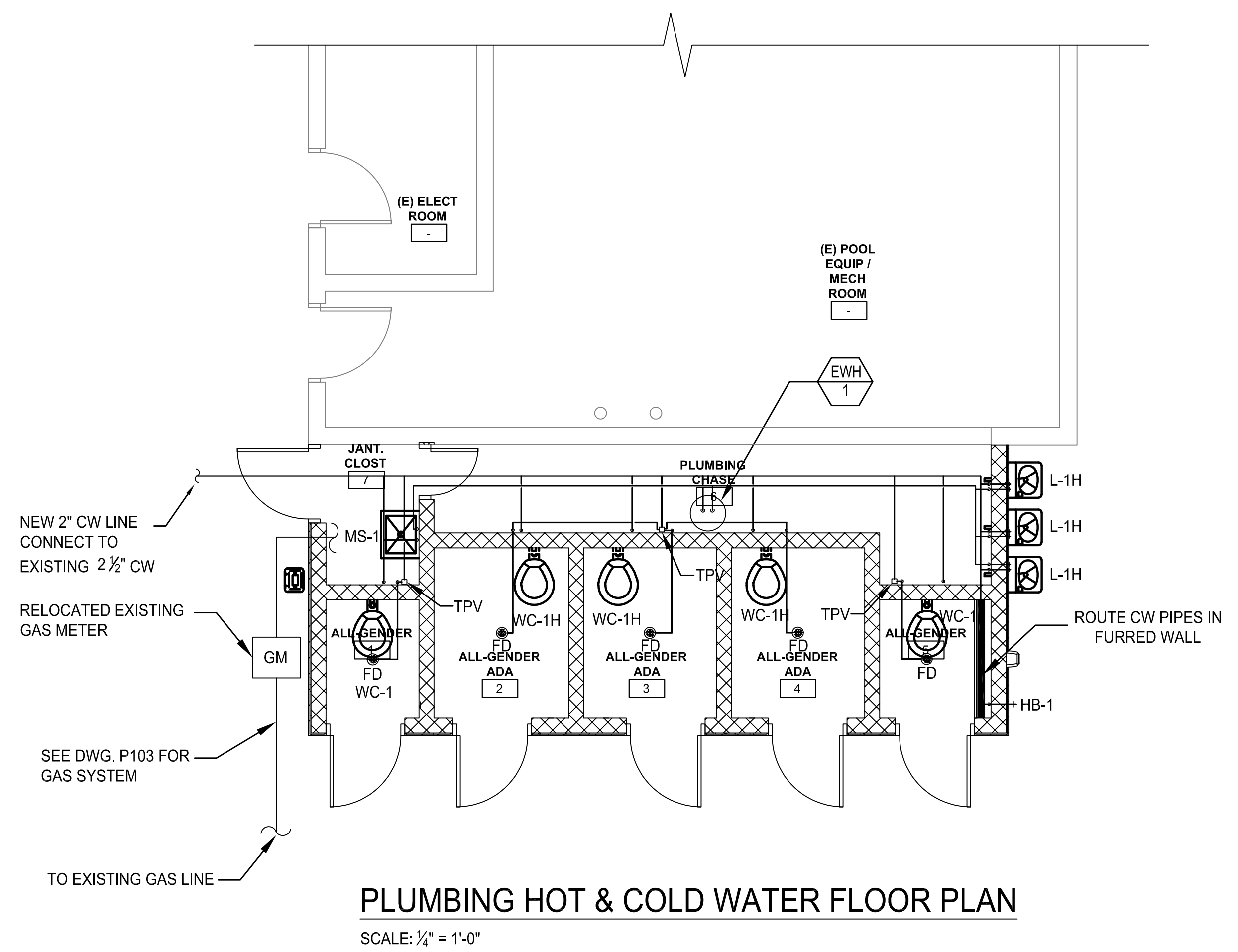
PIPE SIZE	FIXTURE UNITS
F.T.	F.V.
1/2"	0
3/4"	3
1"	8
1 1/4"	18
1 1/2"	32
2"	107
2 1/2"	275
3"	506
3 1/2"	874
4"	1418

PLOTTED: 11/6/2019 8:35 AM

TEMPLATE SHEET REVISION DATE: 08/2014
 REVISION DATE: 11/02/2019 8:29 AM
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THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THIS PLAN SHEET.

REVISION DATES
 (DESIGN STAGE ONLY)



CITY OF LOS ANGELES
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF ENGINEERING

GENERAL MANAGER: MICHAEL A. SHULL
 VERTICAL CONTROL: RECREATION AND PARKS

ENGINEER: SHAHRAM FARZAN, P.E.
 ARCHITECTURAL DIVISION
 L.C. NO. M24912

DESIGNED BY: BRANDON MCKNIGHT
 DRAWN BY: BRANDON MCKNIGHT
 CHECKED BY: SHAHRAM FARZAN, P.E.
 APPROVED BY: MAHMOOD KARIMZADEH, A.I.A., DEPUTY CITY ENGINEER

DATE: 03/01/18
 DATE: 03/01/18

NO. REVISIONS:
 1
 2
 3
 4

INDEX NO. **_RP-300113**
 BUILDING NO. **XXX/XX**

REGISTERED PROFESSIONAL ENGINEER
 SHAHRAM FARZAN, P.E.
 No. M24912
 Exp. 9-30-19
 CIVIL ENGINEER
 STATE OF CALIFORNIA

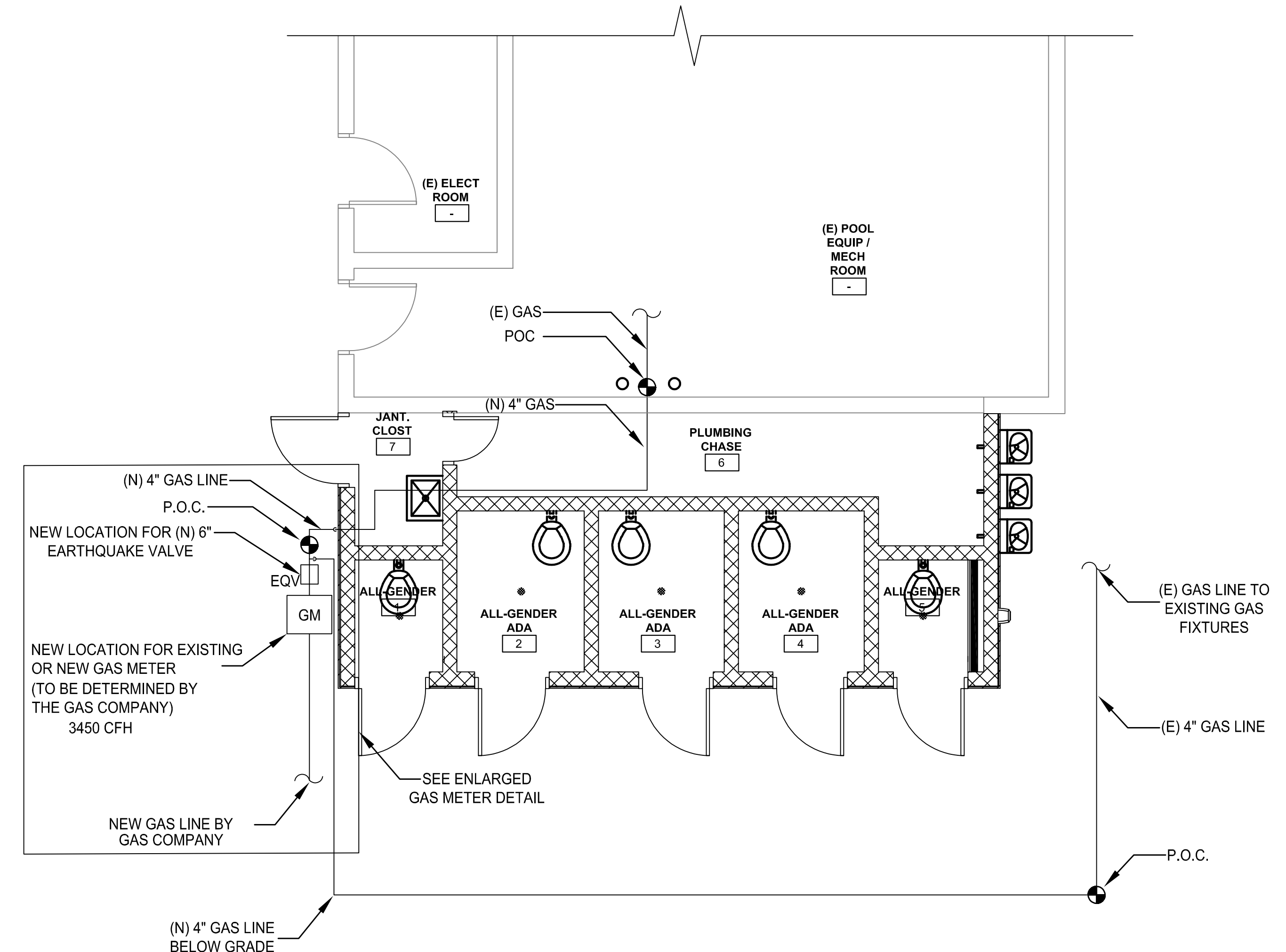
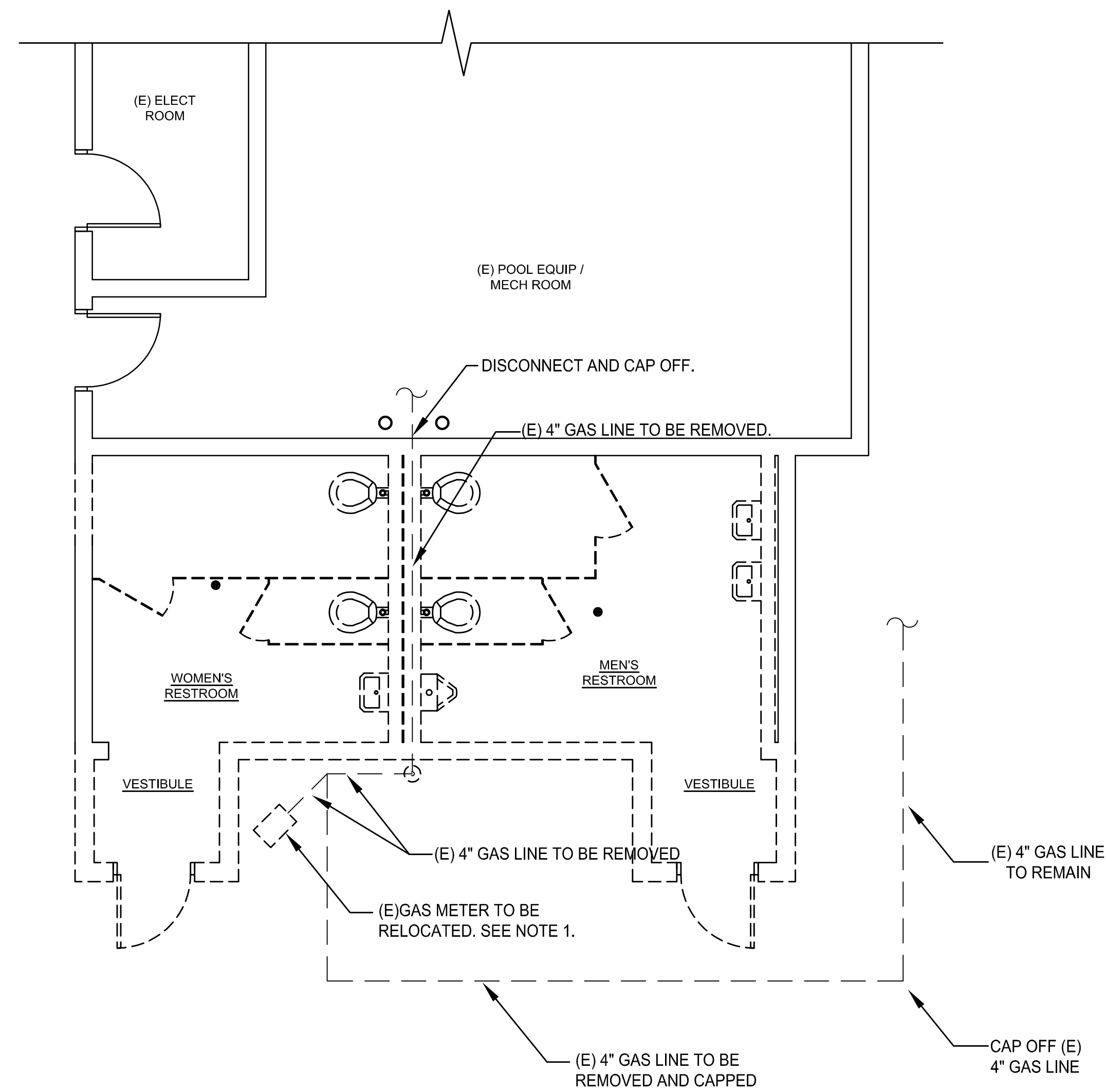
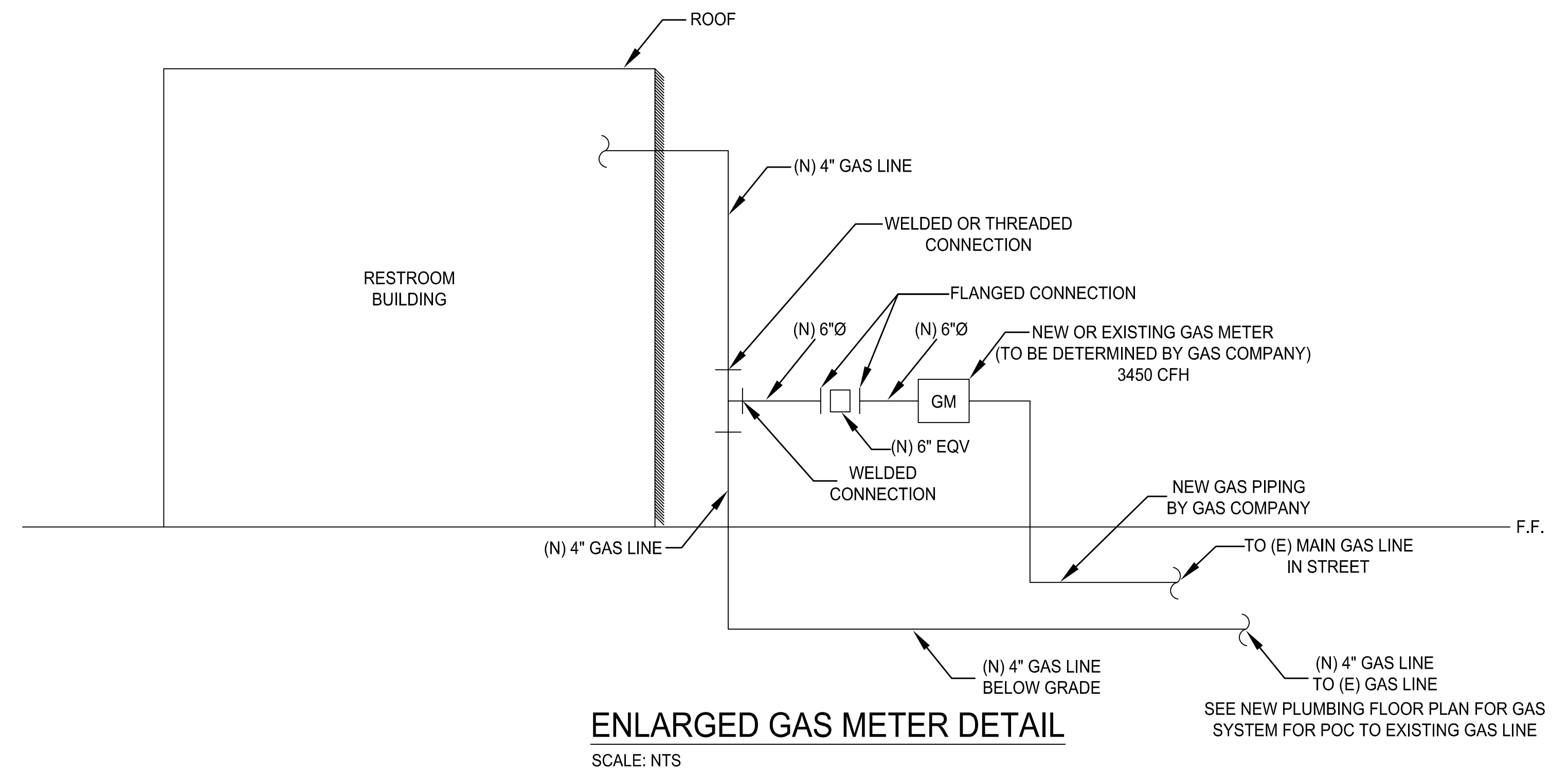
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 PLAN FILE NO.
 DRAWING NO. **P102**
 SHEET **38** OF **45**

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATIONS
 ADDRESS: 345 E. 51ST STREET
 LOS ANGELES, CA 90011

PLOTTED: 11/02/2019 8:38 AM

CONSTRUCTION NOTES

- 1 PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DOCUMENT ALL FINDINGS. CONTRACTOR SHALL PROVIDE INFORMATION TO THE CITY OF LOS ANGELES MECHANICAL ENGINEER.
- 2 CONTRACTOR SHALL CONTACT AND COORDINATE WITH THE GAS COMPANY FOR RELOCATION OF GAS METER AND PIPING. GAS COMPANY TO DETERMINE IF NEW OR EXISTING METER WILL BE USED. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES AND PERMITS.
- 3 FOR GAS PIPING LARGER THAN 4"Ø, CONNECTIONS SHALL BE WELDED.
- 4 FOR GAS PIPING 4"Ø OR SMALLER, CONNECTIONS MAY BE THREADED.



BUREAU OF ENGINEERING
CITY OF LOS ANGELES

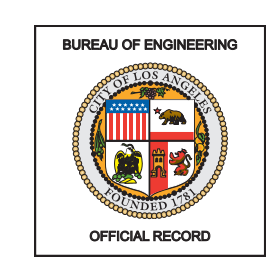
DATE: BY: INDEX NO. - RP-300113

REGISTERED PROFESSIONAL ENGINEER
SHAHRAM FARZAN, P.E.
No. M24812 Exp. 9-30-19
CITY OF CALIFORNIA

DEPARTMENT OF PUBLIC WORKS
CITY ENGINEER
GARY LEE MOORE, PE, ENV SP
ARCHITECTURAL DIVISION
ENGINEER: SHAHRAM FARZAN, P.E. LIC. NO. M24812
DESIGNED BY: BRANDON MCKNIGHT
DRAWN BY: BRANDON MCKNIGHT
CHECKED BY: SHAHRAM FARZAN, P.E.
APPROVED BY: MAHMOOD KARIMZADEH, A.I.A., DEPUTY CITY ENGINEER

CITY OF LOS ANGELES
VERTICAL CONTROL: RECREATION AND PARKS
GENERAL MANAGER: MICHAEL A. SHULL
SHEET TITLE: DEMOLITION GAS FLOOR PLAN
NEW PLUMBING PLAN - GAS
PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATIONS
ADDRESS: 345 E. 51ST STREET
LOS ANGELES, CA 90011

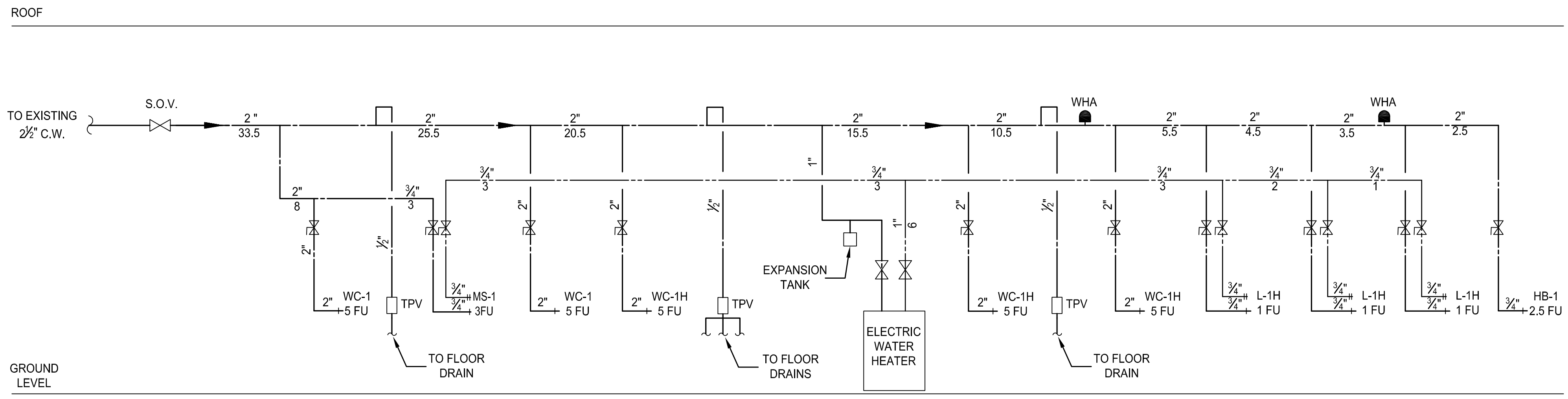
WORK ORDER NO. E1908366
PLAN FILE NO.
DRAWING NO. P103
SHEET 39 OF 45 SHEETS
PLOTTED: 11/6/2019 8:39 AM



TEMPLATE SHEET REVISION DATE: 08/2014
 REVISION DATE: 11/8/2019 8:29 AM
 FILE: Q:\IN-HOUSE-DESIGN\SOUTH-PARK-RENOVATIONS\B PUBLIC RESTROOM REMODELING\CURRENT DRAWINGS\SP103 GAS FLOOR PLAN (SOUTH PARK) DWG
 REVISION DATES (DESIGN STAGE ONLY)

REVISION NOTES (DESIGN STAGE ONLY)

THE CITY OF LOS ANGELES OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.



CALCULATIONS BASED ON 2.0 PSI PER 100 FT.
 AND 5 FT/SEC VELOCITY FOR HOT WATER
 MAT'L: TYPE "L" COPPER

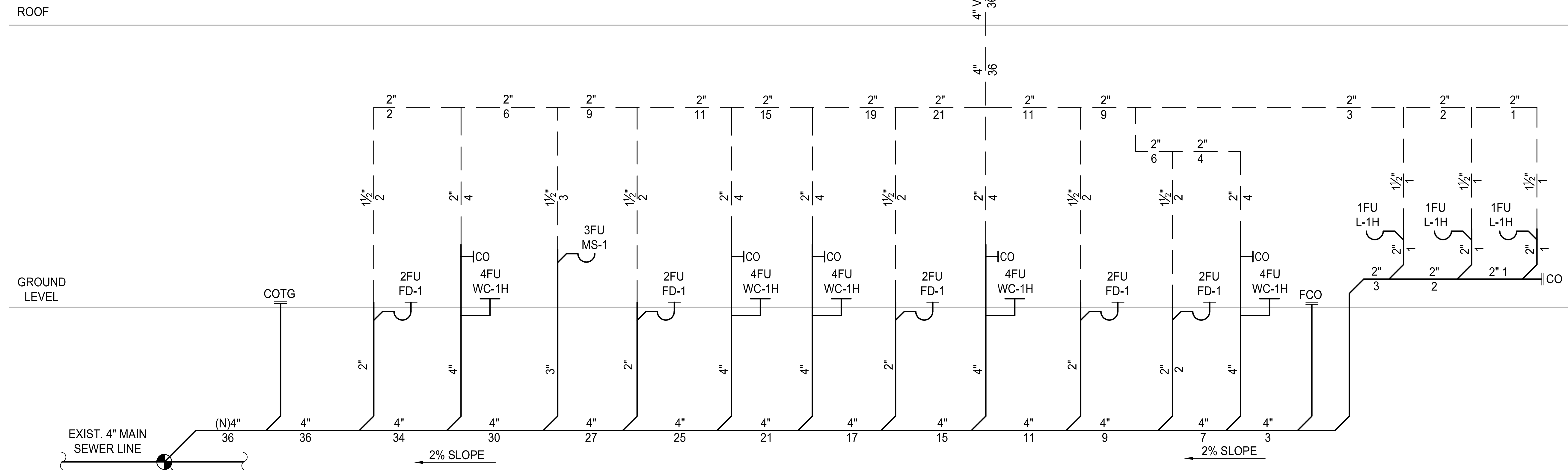
PIPE SIZE	FIXTURE UNITS	
	F.T.	F.V.
1/2"	0	-
3/4"	3	-
1"	8	-
1 1/4"	18	-
1 1/2"	32	-
2"	107	-
2 1/2"	245	-
3"	406	-
3 1/2"	585	-
4"	840	-

CALCULATIONS BASED ON 2.0 PSI PER 100 FT.
 AND 8 FT/SEC VELOCITY FOR COLD WATER
 MAT'L: TYPE "L" COPPER

PIPE SIZE	FIXTURE UNITS	
	F.T.	F.V.
1/2"	0	-
3/4"	3	-
1"	8	-
1 1/4"	18	-
1 1/2"	32	-
2"	107	37
2 1/2"	275	148
3"	506	396
3 1/2"	874	850
4"	1418	1418

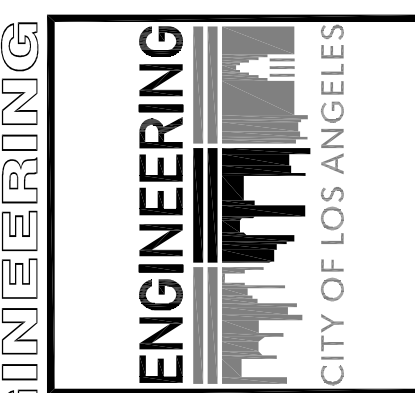
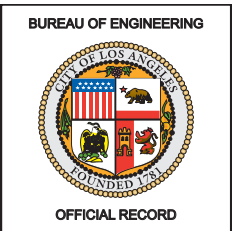
HOT & COLD WATER PIPE RISER DIAGRAM

NTS

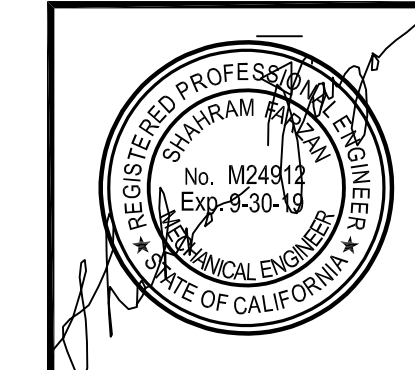


WASTE & VENT PIPE RISER DIAGRAM

NTS



NO. REVISIONS:	DATE:	BY:



ARCHITECTURAL DIVISION	DATE:	BY:
ENGINEER: SHARHAM FARZAN, P.E.	LIC. NO: M24814	
DESIGNED BY: BRANDON MCKNIGHT		
DRAWN BY: BRANDON MCKNIGHT		
CHECKED BY: SHARHAM FARZAN, P.E.		
APPROVED BY: MAHMOOD KARIMZADEH, A.I.A., DEPUTY CITY ENGINEER		

VERTICAL CONTROL: RECREATION AND PARKS GENERAL MANAGER: MICHAEL A. SHULL
SHEET TITLE: PLUMBING RISER DIAGRAMS
PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATIONS
ADDRESS: 345 E. 51ST STREET LOS ANGELES, CA 90011

WORK ORDER NO. E1908366
PLAN FILE NO.
DRAWING NO. P104
SHEET 40 OF SHEETS 45

ELECTRICAL SYMBOLS

- 4' SURFACE MOUNTED LIGHTING FIXTURE.
- JUNCTION BOX: MOUNT +18" UNLESS NOTED OTHERWISE.
- JUNCTION BOX: MOUNTED ABOVE ACCESSIBLE CEILING.
- DUPLEX RECEPTACLE: 125V, 20 AMP, NEMA 5-20R +18" U.O.N.
- GFI TYPE DUPLEX RECEPTACLE: 125V, 20 AMP, NEMA 5-20R +18" U.O.N.
- ELECTRONIC TIME CLOCK: +48" A.F.F.
- EXISTING CONDUIT OR RACEWAY TO REMAIN.
- CONDUIT: EXPOSED IN UNFINISHED AREAS; CONCEALED ABOVE CEILING OR IN WALL IN FINISHED AREAS.
- HOMERUN TO PANEL "A", CIRCUITS 1, 3, 5.
- CONDUIT: IN OR BELOW FLOOR OR BELOW GRADE.
- LIGHTING PANEL.
- PANEL DESIGNATION, LETTER IDENTIFIES THE PANEL.
- MAIN SERVICE SWITCHBOARD.
- 3/4"C, 2#12 & 1#12 GND. --- 3/4"C, 3#12 & 1#12 GND.
- 3/4"C, 4#12 & 1#12 GND. --- 3/4"C, 5#12 & 1#12 GND.
- HEAVY DUTY NON-FUSED DISCONNECT SWITCH H.P. RATED WITH CLASS "R" FUSE CLIPS.
- MANUAL MOTOR STARTER: TOGGLE TYPE WITH OVERLOADS.
- MANUAL MOTOR STARTER: TOGGLE TYPE WITHOUT OVERLOADS.
- THERMOSTAT.
- A.F.F. ABOVE FINISHED FLOOR. A.F.G. ABOVE FINISH GRADE.
- N.F. NONFUSED. A.I.C. AMPERE INTERRUPTING CURRENT.
- W.P. WEATHERPROOF. C.O. CONDUIT ONLY WITH PULL WIRE.
- U.O.N. UNLESS OTHERWISE NOTED. C.B. CIRCUIT BREAKER.
- (N) NEW. (E) EXISTING TO REMAIN.
- (XR) EXISTING TO BE DEMOLISHED. PROVIDE NEW BLANK COVER PLATE TO EXISTING J-BOX.
- (ER) EXISTING TO BE REMOVED AND REPLACE WITH NEW DEVICE.
- (RR) REMOVE AND RELOCATE (E) FIXTURE.
- DISCONNECT AND REMOVE (E) LIGHTS INCLUDING ASSOCIATED CONDUITS AND WIRES INSIDE ROOM U.O.N.
- KEY OPERATED SWITCH; +48" AFF
- (2)SINGLE POLE SWITCH; +48" AFF
- HORSE POWER RATED SWITCH WITHOUT OVERLOADS.
- CEILING MOUNTED OCCUPANCY SENSOR "WATT STOPPER" #UT-305-1 OR EQUAL.
- CEILING MOUNTED POWER PACK, "WATT STOPPER" #BZ-50 OR EQUAL
- ELECTRIC DOOR LOCK; "SECURITRON" #M62.
- EMERGENCY TOUCH PLATE; +48" AFF. "SECURITRON" #SP-1
- WALL MOUNTED OCCUPANCY SENSOR WITH "ON-OFF" SWITCH. +48" A.F.F. WATT STOPPER #DW-100-W.

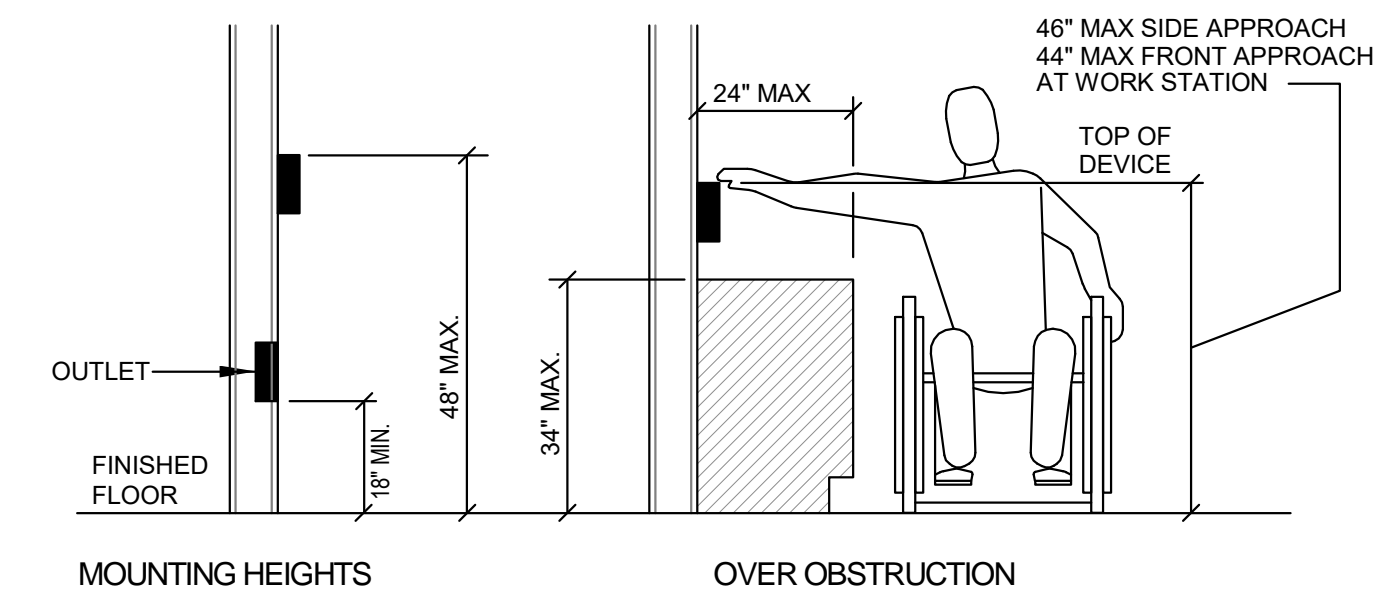
CODES, STANDARDS & GUIDES

- List of 2016 California Code of Regulations (C.C.R.)
 Applicable Codes Effective January 1, 2017.
- 2016 California Building Standards Administrative Code, (CAC), Part 1, Title 24 C.C.R.
 - 2016 California Building Code, (CBC), Part 2, Title 24 C.C.R. Volumes 1 & 2, (Based on 2015 Edition International Building Code with 2010 California Amendments)
 - 2016 California Electrical Code, (CEC), Part 3, Title 24 C.C.R. (Based on 2015 National Electrical Code with 2010 California Amendments)
 - 2016 California Mechanical Code, (CMC), Part 4, Title 24 C.C.R. (Based on 2015 IAPMO Uniform Mechanical Code with 2010 California Amendments)
 - 2016 California Plumbing Code, (CPC), Part 5, Title 24 C.C.R. (Based on 2015 IAPMO Uniform Plumbing Code with 2010 California Amendments)
 - 2016 California Energy Code, (CEC), Part 6, Title 24 C.C.R. (Based on 2015 California Energy Commission Building Energy Efficiency Standards)
 - 2016 California Fire Code, (CFC), Part 9, Title 24 C.C.R. (Based on 2015 International Fire Code with 2010 California Amendments)
 - 2016 California Existing Building Code, (CEC), Part 10, Title 24 C.C.R. (Based on 2015 International Existing Building Code with 2010 California Amendments)
 - 2016 California Green Building Standards Code, (CFC), Part 11, Title 24 C.C.R.
 - 2016 California Reference Standards, Part 12, Title 24 C.C.R. (Partial List - See CBC Chapter 35 and CFC Chapter 45)

- Applicable Standards and Guide:
- 2016 Edition NFPA 13 Installation of Sprinkler System (California Amendments)
 - 2016 Edition NFPA 14 Installation of Standpipe and Hose Systems
 - 2017 Edition NFPA 17 Dry Chemical Extinguishing Systems
 - 2017 Edition NFPA 17A Wet Chemical Extinguishing Systems
 - 2016 Edition NFPA 20 Installation of Stationary Pumps for Fire Protection
 - 2006 Edition NFPA 25 Inspection, Testing, Maintenance of Water-based Fire Protection Systems
 - 2016 Edition NFPA 72 National Fire Alarm Code (California Amended) (Note see UL Standard 1971 for "Visual Devices")
 - 2015 Edition NFPA 2001 Clean Agent Fire Extinguishing Systems

GENERAL NOTES

1. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO COVER A COMPLETE INSTALLATION OF SYSTEMS. THE OMISSION OF EXPRESSED REFERENCE TO ANY ITEM OF LABOR OR MATERIAL FOR THE PROPER EXECUTION OF THE WORK IN ACCORDANCE WITH PRESENT PRACTICE OF THE TRADE SHALL NOT RELIEVE THE CONTRACTOR FROM PROVIDING SUCH ADDITIONAL LABOR AND MATERIALS.
2. WORK INCLUDES ALL LABOR, MATERIALS, APPLIANCES, TOOLS, EQUIPMENT, FACILITIES, TRANSPORTATION AND SERVICES NECESSARY FOR AND INCIDENTAL TO PERFORMING ALL OPERATIONS IN CONNECTION WITH FURNISHING, DELIVERY AND INSTALLATION OF ELECTRICAL SYSTEM, COMPLETE, AS SHOWN ON THE DRAWINGS AND/OR SPECIFIED HEREIN.
3. CONSTRUCT PROJECT IN ACCORDANCE WITH FOLLOWING CODES: REGULATIONS OF STATE AND LOCAL FIRE MARSHAL; NATIONAL ELECTRIC CODE, NATIONAL FIRE PROTECTION ASSOCIATION, EDITION IN FORCE, LOCAL CODES AND ORDINANCES; TITLE 19, 21 AND 24 CALIFORNIA ADMINISTRATIVE CODE.
4. PERMITS, FEES AND INSPECTIONS: OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND FEES REQUIRED BY ANY CONSTITUTED AUTHORITY HAVING JURISDICTION INCLUDING UTILITIES. ARRANGE AND PAY FOR ALL REQUIRED INSPECTIONS OR EXAMINATIONS AND DELIVER CERTIFICATES OF INSPECTION TO ARCHITECT.
5. SUBMIT A LIST OF MATERIALS AND EQUIPMENT MANUFACTURERS THAT CONTRACTOR INTENDS TO USE. SUBMIT SHOP DRAWINGS FOR: CONDUITS, PULLBOXES, LIGHTING PANEL CONDUIT, LIGHT FIXTURES, BREAKERS AND DISCONNECT SWITCHES.
6. THE TERM "PROVIDE" USED ON DRAWINGS SHALL BE CONSIDERED TO MEAN "FURNISH AND INSTALL".
7. BEFORE PROCEEDING WITH WORK CAREFULLY CHECK AND VERIFY ALL DIMENSIONS AND SIZES AND ASSUME ALL RESPONSIBILITY FOR FITTING OF MATERIALS AND EQUIPMENT TO OTHER PARTS OF EQUIPMENT AND TO STRUCTURE. WHERE APPARATUS AND EQUIPMENT HAVE BEEN INDICATED ON DRAWINGS, DIMENSIONS HAVE BEEN TAKEN FROM TYPICAL EQUIPMENT OF CLASS INDICATED. CAREFULLY CHECK DRAWINGS AND SEE THAT EQUIPMENT WILL FIT INTO SPACES PROVIDED.
8. LOCATIONS OF CONDUITS, OUTLETS, APPARATUS AND EQUIPMENT INDICATED ON DRAWINGS ARE APPROXIMATE ONLY AND SHALL BE CHANGED TO MEET ARCHITECTURAL AND STRUCTURAL CONDITIONS AS REQUIRED.
9. BE CAUTIONED THAT DIAGRAMS SHOWING ELECTRICAL CONNECTIONS ARE DIAGRAMMATIC ONLY AND MUST NOT BE USED FOR OBTAINING LINEAR RUNS OF WIRING OR CONDUIT. WIRING DIAGRAMS DO NOT NECESSARILY SHOW EXACT PHYSICAL ARRANGEMENT OF EQUIPMENT.
10. EXTRA WORK OR COSTS TO THIS CONTRACTOR DUE TO OTHER CONTRACTORS OR TRADES SHALL BE ADJUSTED BETWEEN THIS CONTRACTOR AND OFFENDING CONTRACTOR AT NO EXTRA COST TO OWNER. NOTIFY ARCHITECT BEFORE SUCH EXTRA WORK IS DONE.
11. WHERE EQUIPMENT IS MOUNTED ON VIBRATION ISOLATORS, USE FLEXIBLE CONNECTIONS TO REDUCE TRANSMISSION OF NOISE.
12. WHERE CONDUITS PASS THROUGH SLEEVES IN INTERIOR WALLS, FLOORS, OR CEILINGS, COMPLETELY FILL SPACE BETWEEN EACH CONDUIT AND ITS SLEEVE TO PROVIDE AN AIRTIGHT SEAL.
13. USE GLASS FIBER MATERIAL, "DUXSEAL" COMPOUND, FOR ACOUSTIC SEALS.
14. ALL EQUIPMENT SHALL BE BRACED AND/OR ANCHORED TO RESIST A HORIZONTAL FORCE PER TITLE 24, PART 2 SECTION 2312 FOR ZONE 4.
15. PROVIDE CAST OUTLET BOXES IN EXTERIOR LOCATIONS AND WET LOCATIONS.
16. WHERE BOXES ARE INSTALLED IN FIRE RATED CEILING OR WALLS, BE RESPONSIBLE FOR PRESERVING INTEGRITY OF FIRE RATING AS REQUIRED.
17. PROVIDE COPPER CONDUCTORS ONLY.
18. PROVIDE TYPE "THHN" OR "THWN" WIRES ONLY.
19. PROVIDE "UL APPROVED" OR "U.L. LISTED" ELECTRICAL EQUIPMENT ONLY.
20. USE RIGID GALVANIZED STEEL CONDUIT FOR ALL SIZES WHERE DIRECTLY EXPOSED TO WEATHER; WHERE SUBJECT TO ABNORMAL CONDITIONS OF HEAT, COLD, MOISTURE, HUMIDITY, FUMES AND HAZARDOUS ELEMENTS; WHERE INSTALLED EXPOSED BELOW 7-1/2 FEET, IN AREAS WHERE SUBJECT TO MECHANICAL INJURY INCLUDING MECHANICAL AND EQUIPMENT ROOMS; AND IN CONCRETE SLABS ON GRADE.
21. EMT CONDUIT WITH COMPRESSION TYPE FITTINGS MAY BE USED FOR ALL SIZES UP TO 1-1/2 INCHES MAXIMUM TRADE SIZE IN DRY LOCATIONS AS IN STUD PARTITIONS AND FURRED CEILING SPACES. CONDUITS SHALL BE CONTINUOUS FROM OUTLET TO OUTLET TO PANEL EXCEPT WHERE RIGID STEEL CONDUIT IS REQUIRED OR INDICATED. EMT SHALL NOT BE RUN EXPOSED, IN CONCRETE, RUNS MORE THAN 100 FEET FOR POWER FEEDERS.
22. USE FLEXIBLE STEEL CONDUIT ONLY WHERE INDICATED AND FOR SHORT MOTOR OR VIBRATING EQUIPMENT CONNECTIONS, MINIMUM 36 INCHES LONG, OR FOR CONNECTIONS TO RECESSED FIXTURES FROM JUNCTION OR PULLBOXES. MAXIMUM LENGTH FOR ANY APPLICATION SHALL BE 6 FEET. PROVIDE LIQUIDTIGHT FLEXIBLE CONDUIT WITH SEPARATE INSULATED, STRANDED COPPER EQUIPMENT GROUND CONDUCTOR FOR CONNECTIONS IN AREAS EXPOSED TO THE WEATHER, DAMP OR WET LOCATIONS AND CONNECTIONS TO MOTORS AND TRANSFORMER ENCLOSURES, REGARDLESS OF LOCATION.
23. USE PVC (POLYVINYL CHLORIDE) CONDUIT BELOW GRADE ONLY. RUN AT MINIMUM OF 6" BELOW BOTTOM OF FLOOR SLAB OR 24" BELOW GRADE OUTSIDE OF BUILDING LINES UNLESS OTHERWISE NOTED. USE RIGID STEEL ELBOWS AND RISERS THROUGH SLAB.
24. SEAL ALL PVC CONDUITS AT BOTH ENDS WITH "PERMACEL" INCLUDING THOSE TERMINATING IN STEEL RISERS. MAKE GAS TIGHT.
25. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
26. PROVIDE A #12 PULL WIRE IN ALL CONDUITS INDICATED AS CONDUIT ONLY (C.O.) RATED 250 POUND TENSILE STRENGTH.
27. WIRING DEVICES: HIGHEST SPECIFICATION GRADE, COLOR AS SELECTED BY ARCHITECT.
28. WIRING DEVICE PLATES: COLOR-FINISH AS SELECTED BY ARCHITECT.
29. PROVIDE ALL NECESSARY J-BOXES AND PULL BOXES OF PROPER SIZES AS REQUIRED.
30. PROVIDE WEATHERPROOF TYPE ELECTRICAL EQUIPMENT FOR EXTERIOR LOCATIONS.
31. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC ONLY AND INDICATE GENERAL ARRANGEMENT OF WORK. BE RESPONSIBLE FOR CHECKING AND COORDINATING WITH OTHER TRADES AND VERIFYING SPACE IN WHICH WORK WILL BE INSTALLED.
32. INCLUDE ALL ELECTRICAL DEMOLITION AS PART OF THIS CONTRACT. REFER TO ARCHITECTURAL DRAWINGS FOR EXTENT OF WALL REMOVALS, CEILING CHANGES AND ALL OTHER SIMILAR WORK. ELECTRICAL DEMOLITION SHALL INCLUDE DISCONNECTION AND REMOVAL OF AFFECTED LIGHTS, OUTLETS AND ALL OTHER ELECTRICAL DEVICES REMOVE AND PLUG OR CAP ALL AFFECTED CONDUITS. REMOVE WIRES. IF REMOVED OUTLETS AFFECT DOWNSTREAM ACTIVE OUTLETS, PROVIDE ALL WORK NECESSARY TO REROUTE AND RECONNECT AFFECTED CIRCUITS.
33. SEAL ALL SPACE AROUND CONDUIT PENETRATION THROUGH FIRE-RATED WALL WITH A UL LISTED FIRE BARRIER COMPOUND. "3M" CAULKING OR EQUAL.
34. DRAWINGS DO NOT SHOW ALL NECESSARY J-BOXES AND PULL BOXES WHICH WILL BE REQUIRED THROUGHOUT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL THESE BOXES AS NECESSARY TO TERMINATE CONDUITS AND RACEWAYS. PAINT BOXES TO MATCH COLOR OF THE FINISHED SURFACES WHERE THE BOXES ARE ATTACHED.
35. ELECTRICAL EQUIPMENT SHALL BE LISTED BY A CITY OF LOS ANGELES RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVED BY THE CITY OF LA BUILDING & SAFETY DEPARTMENT.
36. FUSIBLE DISCONNECT SWITCH SHALL BE PROVIDED WITH REJECTION TYPE FUSE HOLDERS.
37. AS PART OF CLOSEOUT DOCUMENT CONTRACTOR SHALL PROVIDE ONE SET OF AS-BUILT DRAWINGS AT THE COMPLETION OF THE JOB. SHOW EXACT LOCATION AND MOUNTING OF EQUIPMENT INCLUDING DIMENSIONS.
38. RECORD DRAWINGS: IMMEDIATELY AFTER WORK IS INSTALLED, CAREFULLY DRAW ON PRINTS IN RED INK ALL WORK WHICH IS INSTALLED AT VARIANCE WITH THE WORK AS INDICATED ON THE DRAWINGS. INDICATE BY MEASURED DIMENSION TO BUILDING CORNERS OR OTHER PERMANENT MONUMENTS THE EXACT LOCATION OF ALL CHANGES.
39. OPERATING MANUALS AND INSTRUCTIONS: THE CONTRACTOR SHALL FURNISH TO THE CITY FOUR BOUND COPIES OF OPERATING AND MAINTENANCE MANUALS FOR ALL ELECTRICAL EQUIPMENT. THE CONTRACTOR SHALL EXPLAIN IN DETAIL ALL MANUALS FOR THE OPERATION AND MAINTENANCE OF ALL EQUIPMENT TO THE RECREATION AND PARKS MAINTENANCE PERSONAL BEFORE COMPLETION AND ACCEPTANCE OF THE PROJECT.



MOUNTING HEIGHTS
N.T.S.

TYPICAL MOUNTING HEIGHTS ABOVE FINISHED FLOOR (UNLESS OTHERWISE NOTED ON DRAWINGS)

- +48" TO TOP OF BOX: LIGHT SWITCHES, DIMMER SWITCHES, FIRE ALARM PULL STATION, DUCT DETECTOR TEST PANEL, INTERCOM CALL SWITCH, SPEAKER VOLUME CONTROL, T-STATS, BY-PASS TIMER, WALL TELEPHONE.
- +18" TO BOTTOM OF BOX: ALL DUPLEX RECEPTACLES, WALL OUTLET FOR DESK TELEPHONE, COMPUTER OUTLET, UNLESS OTHERWISE NOTED.

SCOPE OF WORK
INSTALLATION OF LIGHTING AND POWER AT THE PUBLIC RESTROOM RENOVATIONS.

LIGHTING FIXTURE SCHEDULE								
ABBREVIATIONS:				NOTES:				
CLG	=	CEILING	1. VERIFY EXACT CEILING TYPE AND PROVIDE FIXTURES WITH ALL NECESSARY MOUNTING ACCESSORIES.					
REC	=	RECESS						
CHN	=	CHAIN HUNG						
PEN	=	PENDANT						
SPC	=	SPECIAL						
STD	=	STANDARD						
LED	=	LIGHT EMITTING DIODE						
TYPE	MTG.	CLASS	MANUFACTURER AND CATALOG NUMBER	FINISH	LAMP TYPE	TOTAL WATTS	VOLT	DESCRIPTION
A	WALL	LED	LUMINAIRE #BLD 48-20W-4000K-120-277-CC-DP-BLK-TX/SD	BLK	LED	19.6	120	4' WALL MOUNTED, VANDAL RESISTANT TYPE LED FIXTURE.
B	WALL	LED	LUMINAIRE #BLD-24-20W-4000K-120-277-CC-DP-BLK-TX/SD	BLK	LED	21.3	120	2' WALL MOUNTED LED FIXTURE, VANDAL RESISTANT TYPE.
C	PEN	LED	LUMINAIRE #VPF42-24"-20W-3500K-120-277-CP-BLK	BLK	LED	21	120	2' PENDANT MOUNTED LED FIXTURE, VANDAL RESISTANT TYPE.
D	CLG	LED	LUMINAIRE #VPF44-46"-25W-3500K-120-277-CP-BLK -PC-WET	BLK	LED	27	120	4' CEILING MOUNTED, VANDAL RESISTANT TYPE LED FIXTURE. WITH PHOTOELECTRIC SWITCH AND WET LOCATION TYPE.

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CITY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

BUREAU OF ENGINEERING

ENGINEERING CITY OF LOS ANGELES

INDEX BUILDING

NO. DATE REVISION DESCRIPTION

BY

DATE

REVISION DESCRIPTION

INDEX BUILDING

RP-300113

CITY ENGINEER

DATE

ARCHITECTURAL DIVISION

LIC. NO.: E14126

ENGINEER: JIMMY FONG

DESIGNED: PETER MARZO

DRAWN: HOWA YANG

CHECKED: PETER MARZO

APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

CLIENT: RECREATION AND PARKS

GENERAL MANAGER: MICHAEL A. SHULL

SHEET

SYMBOL LIST, CODES, NOTES, AND FIXTURE SCHEDULE

PROJECT

SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION

ADDRESS

345 EAST 51ST STREET

LOS ANGELES, CA 90011

WORK ORDER

E1908366

PLAN FILE

DRAWING

E101

SHEET 41 OF 45

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TTLB TEMPLATE REVISION DATE: 07/12/18

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(E) PANEL "P"														
120/208 VOLTS			MAIN BRK: MLO			BUS RATING/TYPE: 400A			LOCATION: ELEC. ROOM					
3 PHASE			MOUNTING: SURFACE											
4 WIRE														
LOCATION				WATTAGE				LOCATION						
PH-A	PH-B	PH-C	LTG	REC	MIS	CIR	BKR	BKR	CIR	MIS	REC	LTG	WATTAGE	LOCATION
(E) LOAD	2290					1	60-3	20-3	2				800	(E) LOAD
---	2290					3	-	-	4				800	---
---						5	-	-	6				800	---
(E) LOAD	8000					7	100-3	100-3	8				8500	(E) LOAD
---	8400					9	-	-	10				8900	---
---						11	-	-	12				8300	---
(E) LOAD	500					13	20-1	14						SPACE
ELEC. WATER HEATER		2250			1	15	25-2	16						SPACE
---		2250				17	-	18						SPACE
EF-1 TIME CLOCK	300				3	19	15-1	20						SPACE
CONV. RECEPTACLE	360			2		21	20-1	22						SPACE
SECURITRON DOOR LOCK		125			5	23	20-1	24						SPACE
SPACE						25		26						SPACE
SPACE						27		28						SPACE
SPACE						29		30						SPACE
SPACE						31		32						SPACE
SPACE						33		34						SPACE
SPACE						35		36						SPACE
SPACE						37		38						SPACE
SPACE						39		40						SPACE
SPACE						41		42						SPACE
PH-A=	20390 VA					PH-B=	23000 VA						PH-C=	22765 VA
TOTAL CONNECTED LOAD: 66155 VA OR 183.76 AMPS @ 120/208 VOLTS -- 3 PHASE - 4 WIRE														
LCL:	0 VA	X	1.25%	=	0 VA									
FDL:	66155 VA	+	0 VA	(LCL) =	66155 VA	OR	183.8 A							

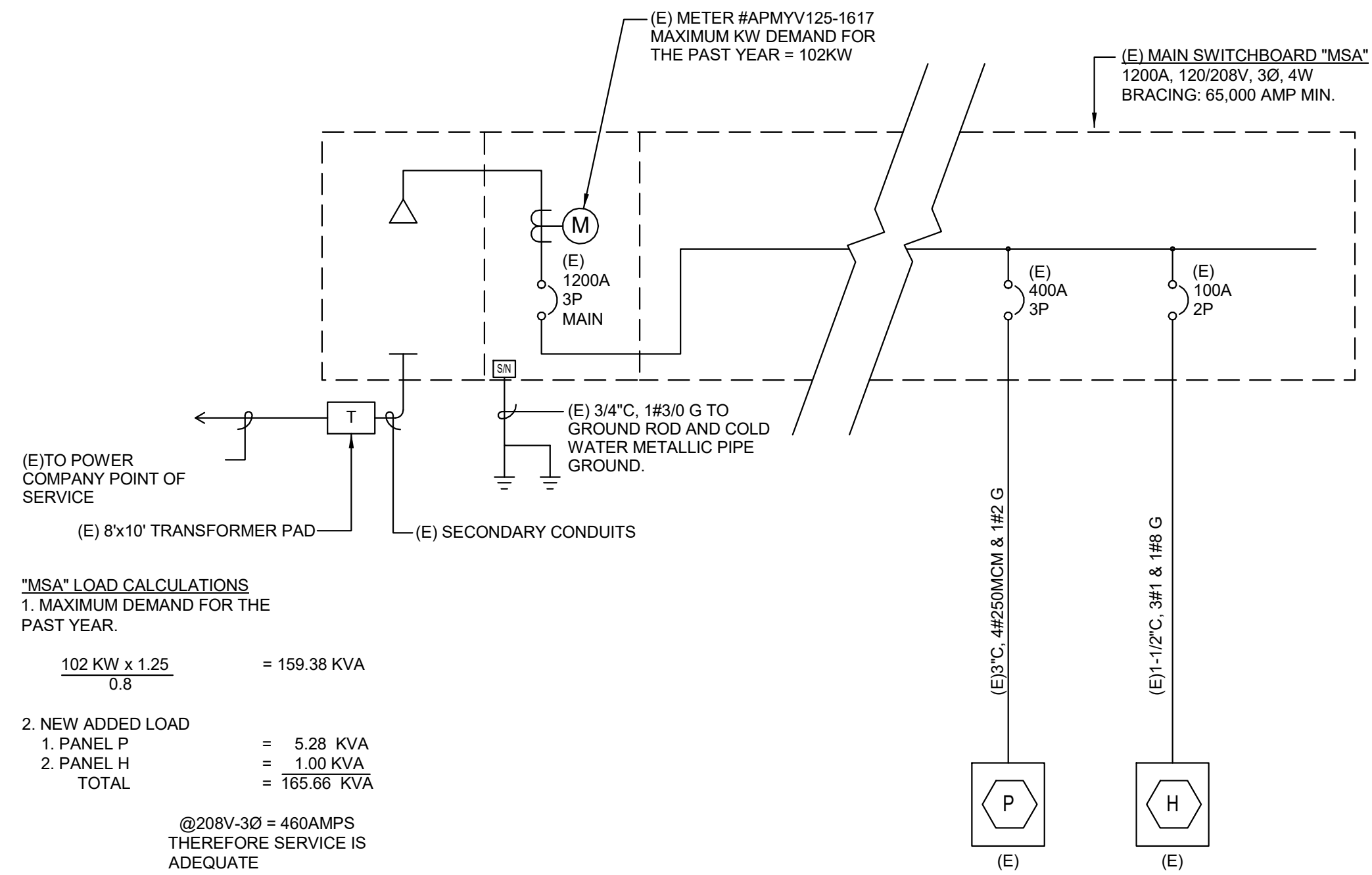
INDICATES NEW LOAD. PROVIDE NEW CIRCUIT BREAKER AT (E) SPACE. MATCH TYPE AND A.I.C. RATING OF EXISTING BREAKERS.

NOTE: NEW ADDED LOAD TO PANEL = 5.28 KVA

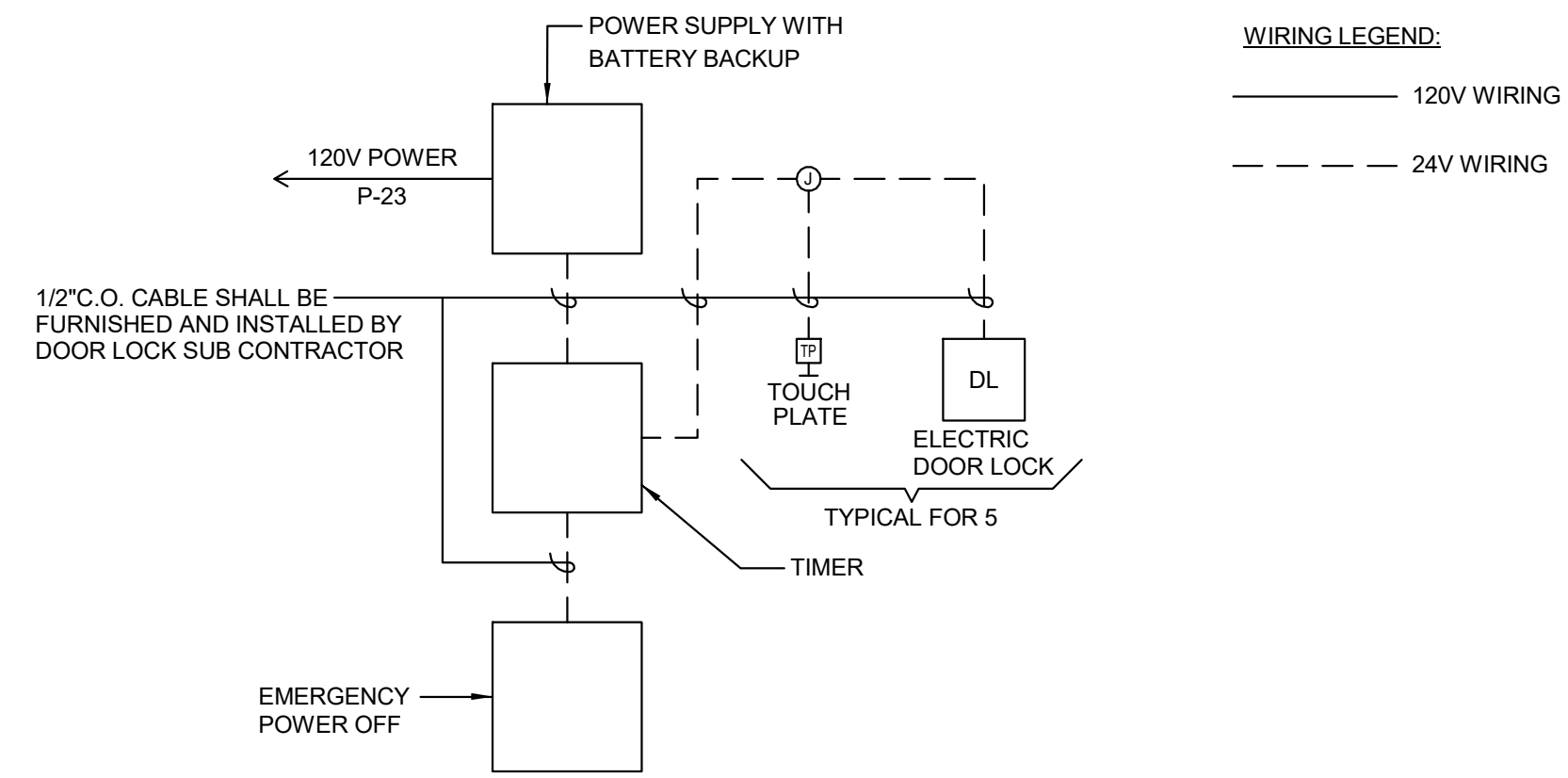
(E) PANEL "H"														
120/208 VOLTS			MAIN BRK: MLO			BUS RATING/TYPE: 100A/COPPER			LOCATION: STORAGE RM.					
1 PHASE			MOUNTING: SURFACE											
3 WIRE														
LOCATION				WATTAGE				LOCATION						
PH-A	PH-B	PH-C	LTG	REC	MIS	CIR	BKR	BKR	CIR	MIS	REC	LTG	WATTAGE	LOCATION
(E) LOAD	600					1	20-1	20-1	2				900	(E) LOAD
(E) LOAD		960				3	20-1	20-1	4				900	(E) LOAD
(E) LOAD	120					5	20-1	20-1	6				720	(E) LOAD
(E) LOAD		900				7	20-1	20-1	8				540	(E) LOAD
(E) LOAD	720					9	20-1	20-1	10				900	(E) LOAD
(E) LOAD		180				11	20-1	20-1	12	1			840	HAND DRYER
(E) LOAD	540					13	20-1	20-1	14		8	165	720	LTS-TOILET, JANITOR.
(E) LOAD		720				15	20-1	20-1	16				720	(E) LOAD
(E) LOAD	720					17	20-1	20-1	18				600	(E) LOAD
(E) LOAD		900				19	20-1	20-1	20				780	(E) LOAD
SPACE						21		22						SPACE
SPACE						23		24						SPACE
SPACE						25		26						SPACE
PH-A=	5985 VA					PH-B=	7440 VA							
TOTAL CONNECTED LOAD: 13425 VA OR 64.543 AMPS @ 120/208 VOLTS -- 1 PHASE - 3 WIRE														
LCL:	165 VA	X	1.25%	=	206.25 VA									
FDL:	13260 VA	+	206.3 VA	(LCL) =	13466 VA	OR	64.74 A							

INDICATES ADDED NEW LOAD. CONNECT TO (E) CIRCUIT BREAKERS.

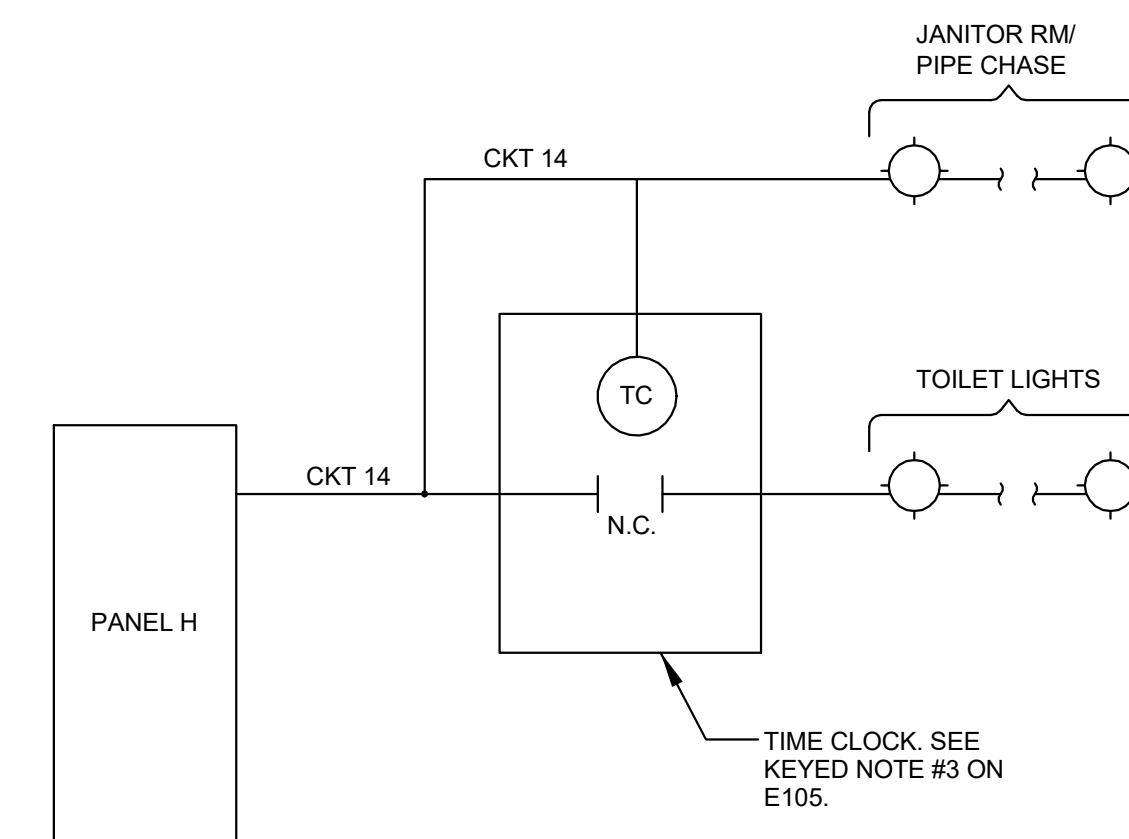
NOTE: NEW ADDED LOAD TO PANEL = 1.025 KVA



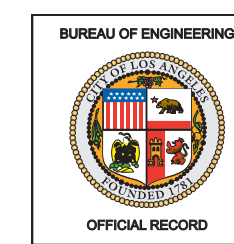
PARTIAL SINGLE LINE DIAGRAM
N.T.S.



AUTOMATIC DOOR MAGNETIC LOCK SYSTEM BLOCK DIAGRAM
N.T.S.



LIGHTING CONTROL DIAGRAM
N.T.S.



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ENGINEERING
CITY OF LOS ANGELES

BUREAU OF ENGINEERING

NO. _____ DATE _____

REVISION DESCRIPTION _____

INDEX **RP-300113**

REGISTRATION ENGINEER
JIMMY FONG
No. E14126
Exp. 09/30/2018

CITY ENGINEER
ARCHITECTURAL DIVISION
ENGINEER: JIMMY FONG LIC. NO.: E14126
DESIGNED: PETER MARZO
DRAWN: HOWA YANG
CHECKED: PETER MARZO
APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

CLIENT: RECREATION AND PARKS
GENERAL MANAGER: MICHAEL A. SHULL

SHEET: PANEL SCHEDULES - PARTIAL SINGLE LINE AND LIGHTING CONTROL DIAGRAMS
PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
ADDRESS: 345 EAST 51ST STREET LOS ANGELES, CA 90011

WORK ORDER
E1908366
PLAN FILE

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E102
SHEET 42 OF 45

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SHEET ISSUE

REVISIONS (DATE) (DESCRIPTION)

A

B

C

D

E

F

G

H

J

K

L

M

STATE OF CALIFORNIA
INDOOR LIGHTING
CERTIFICATE OF COMPLIANCE
Indoor Lighting
Project Name: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION Date Prepared: 7/10/18

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance April 2016

STATE OF CALIFORNIA
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CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance April 2016

STATE OF CALIFORNIA
INDOOR LIGHTING - Lighting Controls
CERTIFICATE OF COMPLIANCE
Indoor Lighting - Lighting Controls
Project Name: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION Date Prepared: 7/10/18

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
INDOOR LIGHTING - LIGHTING CONTROLS
CERTIFICATE OF COMPLIANCE
Indoor Lighting - Lighting Controls
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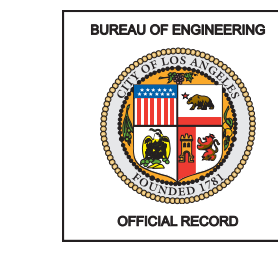
CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

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BUREAU OF ENGINEERING

DEPARTMENT OF PUBLIC WORKS

CITY OF LOS ANGELES

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DESIGNED: PETER MARZO
DRAWN: HOWA YANG
CHECKED: PETER MARZO
APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

SHEET TITLE 24 FORMS
PROJECT SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
ADDRESS 345 EAST 51ST STREET LOS ANGELES, CA 90011

WORK ORDER E1908366
PLAN FILE
DRAWING E103
SHEET 43 OF 45

BUILDING INDEX RP-300113

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TLB TEMPLATE REVISION DATE: 07/12/18

SHEET ISSUE

REVISIONS TABLE

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TLB TEMPLATE REVISION DATE: 07/12/18

SHEET ISSUE

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STATE OF CALIFORNIA
INDOOR LIGHTING - INDOOR LIGHTING
 CEC-NRCC-LTI-02-E (Revised 04/16)
 CERTIFICATE OF COMPLIANCE
 Indoor Lighting
 Project Name: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION Date Prepared: 7/10/18
 Documentation Author Name: JIMMY L. FONG (Page 3 of 3)
 Signature: [Signature] Date Signed: 7/10/18
 Company: PACIFIC ENGINEERS GROUP
 Address: 2740 WEST MAGNOLIA BLVD, SUITE 205
 City/State/Zip: BURBANK, CA 91505 Phone: 818-748-1758

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT
 I certify that this Certificate of Compliance documentation is accurate and complete.
 Responsible Person's Declaration Statement
 I certify the following under penalty of perjury, under the laws of the State of California:
 1. The information provided on this Certificate of Compliance is true and correct.
 2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
 3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
 4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
 5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.
 Responsible Designer Name: JIMMY L. FONG
 Company: PACIFIC ENGINEERS GROUP
 Address: 2740 WEST MAGNOLIA BLVD, SUITE 205
 City/State/Zip: BURBANK, CA 91505
 Signature: [Signature] Date Signed: 7/10/18
 License: E14126
 Phone: 818-748-1758

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
INDOOR LIGHTING
 CEC-NRCC-LTI-01-E (Revised 04/16)
 CERTIFICATE OF COMPLIANCE
 Indoor Lighting
 Project Name: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION Date Prepared: 7/10/18
 Documentation Author Name: JIMMY L. FONG (Page 4 of 4)
 Signature: [Signature] Date Signed: 7/10/18
 Company: PACIFIC ENGINEERS GROUP
 Address: 2740 WEST MAGNOLIA BLVD, SUITE 205
 City/State/Zip: BURBANK, CA 91505 Phone: 818-748-1758

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 Signature: [Signature] Date Signed: 7/10/18
 License: E14126
 Phone: 818-748-1758

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance April 2016

STATE OF CALIFORNIA
INDOOR LIGHTING POWER ALLOWANCE
 CEC-NRCC-LTI-03-E (Revised 04/16)
 CERTIFICATE OF COMPLIANCE
 Certificate of Compliance - Indoor Lighting Power Allowance
 Project Name: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION Date Prepared: 7/10/18
 Documentation Author Name: JIMMY L. FONG (Page 1 of 4)
 Signature: [Signature] Date Signed: 7/10/18
 Company: PACIFIC ENGINEERS GROUP
 Address: 2740 WEST MAGNOLIA BLVD, SUITE 205
 City/State/Zip: BURBANK, CA 91505 Phone: 818-748-1758

A separate page must be filled out for Conditioned and Unconditioned Spaces. This page is only for:
 CONDITIONED spaces UNCONDITIONED spaces
A. SUMMARY TOTALS OF LIGHTING POWER ALLOWANCES
 If using Complete Building Method for compliance, use only the total in column (a) as total allowed building watts.
 If using Area Category Method, Tailored Method, or a combination of Area Category and Tailored Method for compliance, use only the total in column (b) as the total allowed building watts.

	(a)	(b)
01 Complete Building Method Allowed Watts. Documented in section B of NRCC-LTI-03-E (below on this page)		190
02 Area Category Method Allowed Watts. Documented in section C-1 of NRCC-LTI-03-E (below on this page)		
03 Tailored Method Allowed Watts. Documented in section A of NRCC-LTI-04-E		
TOTAL ALLOWED BUILDING WATTS. Enter number into correct cell on NRCC-LTI-01, Page 2, Row 1		190

 Check here if building contains both conditioned and unconditioned areas.
B. COMPLETE BUILDING METHOD LIGHTING POWER ALLOWANCE

01	02	03	04
TYPE OF BUILDING (From §140.6 Table 140.6-B)	WATTS PER ft2	COMPLETE BLDG. AREA	ALLOWED WATTS
Total Area:			
Total Watts. Enter Total Watts into section A, row 1 (Above on this page)			

C-1 AREA CATEGORY METHOD TOTAL LIGHTING POWER ALLOWANCES

	Watts
Total from section C-2	190
Total from section C-3	0
Total Watts. Enter Total Watts into section A, row 2 (Above on this page)	190
For Alterations Only - Reduced lighting power option (Total Allowed Watts x 0.85). Enter this value into section A, row 2 if using this option.	

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance April 2016

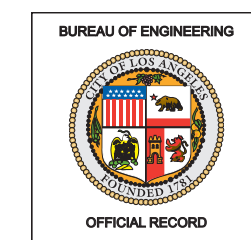
STATE OF CALIFORNIA
INDOOR LIGHTING POWER ALLOWANCE
 CEC-NRCC-LTI-03-E (Revised 04/16)
 CERTIFICATE OF COMPLIANCE
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 City/State/Zip: BURBANK, CA 91505 Phone: 818-748-1758

A separate page must be filled out for Conditioned and Unconditioned Spaces. This page is only for:
 CONDITIONED spaces UNCONDITIONED spaces
C-2 AREA CATEGORY METHOD GENERAL LIGHTING POWER ALLOWANCE
 - Do not include portable lighting for offices. Portable lighting for offices shall be documented only in Section G of NRCC-LTI-01-E.
 - Separately list lighting for each primary function area as defined in §100.1 of the Standards.

01		02	03	04
AREA CATEGORY (From §140.6 Table 140.6-C)		WATTS PER ft2	AREA (ft2)	ALLOWED WATTS
Location in Building	Primary Function Area per Table 140.6-C			
ROOMS 101 THRU 106	TOILETS, JANITOR / PIPE CHASE	0.6	316	190
TOTALS			316	190

 Enter sum total Area Category allowed watts into section C-1 of NRCC-LTI-03-E (this compliance document)

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance April 2016



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 Consulting Electrical Engineers
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 (818) 748-1758
 FAX (818) 763-9180 Y15-034 RR

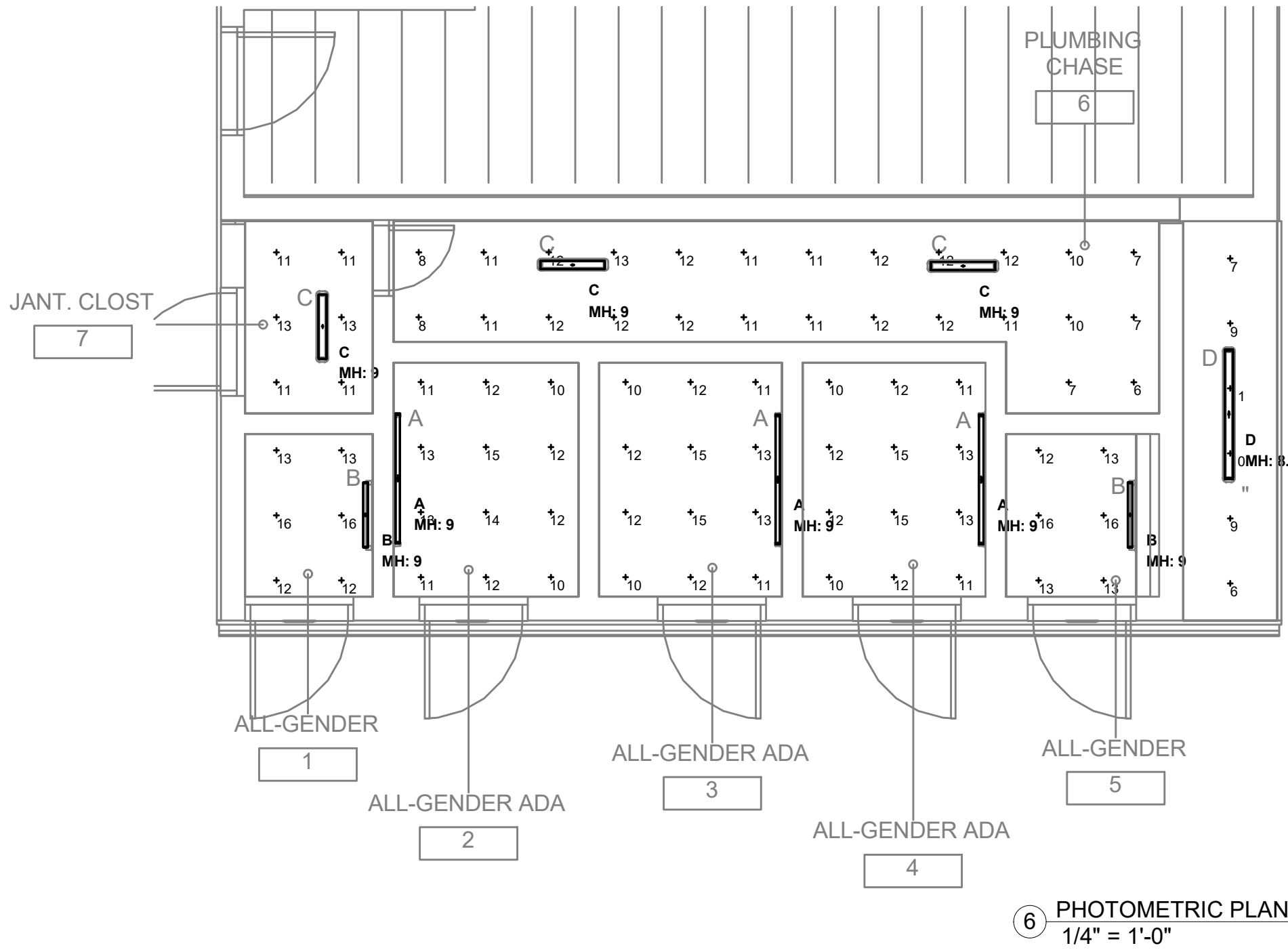
BUREAU OF ENGINEERING
 CITY OF LOS ANGELES
ENGINEERING
 CITY OF LOS ANGELES
 RP-300113
 INDEX
 BUILDING
 REVISION DESCRIPTION
 NO. DATE
 GARY LEE MOORE, PE, ENV SP
 ARCHITECTURAL DIVISION
 ENGINEER: JIMMY FONG LIC. NO.: E14126
 DESIGNED: PETER MARZO
 DRAWN: HOWA YANG
 CHECKED: PETER MARZO
 APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER
 CLIENT: RECREATION AND PARKS
 GENERAL MANAGER: MICHAEL A. SHULL
 SHEET TITLE 24 FORMS
 PROJECT SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION
 ADDRESS 345 EAST 51ST STREET LOS ANGELES, CA 90011
 WORK ORDER E1908366
 PLAN FILE
 DRAWING E104
 SHEET 44 OF 45
 PLOTTED 8/12/19 1:36:48 PM

Jobname: South Park - Public Restroom Renovation
 Report for: Pacific Engineers Group
 c/o: Crissy Cosci
 Report by: Christian Almonte / Applications Engineer
 Mounting Ht.: See Drawing [PLEASE VERIFY CORRECT HEIGHTS]
 Reflectance: 80/50/20 [UNLESS OTHERWISE SPECIFIED]
 See Luminaire Schedule for Light Loss Factor [UNLESS OTHERWISE SPECIFIED]
 Filename: South Park_Public Restrm Reno LTG_2019-07-Rev3.AGI
 Date: 7/22/2019

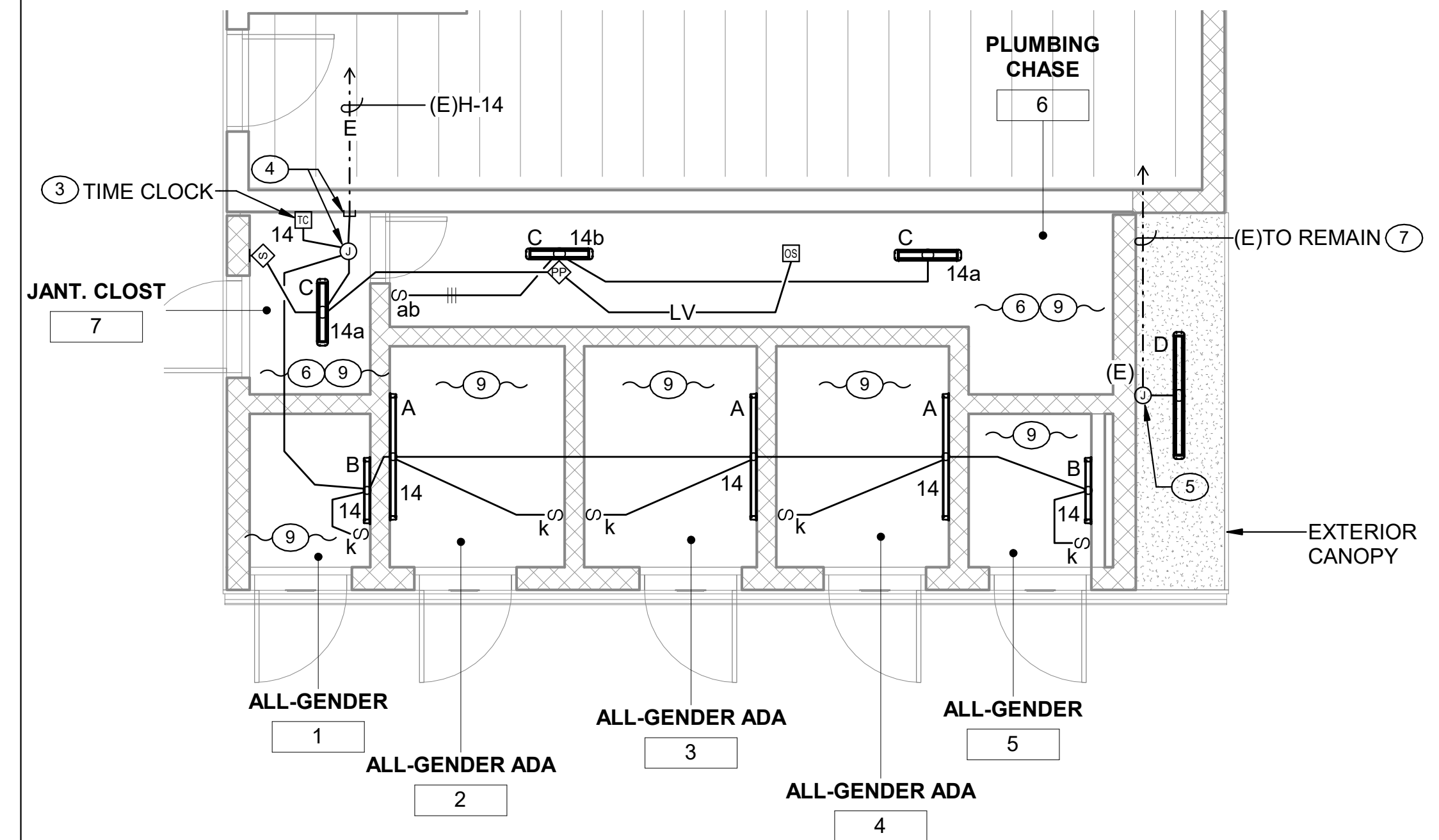
-----Disclaimer-----
 Luminaire data is obtained according to IES procedures under controlled laboratory conditions. Field results may differ from computer predictions due to many uncontrollable factors including, but not limited to: Line Voltage Variations, Lamp Performance, Ballast input watts, LED Drivers input watts, Temperature Variations and Jobsite Conditions.
 Final lighting design shall be the sole responsibility of the Electrical Engineer of record.

Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description
A	3	A	SINGLE	N.A.	0.579	LUMINAIRE LED: BLD48-20W-4000K (LLF prorated from BLD36-30W)
B	2	B	SINGLE	N.A.	0.567	LUMINAIRE LED: BLD24-20W-4000K (LLF prorated from BLD36-30W)
C	1	C	SINGLE	N.A.	0.654	LUMINAIRE LED: VPF42-20W-4000K-CP (LLF derated from 25W)
D	1	D	SINGLE	N.A.	0.850	LUMINAIRE LED: VPF44-25W-4000K-CP

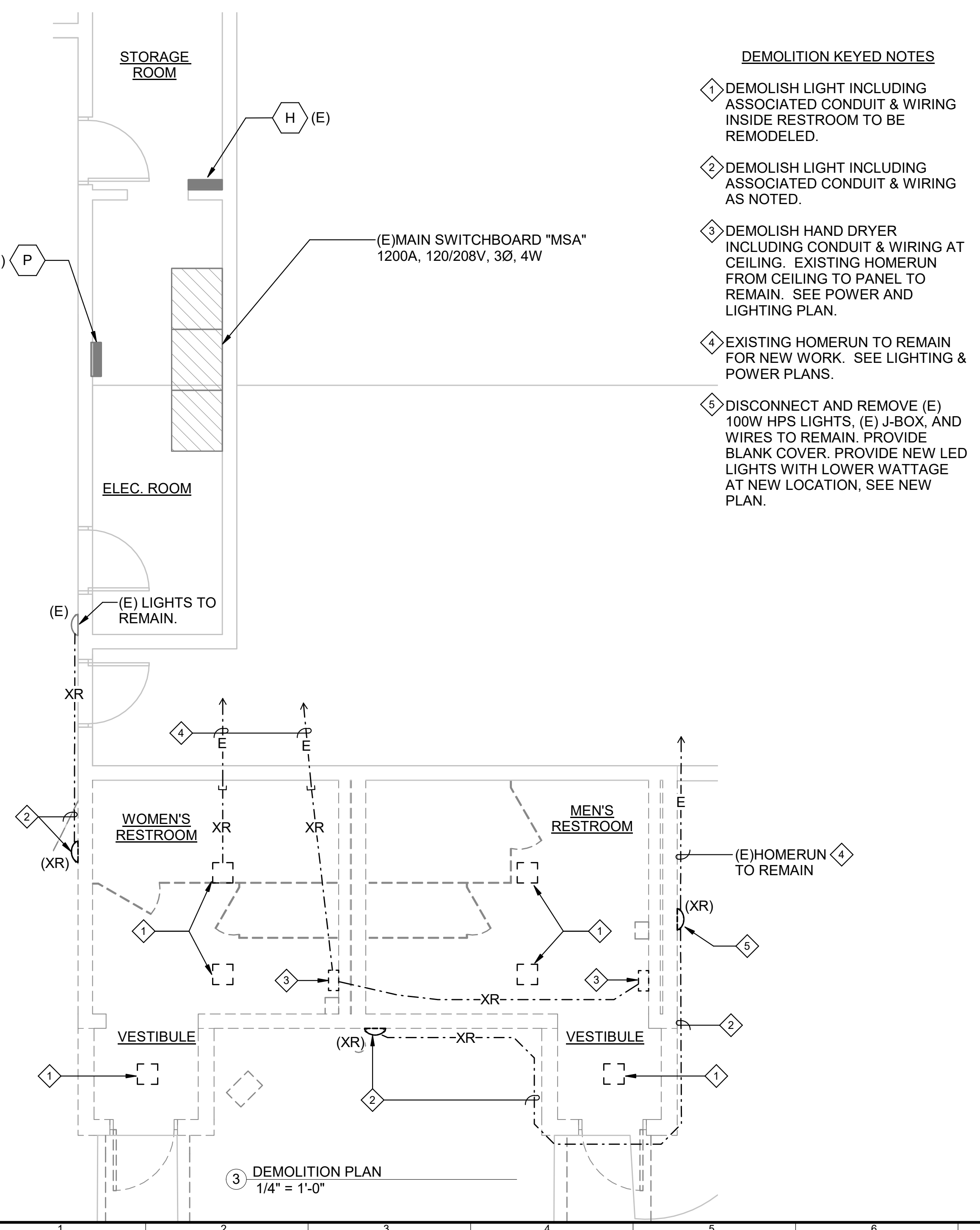
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
1_Floor	Illuminance	Fc	13.67	16	12	1.14	1.33
2_Floor	Illuminance	Fc	12.08	15	10	1.21	1.50
3_Floor	Illuminance	Fc	12.17	15	10	1.22	1.50
4_Floor	Illuminance	Fc	12.17	15	10	1.22	1.50
5_Floor	Illuminance	Fc	13.83	16	12	1.15	1.33
6_Floor	Illuminance	Fc	10.50	13	8	1.75	2.17
7_Floor	Illuminance	Fc	11.67	13	11	1.08	1.18
CANOPY_Floor	Illuminance	Fc	8.67	11	6	1.45	1.83



6 PHOTOMETRIC PLAN
1/4" = 1'-0"



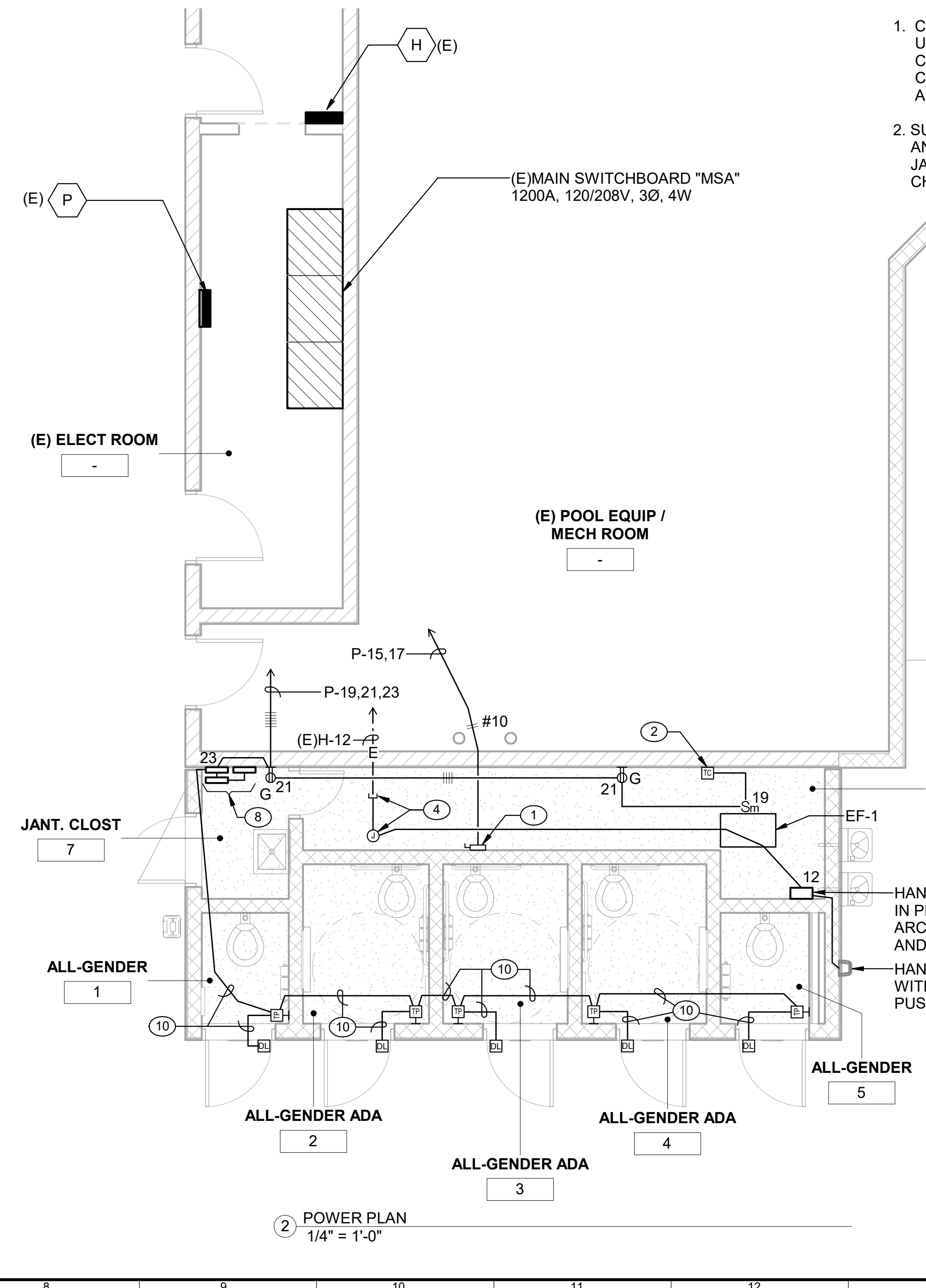
1 LIGHTING PLAN
1/4" = 1'-0"



3 DEMOLITION PLAN
1/4" = 1'-0"

DEMOLITION KEYED NOTES

- DEMOLISH LIGHT INCLUDING ASSOCIATED CONDUIT & WIRING INSIDE RESTROOM TO BE REMODELED.
- DEMOLISH LIGHT INCLUDING ASSOCIATED CONDUIT & WIRING AS NOTED.
- DEMOLISH HAND DRYER INCLUDING CONDUIT & WIRING AT CEILING. EXISTING HOMERUN FROM CEILING TO PANEL TO REMAIN. SEE POWER AND LIGHTING PLAN.
- EXISTING HOMERUN TO REMAIN FOR NEW WORK. SEE LIGHTING & POWER PLANS.
- DISCONNECT AND REMOVE (E) 100W HPS LIGHTS, (E) J-BOX, AND WIRES TO REMAIN. PROVIDE BLANK COVER. PROVIDE NEW LED LIGHTS WITH LOWER WATTAGE AT NEW LOCATION, SEE NEW PLAN.



2 POWER PLAN
1/4" = 1'-0"

GENERAL NOTE:

- CONDUITS & J-BOXES IN NEW UNISEX TOILETS SHALL BE CONCEALED. NO EXPOSED CONDUITS OR J-BOXES ALLOWED.
- SURFACE MOUNTED CONDUITS AND J-BOXES ARE ALLOWED IN JANITOR CLOSET AND PLUMBING CHASE.

KEYED NOTES

- 30AS, 250VAC NON-FUSED DISCONNECT SWITCH. EXTEND WIRING TO ELECTRIC WATER HEATER.
- TIME CLOCK FOR EXHAUST FAN. SEE MECHANICAL DRAWINGS.
- ELECTRONIC TIME CLOCK TO CONTROL UNISEX TOILET LIGHTS ONLY. TIME CLOCK SHALL BE "INTERMATIC" MODEL #ET7015C OR EQUAL IN NEMA-1 ENCLOSURE. SEE LIGHTING CONTROL DIAGRAM ON SHEET E102.
- LOCATE (E) CIRCUIT HOMERUN AND INTERCEPT WITH A J-BOX AND EXTEND CONDUIT AND WIRES TO NEW LIGHTS OR HAND DRYER.
- EXTEND (E) WIRING TO NEW CANOPY LIGHT. CONNECT TO SAME CIRCUIT.
- LIGHTS AT PLUMBING CHASE AND JANITOR CLOSET SHALL BE CONTROLLED BY OCCUPANCY SENSORS AND NOT BY A TIME CLOCK.
- EXISTING CIRCUIT TO OTHER EXTERIOR LIGHTS TO REMAIN. THIS CIRCUIT IS CONTROLLED BY AN EXISTING TIME CLOCK NEXT TO EXISTING SERVING PANEL.
- MAGNETIC LOCK POWER SUPPLY WITH BATTERY BACKUP, TIMER & EMERGENCY POWER-OFF BUTTON. POWER SUPPLY SHALL BE "SECURITRON" #BPS-12/24-1-B-24-5. TIMER SHALL BE "SECURITRON" DT-7 AND EMERGENCY POWER-OFF BUTTON SHALL BE "SECURITRON" #TM-9. SEE BLOCK DIAGRAM ON SHEET E102.
- MOUNT FIXTURE AT + 9'-0" AFF IN THIS ROOM.
- 1/2"C.O. WIRES SHALL BE PROVIDED BY ELECTRIC DOOR LOCK SUB CONTRACTOR.

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 FAX (818) 763-9180 Y15-034 RR

BUREAU OF ENGINEERING

CITY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

ARCHITECTURAL DIVISION

GENERAL MANAGER: MICHAEL A. SHULL

CLIENT: RECREATION AND PARKS

SHEET: RESTROOM DEMOLITION, POWER, PHOTOMETRIC, AND LIGHTING PLANS

PROJECT: SOUTH PARK RENOVATION - PUBLIC RESTROOM RENOVATION

ADDRESS: 345 EAST 51ST STREET LOS ANGELES, CA 90011

ENGINEER: JIMMY FONG LIC. NO.: E14126

DESIGNED: PETER MARZO

DRAWN: HOWA YANG

CHECKED: PETER MARZO

APPROVED: MAHMOOD KARIMZADEH, AIA, DEPUTY CITY ENGINEER

WORK ORDER: E1908366

PLAN FILE

DRAWING: E105

SHEET 45 OF 45

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PROJECT MANUAL

FOR CONSTRUCTION OF

DEPARTMENT OF RECREATION AND PARKS SOUTH PARK RENOVATION PUBLIC RESTROOM RENOVATION

BID SET

PREPARED FOR:

CITY OF LOS ANGELES
DEPARTMENT OF RECREATION AND PARKS
221 NORTH FIGUEROA STREET SUITE 1510
LOS ANGELES, CA 90012

WORK ORDER NO: E1908366



BY:

BUREAU OF ENGINEERING - ARCHITECTURAL DIVISION
DEPARTMENT OF PUBLIC WORK
CITY OF LOS ANGELES

February 29, 2024

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TABLE OF CONTENTS

GENERAL CONDITIONS

GENERAL REQUIREMENTS

SUPPLEMENTARY GENERAL REQUIREMENTS

DIVISION 02 - EXISTING CONDITIONS

SECTION 024119 – SELECTIVE DEMOLITION

DIVISION 03 - CONCRETE

SECTION 031000 - CONCRETE FORMWORK
SECTION 032000 - CONCRETE REINFORCING
SECTION 033000 - CAST-IN-PLACE CONCRETE
SECTION 033500 - CONCRETE FINISHES
SECTION 036200 - NON-SHRINK GROUTING

DIVISION 04 - MASONRY

SECTION 042200 - CONCRETE MASONRY UNITS

DIVISION 05 - METALS

SECTION 055000 - METAL FABRICATIONS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

SECTION 061000 - ROUGH CARPENTRY
SECTION 061600 - SHEATHING

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 071113 - BITUMINOUS DAMPPROOFING
SECTION 071900 - WATER REPELLENTS
SECTION 072100 - THERMAL INSULATION
SECTION 076200 - SHEET METAL FLASHING AND TRIM
SECTION 077200 - ROOF ACCESSORIES
SECTION 079200 - JOINT SEALANTS

DIVISION 08 - OPENINGS

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES
SECTION 083113 - ACCESS DOORS AND FRAMES
SECTION 087100 - DOOR HARDWARE
SECTION 089119 - FIXED LOUVERS

DIVISION 09 - FINISHES

SECTION 099113 - EXTERIOR PAINTING
SECTION 099123 - INTERIOR PAINTING
SECTION 099600 - HIGH PERFORMANCE COATINGS
SECTION 099650 - ANTI-GRAFFITI COATINGS

DIVISION 10 - SPECIALTIES

SECTION 102800 - TOILET AND BATH ACCESSORIES

DIVISION 11 - EQUIPMENT

NOT APPLICABLE

DIVISION 12 - FURNISHINGS

NOT APPLICABLE

DIVISION 13 - SPECIAL CONSTRUCTION

NOT APPLICABLE

DIVISION 14 - CONVEYING EQUIPMENT

NOT APPLICABLE

DIVISION 21 - FIRE SUPPRESSION

NOT APPLICABLE

DIVISION 22 - PLUMBING

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING
SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING
SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
SECTION 220548 - NOISE, VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT
SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
SECTION 220719 - PLUMBING PIPING INSULATION
SECTION 221116 - DOMESTIC WATER PIPING
SECTION 221119 - PLUMBING SPECIALTIES
SECTION 221316 - SANITARY WASTE AND VENT PIPING
SECTION 221413 - STORM DRAINAGE PIPING
SECTION 223400 - FUEL-FIRED WATER HEATER
SECTION 224000 - PLUMBING FIXTURES

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

SECTION 230500 - COMMON WORK RESULTS FOR HVAC
SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
SECTION 230800 - TESTING, ADJUSTING AND BALANCING FOR HVAC
SECTION 230802 - MECHANICAL TESTING REQUIREMENTS
SECTION 233100 - METAL DUCTS AND CASINGS
SECTION 233300 - AIR DUCT ACCESSORIES
SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

DIVISION 25 - INTEGRATED AUTOMATION

NOT APPLICABLE

DIVISION 26 - ELECTRICAL

SECTION 260100 - BASIC MATERIALS AND METHODS
SECTION 260190 - SUPPORTING DEVICES
SECTION 260519 - WIRE AND CABLE
SECTION 260526 - GROUNDING
SECTION 260533 - CONDUIT
SECTION 260534 - BOXES
SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS
SECTION 260921 - ELECTRICAL-HVAC-PLUMBING COORDINATION
SECTION 262726 - WIRING DEVICES
SECTION 262813 - FUSES
SECTION 262816 - DISCONNECT SWITCHES
SECTION 265100 - LIGHTING FIXTURES

DIVISION 27 - COMMUNICATIONS

NOT APPLICABLE

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

NOT APPLICABLE

DIVISION 31 - EARTHWORK

SECTION 312319 - EXCAVATION FILL STRUCTURES
SECTION 312323 - EXCAVATION FILL UTILITIES
SECTION 312326 - BASE COURSE

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 321313 - SITE CONCRETE WORK

DIVISION 33 - UTILITIES

NOT APPLICABLE

DIVISION 34 - TRANSPORTATION

NOT APPLICABLE

DIVISION 35 - WATERWAY AND MARINE CONSTRUCTION

NOT APPLICABLE

DIVISION 40 - PROCESS INTEGRATION

NOT APPLICABLE

DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT

NOT APPLICABLE

DIVISION 42 - PROCESS HEATING, COOLING, AND DRYING EQUIPMENT

NOT APPLICABLE

DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT

NOT APPLICABLE

DIVISION 44 - POLLUTION CONTROL EQUIPMENT

NOT APPLICABLE

DIVISION 45 - INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT

NOT APPLICABLE

DIVISION 46 - WATER AND WASTEWATER EQUIPMENT

NOT APPLICABLE

DIVISION 48 - ELECTRICAL POWER GENERATION

NOT APPLICABLE

APPENDIX

Attachment No. 1 CEQA Notice of Exemption

Attachment No. 2 Asbestos and Lead Sampling Report, Dated: April 2019

Attachment No. 3 Protection of Trees During Construction

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GENERAL CONDITIONS

FOR CONSTRUCTION OF

DEPARTMENT OF RECREATION AND PARKS SOUTH PARK RENOVATION PUBLIC RESTROOM RENOVATION

WORK ORDER NO: E1908366



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CONTENTS
GENERAL CONDITIONS

<u>Article</u>	<u>Page</u>
GENERAL	1
1. DEFINITIONS	1
CONTRACT DOCUMENTS	8
2. SCOPE.....	8
3. AUTHORITY OF THE BOARD OF RECREATION AND PARK COMMISSIONERS, PROJECT MANAGER, AND INSPECTOR	8
4. INTENT OF CONTRACT DOCUMENTS	8
5. STANDARD SPECIFICATIONS.....	9
6. INTERPRETATION OF PLANS AND SPECIFICATIONS.....	9
7. PRECEDENCE OF CONTRACT DOCUMENTS	9
8. ACCURACY OF PLANS AND SPECIFICATIONS	10
9. EXAMINATION OF COVERED WORK.....	10
10. UNNOTICED DEFECTS	10
11. BUILDING CODES AND REGULATIONS	10
12. LENGTH OF WORKDAY AND WORK WEEK.....	11
13. PAYMENT OF EMPLOYEES.....	11
14. CONVICT-MADE MATERIALS	11
15. SALES; BUSINESS OR USE TAX.....	11
16. NONDISCRIMINATION IN EMPLOYMENT	11
17. APPRENTICE UTILIZATION	12
18. LAWS AND REGULATIONS.....	12
19. PERMITS AND CONSTRUCTION EASEMENTS.....	12
20. PARTIES EXCLUDED FROM THE WORK.....	12
21. BUSINESS TAX REGISTRATION CERTIFICATES	13
22. FINANCIAL LIABILITY	13
THE CONTRACTOR'S RESPONSIBILITIES	13
23. CONTRACTOR'S OBLIGATIONS.....	13
24. CONTRACTOR'S REPRESENTATIVE AT THE SITE	14
25. FAMILIARITY WITH PLANS AND SPECIFICATIONS.....	15
26. JOB CONDITIONS.....	15
27. RESPONSIBILITY FOR SITE	15
28. WORKMANSHIP AND MATERIALS	16
29. INJURY AND ILLNESS PREVENTION - SAFETY MEASURES.....	16
30. PROTECTION OF PERSONS AND PROPERTY AND RESTORATION OF EXISTING IMPROVEMENTS	16
31. NON-CONFORMING WORK	18
32. SUBCONTRACTORS AND SUB-SUBCONTRACTORS... NOTE: REVISED AS OF FEBRUARY 12, 2016	19

**CONTENTS
GENERAL CONDITIONS**

<u>Article</u>	<u>Page</u>
33. RESPONSIBILITY OF CONTRACTOR TO ACT IN EMERGENCY	23
34. ASSIGNMENT	23
35. INDEPENDENT CONTRACTOR	23
INDEMNIFICATION AND INSURANCE REQUIREMENTS	24
36. INDEMNIFICATION	24
37. INSURANCE	24
38. SERVICE OF NOTICE	28
39. AGENT TO ACCEPT SERVICE.....	28
PROGRESS OF WORK.....	29
40. TEMPORARY SUSPENSION OF WORK	29
41. UNAVOIDABLE DELAY	29
42. ARCHAEOLOGICAL AND PALEONTOLOGICAL DISCOVERIES	30
43. OTHER CONTRACTS	30
44. TERMINATION OF CONTRACT BY CITY (CONTRACTOR NOT AT FAULT)	30
45. TERMINATION OF CONTRACT BY CITY (CONTRACTOR DEFAULT).....	33
46. PRE-FINAL INSPECTION.....	33
47. FINAL INSPECTION	33
48. PARTIAL ACCEPTANCE.....	34
49. FINAL ACCEPTANCE.....	34
50. LIQUIDATED DAMAGES.....	35
51. COMPENSATION FOR DELAY, DISRUPTION, AND UNANTICIPATED OVERHEAD	35
CHANGES TO THE CONTRACT	36
52. CHANGES AND EXTRA WORK	36
53. DIFFERING SITE CONDITIONS	37
LEGAL REQUIREMENTS.....	38
54. CLAIMS AND PROTESTS	38
55. COMMENCEMENT OF STATUTE OF LIMITATIONS.....	40
56. GOVERNING LAW.....	40
57. VENUE.....	40
58. NO WAIVER OF RIGHTS	40
59. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE.....	40
60. PATENTS AND COPYRIGHTS	41
61. PUBLIC RECORDS ACT	41

GENERAL

1. DEFINITIONS

The following terms as used in the Contract shall be defined and interpreted as follows:

ADDENDA

Written documents issued during the bidding period which modify, supersede, or supplement the original Contract Documents.

AGREEMENT

See "CONTRACT."

AS SHOWN, AS INDICATED, AND AS SPECIFIED

These words are understood to be followed by the words "in the Contract Documents."

BENEFICIAL USE

Use of a building, system, structure, or facility by the CITY.

BID

The offer of the Bidder submitted on the prescribed forms setting forth the price(s) for the Work.

BIDDING PERIOD

The time period allocated to the Bidder to enable preparation of a Bid or Proposal.

BIDDER

The person or persons, partnership, firm or corporation submitting a Bid or proposal for the Work defined in the Contract Documents.

BID GUARANTY

The cash, certified check or Bidders Surety Bond accompanying the Bid as a guaranty that the Bidder will enter into a contract with the RECREATION AND PARK COMMISSION for the performance of the Work.

BOARD OF RECREATION AND PARK COMMISSIONERS

The Board of Recreation and Park Commissioners, of the City of Los Angeles.

BOND

Bid bond, performance and payment bond or other instrument of security.

CHANGE ORDER

A written order to the CONTRACTOR signed by the GENERAL MANAGER directing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or time which is issued after the effective date of the Contract and effects less modification than is effected by a Supplemental Agreement. A Change Order may or may not also be signed by the CONTRACTOR.

CITY

The CITY of Los Angeles, a municipal corporation.

CLAIM

A written demand or assertion by one of the parties seeking, as a matter of right, an interpretation of the Contract Documents, payment of money, extension of time or other relief. The party asserting the claim must set forth the facts and circumstances for which the other party is responsible.

CODE

Codes of the State of California as well as any other Federal or local law, statute, ordinance, rule or regulation.

CONTRACT

A binding agreement between the CITY and the CONTRACTOR for the Work described in the Contract Documents.

CONTRACT COMPLETION DATE

The date the CITY accepts the entire Work as being in compliance with the Contract Documents, and authorizes the final payment in accordance with the requirements set forth in Article 25, FINAL PAYMENT of the General Requirements.

CONTRACT DOCUMENTS

The following documents constitute a part of and comprise the Contract Documents: Agreement, Notice Inviting Bids or Proposals, Instruction to Bidders, Contractor's Bid or Proposal, Special and Supplementary Conditions, General Requirements, Geotechnical Baseline Report (if provided for the in the General Requirements), Federal and State Requirements, Standard and Reference Specifications, Standard Plans, Plans and Specifications, Soil Reports and Subsurface Investigation Reports, Summary of First Notice Replies, Addenda and Notice to Bidders issued prior to the opening of bids, Plan Clarifications, Request for Information, Supplemental Agreements and Change Orders issued after Contract award.

CONTRACTOR DEFAULT

See TERMINATION OF CONTRACT BY CITY (CONTRACTOR DEFAULT) Article of these General Conditions.

CONTRACT PRICE

The total amount of money for which the Contract is awarded.

CONTRACT UNIT PRICE

The amount stated in the Bid for a single unit of an item of Work.

CONTRACTOR

The person or persons, partnership, firm or corporation who enters into the Contract as stipulated in the Agreement awarded by the CITY. Prime Contractor and Contractor shall mean the same.

CONTRACTOR'S REPRESENTATIVE

The representative of the CONTRACTOR at the site who shall supervise and direct the construction and who is authorized to receive and fulfill instructions from the PROJECT MANAGER or INSPECTOR.

DAYS

Unless otherwise specifically stated, the term "days" will be understood to mean consecutive calendar days.

EASEMENT

Permission to access or utilize property not owned by the CITY.

EQUAL

See "OR EQUAL".

GENERAL CONDITIONS

Instructions to the CONTRACTOR setting forth its responsibilities and the CITY'S responsibilities for proper execution of the Work indicated herein.

GENERAL MANAGER

GENERAL MANAGER of the Department of Recreation and Parks, or an authorized representative.

GENERAL REQUIREMENTS

Instructions to the CONTRACTOR setting forth its responsibilities and the CITY'S responsibilities for proper execution of the administration and technical aspects of the project indicated herein.

GEOTECHNICAL DESIGN SUMMARY REPORT /GEOTECHNICAL BASELINE REPORT (GBR)

The report that sets forth the geotechnical interpretations regarding anticipated conditions for the design and construction of the project. This report establishes a geotechnical baseline that provides the basis for identification of changed site/ground conditions.

GEOTECHNICAL SITE ASSESSMENT

SEE A GEOTECHNICAL DESIGN SUMMARY REPORT. @

HOLIDAY

Those holidays and dates observed by the CITY. A list of such holiday dates is available from the RECREATION AND PARK COMMISSION Office.

IMMEDIATELY NOTIFY

The obligation to cause verbal notification of some condition or event as soon as possible upon discovery or knowledge of the condition or event and in all instances, no more than two (2) hours.

INSPECTOR

The Inspector of Public Works, the Director of the Bureau of Contract Administration, or an authorized representative(s) located at the Public Works Building, 1149 S. Broadway, 3rd Floor, Los Angeles, CA, 90015.

JOBSITE

The area upon or in which the CONTRACTOR'S operations are carried on and such other areas adjacent thereto as may be designated as such by the Contract Documents.

LAW

Any Federal, State or local law, statute, ordinance, rule, regulation or code.

LIQUIDATED DAMAGES

The amount the CONTRACTOR shall pay to the CITY, as determined by rates and amounts as fixed and agreed in the Contract Documents, due to the CONTRACTOR'S failure to complete the Work or submit the schedule within the time specified, or for non-compliance with other specified requirements.

MODIFICATIONS

Includes Change Orders and Supplemental Agreements. A modification may only be issued after the effective date of the Contract.

NON-CONFORMING WORK

Non-conforming Work is Work which does not conform in all respects to all requirements in the Contract Documents, including damaged Work and damaged materials, without respect to the causes or nature of such lack of conformity.

NOTICE OF AWARD

The written notice by the CITY to the successful Bidder stating that upon compliance by the successful Bidder of required conditions, the City will execute the Contract.

NOTICE TO BIDDERS

A notice included in the bidding documents that informs prospective bidders of the bidding procedures and the opportunity to submit a bid.

NOTICE TO CONTRACTOR

The written notice by the CITY to the CONTRACTOR which officially advises on direction and provides information pertinent to the Contract.

NOTICE TO PROCEED

The written notice by the CITY to the successful Bidder stating that the Work or portions of the Work may commence.

NOTICE TO WITHHOLD

The written notice by the CITY to the CONTRACTOR advising that certain payments shall be withheld due to unacceptable execution of the Work by the CONTRACTOR.

OR EQUAL

The product, equipment, or material which is proposed by the CONTRACTOR for use in the Work which in the sole judgment of the PROJECT MANAGER is equal to, better than and as suitable as the product or material specified in the Contract Documents as to function, performance, reliability, quality, and general configuration.

PARTIAL ACCEPTANCE

Any portion of the Work which has been completed in accordance with the plans and specifications and has been accepted in writing by the PROJECT MANAGER and the INSPECTOR on the "Statement of Partial Completion" form.

PLANS OR DRAWINGS

The drawings, profiles, cross sections, working drawings, and supplemental drawings, or reproductions thereof, issued or approved by the PROJECT MANAGER, which show the location, character, dimensions or details of the Work.

PROJECT

The Work and/or construction operations executed through the performance of this Contract.

PROJECT MANAGER

The authorized representative of the GENERAL MANAGER.

PROTEST

See definition of Claim.

REFERENCE SPECIFICATIONS

Those bulletins, standards, rules, methods of analysis or test, codes, and specifications of other agencies, PROJECT MANAGER societies, or industrial associations referred to in the Contract Documents. These refer to the latest edition, including amendments in effect and published at the time of advertising the project, adopted by the RECREATION AND PARK COMMISSION, if applicable, unless specifically referred to by edition, volume, or date.

RIGHTS OF ENTRY

Written permission from an owner of a facility or property to access the facility or property for a specific purpose.

RIGHT OF WAY

Rights of way, easements, or rights of entry for the Work will be provided by the CITY. The CONTRACTOR shall make arrangements, pay for, and assume all responsibility for acquiring, using, and disposing of additional work areas and facilities temporarily required in addition to those provided by the CITY. The

CONTRACTOR shall indemnify and hold the CITY harmless from all claims for damages caused by such actions.

SPECIAL PROVISIONS

Any provision which supplements or modifies the Specifications.

SPECIFICATIONS

The Contract Documents and revisions to it which were prepared to specifically describe the commercial, legal, technical and nontechnical requirements of the project. Specifications include but are not limited to Terms, Provisions, General Conditions, General Requirements, Special Provisions, Technical Specifications, Equipment Schedules, and all revisions made to the specifications in Addenda, Notice To Bidders, and Change Orders or Modifications, signed by the GENERAL MANAGER.

STANDARD PLANS

Details of standard structures, devices or instructions referred to on the plans or in the specifications by title or number issued by the CITY.

STANDARD SPECIFICATIONS

Documents, Materials and items specified in Article 5 of these General Conditions.

STARTUP

That stage of performance testing as defined in the specifications which use the actual process fluid, material, or medium for a specified number of days of continuous operation without major interruptions and prior to acceptance by the CITY.

SUBCONTRACTOR

A "Subcontractor" is a contractor who is licensed pursuant to California Business and Professions Code, Section 7000 *et seq.* and who contracts directly with the prime CONTRACTOR. The Subcontractor performs some part of the Work of the Contract. A Subcontractor does not have any direct contract with the CITY related to the project.

SUB-SUBCONTRACTOR

A "Sub-subcontractor" is a Subcontractor, within the definition of that term, who has a contract with a Subcontractor and has no Contract with the City related to the project.

SUPERVISOR

The designated individual who is responsible for the proper execution or installation of some portion or portions of the Work. The SUPERVISOR reports directly or indirectly to the CONTRACTOR'S REPRESENTATIVE.

SUPPLEMENTAL AGREEMENT

A written amendment of the Contract Documents which modifies the Contract in price or scope by a percentage which is more than can be accomplished by a Change Order and signed by the CITY and the CONTRACTOR.

SUPPLIER

An individual, organization, or firm who is not required for the purposes of the Work to be licensed pursuant to California Business and Professions Code as a CONTRACTOR, Subcontractor, or Sub-subcontractor, within the meanings of those terms as defined herein above, who provides equipment and/or materials for the Work, to the CONTRACTOR, a Subcontractor, or a Sub-subcontractor, including that fabricated to a special design, but who does not perform labor at the site except for labor or labor supervision required by some manufacturers as part of their equipment installation for warranty or other purposes. The term "supplier" also includes fabricator, manufacturer, or vendor.

SURETY

Any individual, firm or corporation, bound with and for the CONTRACTOR for the acceptable performance, execution and completion of the Work, and for the satisfaction of all obligations incurred.

TERMS

Unless otherwise stated, the words "directed, required, permitted, ordered, instructed, designated, considered necessary, prescribed, approved, acceptable, satisfactory," or words of like meaning, refer to actions, statements, judgments, conclusions, and decisions within the responsibility of the PROJECT MANAGER or the INSPECTOR.

UNAVOIDABLE DELAY

Delay arising from causes beyond the control and without the fault or negligence of the CONTRACTOR and its Subcontractors at all tiers.

UTILITY

Tracks, overhead or underground wires, cables, pipeline, conduits, ducts, or structures, sewers, or storm drains owned, operated, or maintained in or across a public right of way, private easement, or jobsite.

VOLUME I

Are the items in the bid package entitled "CITY OF LOS ANGELES, CALIFORNIA, DEPARTMENT OF RECREATION AND PARKS INSTRUCTION TO BIDDERS, PROPOSAL, AFFIDAVIT AND BOND FOR..." inclusive.

VOLUME II

Are the items in the bid package entitled "CONTENTS GENERAL CONDITIONS", "CONTENTS GENERAL REQUIREMENTS", and any specifications and attachments inclusive.

WORK

Includes all material, labor, utility services, tools, expendable equipment, and all appliances, machinery, transportation, appurtenances and specified services necessary to perform and complete the Contract; and such additional items not specifically indicated or described that can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure. As used herein, "provide" shall be understood to mean "furnish and install, complete in place."

WORKSITE

See "JOBSITE."

WORKDAY

Any day within the period between the start of the Contract time and the date provided in the Contract for completion or the date established in the Statement of Completion by the CITY acknowledging that all Work under the contract is complete, whichever occurs last, other than:

- Saturday,
- Sunday,
- any day designated as a holiday by the CITY, and,
- any other day designated as a holiday in a Master Labor Agreement entered into by the CONTRACTOR or on behalf of the CONTRACTOR as an eligible member of a Contractor's Association,
- any day the CONTRACTOR is prevented from working for cause as established by UNAVOIDABLE DELAY of these General Conditions; and,

- any day the Contractor is prevented from working during the first five (5) hours of the workday with at least sixty percent (60%) of the normal Work force from cause as established by an Unavoidable Delays of these General Conditions.

CONTRACT DOCUMENTS

2. SCOPE

- A. The work to be performed under this Contract shall consist of furnishing all tools, equipment, materials, supplies and manufactured articles, and for furnishing all transportation, services, including fuel, power and water, and essential communications, and the performance of all labor, Work, or operations required for the fulfillment of the Contract, in strict accordance with the specifications, schedules, and drawings, all of which are made a part hereof, and including such detail sketches as may be furnished by the PROJECT MANAGER from time to time during the construction in explanation of said drawings. The items shall be complete and all Work, material, and services not expressly called for in the Specifications, or not shown on the drawings, which may be necessary for complete and proper construction to carry out the Contract in good faith shall be performed, furnished, and installed by the CONTRACTOR at no increase in cost to the CITY.
- B. The Work required by the Contract shall be completed within **Three Hundred Sixty-Five (365)** calendar days of the date specified by the General Manager in the notice to proceed with the work. The Contract completion time shall consist of **Three Hundred Sixty-Five (365)** calendar days for construction, and **Zero (0)** calendar days for maintenance.

3. AUTHORITY OF THE RECREATION AND PARK COMMISSION, PROJECT MANAGER, AND INSPECTOR

The GENERAL MANAGER, RECREATION AND PARKS has the final authority in all matters affecting the Work. The CONTRACTOR shall promptly comply with instructions from the PROJECT MANAGER or the INSPECTOR.

On all questions relating to quantities, the acceptability of material, equipment, or Work, the execution, progress or sequence of Work, and the meaning of specifications or drawings, the decision of the PROJECT MANAGER is final and binding, and shall be precedent to any payment under the Contract, unless otherwise ordered by the BOARD OF RECREATION AND PARKS.

The PROJECT MANAGER is authorized to require performance of the Work consistent with the meaning of the plans and specifications and to approve necessary additive changes in Plans up to a maximum as authorized by the Recreation and Park Commission. The PROJECT MANAGER may initiate changes in Plans or scope of Work, regardless of cost, for submission to the RECREATION AND PARK COMMISSION for its approval.

The INSPECTOR is authorized to enforce compliance with Plans and Specifications, to determine the acceptability of materials and workmanship, administer requirements with respect to subcontracts, and to prepare and process progress payment estimates. In the event of a dispute between the CONTRACTOR and the INSPECTOR, the latter is authorized to reject materials or suspend the Work until any questions at issue can be referred to and decided by the RECREATION AND PARK COMMISSION or, in design matters, by the PROJECT MANAGER.

The INSPECTOR may sample and test all materials to be incorporated into the Work. The INSPECTOR may delegate this authority to sample materials and perform tests to the Department of General Services, Standards Division, or other approved agencies, the CONTRACTOR will pay for testing.

4. INTENT OF CONTRACT DOCUMENTS

The Contract Documents are complementary, and what is called for by one part shall be as binding as if called for by all. The intent of the Documents is to include all Work consistent therewith and reasonably inferable there from as being necessary for completion of the Contract. Materials or Work described in words that indicate the proper execution and a well known technical or trade designation shall be held to refer to such recognized standards.

It is understood and agreed that the written terms and provisions of the Contract Documents represent the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral. The Contract Documents shall not be construed to create any contractual relationship of any kind between the PROJECT MANAGER or the INSPECTOR and the CONTRACTOR.

5. STANDARD SPECIFICATIONS

The applicable portions of the Standard Specifications for Public Works Construction (SSPWC) shall become part of these Contract Documents, and unless otherwise specified, all Work and materials shall conform to the Standard Specifications as modified by the corresponding issue of Standard Plan No. S-610 as amended or revised and adopted by the RECREATION AND PARK COMMISSION in effect on the date of advertising for bids.

6. INTERPRETATION OF PLANS AND SPECIFICATIONS

Every part of the Contract, as shown on the Plans and described in the Specifications, must be completed and finished. No deviations are to be made from the Plans or Specifications without previous written authorization from the PROJECT MANAGER.

In general, the Plans will show dimensions, positions and type of construction, and the Specifications will define materials, quantities, and if indicated, required methods of construction. Any Work called for on the Plans and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both. Work not particularly detailed, marked, or specified shall be the same as similar parts that are detailed, marked, or specified.

The Plans have been drawn to the indicated scales except where otherwise noted. Dimensions indicated by figures or numerals shall govern in all cases whether drawn to scale or not. Larger scale drawings shall take precedence over smaller scale drawings. Drawings shall not be scaled for dimensions.

The general character of the detailed Work is shown on the Contract drawings, but minor modifications may be made in larger scale drawings. The PROJECT MANAGER will furnish additional details, when needed, to more fully explain the Work, and the same shall be considered part of the Contract.

Where on any drawings, a portion of the Work is drawn out or detailed and the remainder is indicated in outline, the drawn out or detailed parts shall apply also to all other like portions of the Work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts in the Work, unless otherwise indicated.

References made to other specifications and codes refer to the edition including amendments in effect and published at the time of advertising the project or issuing the permit, unless specifically referred to by edition, volume, or date as noted in the Contract Documents.

The CONTRACTOR shall furnish and install all equipment and materials required to complete installations whether or not the quantities are specifically shown, called out, or reflected in the Contract Drawings.

7. PRECEDENCE OF CONTRACT DOCUMENTS

In resolving inconsistencies or ambiguities among two (2) or more components of the Contract Documents, the highest precedence shall be given to Permits from the other agencies as may be required by law and decreasing order as follows:

1. Permits from other agencies as may be required by law
2. Agreement
3. Special Provisions
4. General Conditions
5. Specifications - Division 01: General Requirements
6. Specifications - Divisions 02 - 17
7. Geotechnical Site Assessment
8. Drawings
9. Standard Plans
10. Standard Specifications

11. Reference Specifications
12. Reference Drawings

Supplemental Agreements, Change Orders, PROJECT MANAGER'S written interpretations and clarifications, Notice to Bidders and Addenda, in the precedence listed, will take precedence over all other Contract Document components referenced therein. Figure dimensions on Drawings will take precedence over scaled dimensions.

Detailed Drawings, including Process and Instrumentation Drawings (P & ID's), will take precedence over general Drawings.

8. ACCURACY OF PLANS AND SPECIFICATIONS

Omissions from the Plans and Specifications shall not relieve the CONTRACTOR from the responsibility of furnishing, making, or installing all items required by law or usually furnished, made, or installed in a project of the scope and character indicated by the Plans and Specifications. If the CONTRACTOR is of the opinion that it will incur costs above and beyond what would reasonably be anticipated in meeting the above requirements, it shall inform the PROJECT MANAGER in writing within twenty (20) calendar days after discovering the omission and before starting the Work.

The Plans show conditions as they are supposed or believed by the PROJECT MANAGER to exist, but it is not intended or to be inferred that the conditions as shown thereon constitute a representation or warranty, expressed or implied, by the CITY or its officers, that such conditions are actually existent, nor shall the CITY, or any of its officers, be liable for any loss sustained by the CONTRACTOR as a result of any variance between conditions as shown on the Plans, and the actual conditions revealed during progress of the Work or otherwise, except as indicated in Article 53, Differing Site Conditions of these General Conditions.

9. EXAMINATION OF COVERED WORK

If any Work is covered without inspection, approval or consent of the INSPECTOR, and examination is required by the INSPECTOR, it shall be uncovered at the CONTRACTOR'S sole expense.

Examination of covered Work may be ordered by the PROJECT MANAGER and if so ordered, the Work shall be uncovered by the CONTRACTOR. If such Work is found to be in accordance with the Contract Documents, the CITY will issue a Change Order authorizing payment for the cost of examination and replacement. If such Work is found to be not in conformance with the Contract Documents, the CONTRACTOR shall correct the non-conforming Work and the cost of examination and correction of the non-conforming Work shall be borne solely by the CONTRACTOR.

10. UNNOTICED DEFECTS

Any non-conformity in the Work that is discovered before Contract Completion, or before final payment has been made, or during the guarantee period, shall be removed and replaced by the CONTRACTOR with Work which conforms to the provisions of the Contract Documents. Failure on the part of the PROJECT MANAGER or the INSPECTOR to condemn or reject non-conforming Work shall not constitute acceptance or implied acceptance of such Work.

11. BUILDING CODES AND REGULATIONS

The CONTRACTOR shall perform the Work in accordance with the requirements of the Los Angeles City Building Code and all other regulations, laws, and ordinances, even though such requirements are not specifically mentioned in the Specifications or shown on the drawings.

It is not the responsibility of the CONTRACTOR to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the CONTRACTOR observes that any of the Contract Documents are at variance therewith in any respect, it shall promptly notify the PROJECT MANAGER in writing, and any necessary changes shall be accomplished by issuance of a Change Order.

If the CONTRACTOR performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the PROJECT MANAGER, it shall assume full responsibility therefore and shall bear all costs attributable thereto.

12. LENGTH OF WORKDAY AND WORK WEEK

Eight (8) hours of labor shall constitute a calendar day's work for employees of the CONTRACTOR under this Contract. Said employees shall be paid not less than the prevailing wage rate for the first eight (8) hours work of each day.

A working day shall be Monday through Friday, and work shall be between 7:00 a.m. and 4:00 p.m., unless otherwise approved by the PROJECT MANAGER or the RECREATION AND PARK COMMISSION or revised by CITY Ordinance.

When work in excess of eight (8) hours per day, or forty (40) hours during any one (1) week is performed, wages for all hours over eight (8) hours in any day or over forty (40) hours during any one (1) week shall be paid at the prevailing wage rate, as provided in the California Code and the CITY's code requirements.

13. PAYMENT OF EMPLOYEES

The CONTRACTOR and each Subcontractor shall pay each employee engaged in Work on the project under this Contract in compliance with the Federal and State wage provisions indicated on the appropriate page of the Proposal (General Instruction and Information for Bidders), and LENGTH OF WORKDAY AND WORK WEEK of these General Conditions.

The certified payroll and the Statement of Compliance shall be submitted to the INSPECTOR by the CONTRACTOR and all Subcontractors performing Work on the project, regardless of dollar amount or type of contract.

If there is a difference between the Federal and State minimum wage rates for similar classifications of labor, the CONTRACTOR and its Subcontractors shall pay not less than the higher wage rate.

When the CONTRACTOR intends to use a craft or classification not shown on the general prevailing wage determinations, it will be required to pay the wage rate of that craft or classification most closely related to it as shown in the general prevailing wage determinations. In case of disagreement between the CONTRACTOR and the CITY, the INSPECTOR shall make the final determination as to the prevailing wages for the Work.

14. CONVICT-MADE MATERIALS

No materials manufactured or produced in a penal or correctional institution shall be incorporated in the project under this Contract.

15. SALES; BUSINESS OR USE TAX

Purchases of materials and equipment which will be incorporated or installed permanently in the Contract Work, or which will be used in the operation of the CONTRACTOR or Subcontractors, and not incorporated in the Contract Work, are not exempt from City of Los Angeles and California State Sales or Use Taxes as applicable. The CITY shall consider any required business taxes to be included in the overhead costs of the CONTRACTOR.

16. NONDISCRIMINATION IN EMPLOYMENT

The CONTRACTOR shall comply with all of the provisions of the Los Angeles Administrative Code, Mandatory Provision Pertaining to Nondiscrimination in Employment.

The CONTRACTOR shall submit Monthly Ethnic Composition of Work Force Reports to the INSPECTOR indicating the number of employees in the various work categories and ethnic groups and gender on forms furnished by the CITY. Failure to furnish the reports shall constitute grounds for the CITY to withhold the progress payment.

Nondiscrimination Clause: "The CONTRACTOR shall not discriminate during the performance of this Contract against any employee or applicant for employment because of employee's or applicant's race, religion, national origin, ancestry, sex, age, sexual orientation or physical handicap." The CONTRACTOR shall include in all subcontracts awarded under this Contract the same Nondiscrimination Clause.

If conflicts exist between these provisions and the Federal Rules and Regulations governing the same, the more stringent requirements shall prevail.

17. APPRENTICE UTILIZATION

Any Contract awarded hereunder will require the CONTRACTOR to comply with the provisions of the California Labor Code relating to apprentice employment and training; and will require the CONTRACTOR to assume full responsibility for compliance with said section with respect to all Apprenticing Occupations involved in the Project. (Compliance with said Apprentice Utilization provisions of the Labor Code is not required for Public Works Contracts involving less than \$30,000 or less than twenty (20) Working days in duration).

18. LAWS AND REGULATIONS

The CONTRACTOR shall observe and comply with all Federal, State, and local laws, ordinances, codes, orders, and regulations which in any manner affect those engaged or employed on the Work, the materials used in the Work, or the conduct of the Work. If any discrepancy or inconsistency should be discovered in this Contract in relation to any such law, ordinance, code, order, or regulation, the CONTRACTOR shall report the same in writing to the PROJECT MANAGER. The CONTRACTOR shall indemnify and save harmless the CITY, and its officers, agents, and employees, against all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by itself or by its employees or subcontractors as stated in these Contract Documents. Any particular law or regulation specified or referred to elsewhere in these specifications shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of Federal, State, and local laws and regulations.

19. PERMITS AND CONSTRUCTION EASEMENTS

The CONTRACTOR shall anticipate, obtain and pay for all permits, excluding the General Building Permit, necessary for performance of the Work.

The CONTRACTOR shall obtain and pay all costs incurred and submit to the PROJECT MANAGER copies of all permits required for the construction and installation of all Work called for on this project. All costs shall be included in the CONTRACTOR'S bid. The permit list to be obtained by the CONTRACTOR shall include, but not be limited to the following:

1. Night Work, hauling, overload, grading, excavation, demolition, foundation, and associated building permits.
2. Electrical permits.
3. Mechanical permits.
4. Plumbing permits.
5. South Coast Air Quality Management District permits.
6. Fire sprinkler permit.
7. All Federal, State, County and CITY issued permits.

Rights of ways, easements, or rights of entry for the Work will be provided by the CITY. The CONTRACTOR shall make arrangements, pay for, and assume all responsibility for acquiring, using, and disposing of Work areas and facilities temporarily required which are necessary in addition to those provided by the CITY. The CONTRACTOR shall indemnify and hold the CITY harmless for all claims for damages caused by such actions.

20. PARTIES EXCLUDED FROM THE WORK

Lists of individuals, firms and organizations which have been debarred, suspended or have voluntarily excluded themselves from Federal Procurement and Non Procurement Program is maintained by US General Services Administration. A copy can be obtained from Superintendent of Documents, US Government Printing Office, Washington, DC 20402, Tel: (202) 783-3238.

The CITY will not conduct business with an individual, firm or organization, and the CONTRACTOR shall not employ or otherwise utilize any Subcontractor, supplier or equipment vendor at any tier which is on the U.S. General Services Administration "List of Parties Excluded from Federal Procurement and Non Procurement Programs". The CONTRACTOR shall not utilize or otherwise employ any subcontractors or suppliers on the

CITY's list of nonresponsible bidders maintained by the General Services Division of the Bureau of Contract Administration.

21. BUSINESS TAX REGISTRATION CERTIFICATES

The CONTRACTOR represents that it has, or will obtain upon award, the Business Tax Registration Certificate(s) required by the Los Angeles City Business Tax Ordinance. The CONTRACTOR shall maintain, or obtain as necessary, all such Certificates required of it under said Ordinance and shall not cause or allow any such Certificate to be revoked or suspended.

The CITY requires all firms that have business activity within the City of Los Angeles to pay CITY business taxes.

Payments for goods or services will be withheld unless proof of tax compliance is provided to the CITY. All firms and individuals that do business with the CITY will be required to provide a Business Tax Registration Certificate number or an exemption number as proof of compliance with Los Angeles City business tax requirements in order to receive payment for goods or services.

The Tax and Permit Division of the City Clerk's Office has the sole authority to determine whether a firm is covered by business tax requirements.

22. FINANCIAL LIABILITY

The CITY's liability under this Contract shall not exceed the CITY's appropriation to fund the Contract at the time of Contract award. However, if the CITY shall appropriate funds for any successive years, the CITY'S maximum liability shall not exceed the extent of such appropriation, subject to the terms and conditions of this Contract.

THE CONTRACTOR'S RESPONSIBILITIES

23. CONTRACTOR'S OBLIGATIONS

Only competent workers shall be employed on the Work. Any worker, at the journey level or above, employed on the Work shall have a current license or certificate as required for the type of Work being performed, issued by the Department of Building and Safety of the City of Los Angeles and any such other organization as required.

Any person or subcontractor employed who is found by the PROJECT MANAGER AND/OR INSPECTOR to be incompetent, disorderly or otherwise objectionable, or who fails or refuses to perform Work properly, acceptably and as directed shall be immediately removed from the Work by the CONTRACTOR and not be reemployed on the Work.

The CONTRACTOR, at its sole cost and expense, shall perform all labor and services and furnish all the materials, tools, and appliances, except as hereinafter otherwise definitely provided, necessary or proper for performing and completing the Work required, in the manner and within the time stipulated in these specifications. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and such temporary works as may be required. If, at any time before the commencement or during the progress of the Work or any part of it, the CONTRACTOR'S methods or appliances appear to the PROJECT MANAGER or the INSPECTOR to be unsafe, inefficient, or inadequate for securing the safety of the workers, the quality of the Work required, or the rate of progress stipulated, the PROJECT MANAGER or the INSPECTOR may order the CONTRACTOR to increase their safety and efficiency or to improve their character, and the CONTRACTOR shall comply with such orders at its own expense. Neither the making of such demands by the PROJECT MANAGER nor the failure to make such demands shall relieve the CONTRACTOR of its obligation to secure the safe conduct of the Work, the quality of Work required, nor the rate of progress stipulated in the Contract. The CONTRACTOR shall be fully responsible for the safety, efficiency, and adequacy of its plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation. All of the labor and materials shall be performed and furnished strictly pursuant to and in conformity with the Contract Documents, the lines and grades and other directions of the PROJECT MANAGER or the INSPECTOR as given from time to time during the progress of the Work under the terms of the Contract, and in accordance with working drawings to be furnished from time to time as provided herein. The CONTRACTOR shall complete the entire Work to the satisfaction of the PROJECT MANAGER and INSPECTOR and in accordance with the Specifications and drawings herein mentioned, at the prices fixed in the Contract.

Where articles or materials are especially manufactured or fabricated for delivery under these specifications, the CONTRACTOR shall at all times employ such workforce, plant, materials, and tools as will be sufficient to complete the performance of the Contract and every part thereof within the time limits stipulated herein. If the CONTRACTOR fails to employ sufficient workforce, plant, materials, tools, or to maintain adequate progress, the PROJECT MANAGER may require an increase in progress at any point or points or a modification of plans and procedure in such a manner as to accelerate the Work. Failure to adequately staff the project shall be just cause for the CITY to terminate the Contract.

24. CONTRACTOR'S REPRESENTATIVE AT THE SITE

A technically qualified and English-speaking project representative shall be designated in writing as the CONTRACTOR'S representative at the job site, who shall supervise the Work and shall provide competent supervision of the Work until its completion. The CONTRACTOR'S project representative shall be assigned full time and exclusively to this project. Alternate representatives with qualifications equal to or better than the previous representative may be designated. The CONTRACTOR'S representatives shall have at least five (5) years of verifiable experience as the person primarily responsible for supervision of the Work on projects of the same or similar size and nature as this project. Within five (5) days after the Notice of Award the CONTRACTOR shall provide a statement to the PROJECT MANAGER with the following:

1. Identification and resume, showing the qualifications and experience of the CONTRACTOR'S representative and the alternate appointed to act in the place of the CONTRACTOR'S representative.
2. References of not less than two (2) previous projects on which the CONTRACTOR'S representative and the alternate had supervisory responsibility on a project of a similar nature and at least one-half or more of the cost of this project. Such references shall include names, addresses, and telephone numbers of owner representatives who worked on the project as well as project information such as project type, size, location and duration.

The PROJECT MANAGER reserves the right to disapprove any candidate named as the CONTRACTOR'S representative or alternate who fails to meet the provisions set forth herein. The PROJECT MANAGER reserve the right to remove, without any right to work on the project, either the CONTRACTOR'S representative or alternate, who in the sole opinion of the PROJECT MANAGER has demonstrated incompetence, lack of ability, or other unsuitability to perform supervision of the Work.

If the CONTRACTOR'S representative or alternate leave the employ of the CONTRACTOR, the CONTRACTOR will be required to replace the individual(s) and fulfill the requirements of this Article within fifteen (15) calendar days. In no event shall any Work proceed in the absence of an approved representative.

The CONTRACTOR'S representative or alternate shall have full authority to act on behalf of the CONTRACTOR, including, but not limited to final approval of Change Orders and Supplemental Agreements. All directions given by the PROJECT MANAGER to said representative or alternate shall be considered as having been given to the CONTRACTOR. Such instructions given by the PROJECT MANAGER to the CONTRACTOR'S representative or alternate will be confirmed in writing. All instructions and directions given by the PROJECT MANAGER or the INSPECTOR will be limited to matters properly falling within the PROJECT MANAGER'S or the INSPECTOR'S authority as specified in AUTHORITY OF THE RECREATION AND PARK COMMISSION, PROJECT MANAGER AND INSPECTOR of these General Conditions.

The CONTRACTOR'S representative or alternate shall be present at the site of the Work at all times while Work under the Contract is in progress. Failure to observe this requirement shall constitute suspension of the Work by the CONTRACTOR, until such time as said representative or alternate is again present at the site, and no payment will be allowed for any Work performed in the absence of said representative or alternate. Work performed in violation of these provisions shall be removed and reconstructed, re-fabricated, or reinstalled under the required supervision. No extensions of time will be granted, nor will additional payment be allowed for any costs to the CONTRACTOR for slowdown, delays, idled equipment, or any other costs incurred by the CONTRACTOR as the direct or indirect result of such suspension.

Whenever the Work is defined as being suspended under the provisions of this Article, any such suspension in excess of ten (10) calendar days shall constitute just cause for the CITY to terminate the Contract under the provisions of TERMINATION OF CONTRACT BY CITY (CONTRACTOR DEFAULT) of these General Conditions.

25. FAMILIARITY WITH PLANS AND SPECIFICATIONS

It shall be the responsibility of the CONTRACTOR to be thoroughly familiar with all details of the Project, including the Work of CONTRACTOR'S forces and all Subcontractors. The CONTRACTOR shall call the following to the attention of both the PROJECT MANAGER and the INSPECTOR in writing within twenty-four (24) hours of discovery, before any Work is performed:

1. Errors and omissions in the Plans and Specifications;
2. Work on the Plans or in the Specifications which, if so constructed, would result in a conflict or interference with other Work or the Work of other trades, including the location of fixtures and equipment;
3. Existing improvements visible at the job site, for which no existing disposition is made on the Plans or in the Specifications but which could reasonably be assumed to interfere with the satisfactory completion of the improvements contemplated by the Plans and Specifications.

Failure to notify shall constitute a waiver by the CONTRACTOR of any claim for delay or other damages occasioned by such defect. If the CONTRACTOR proceeds with the Work without instructions from the PROJECT MANAGER, the incorrect Work shall be removed and corrections made to comply with the PROJECT MANAGER'S instructions, at no cost to the CITY. The requirements of this Article are applicable to typographical errors in the Specifications and notational errors on the Plans where ambiguity or inadequate description exists.

26. JOB CONDITIONS

The CONTRACTOR shall visit the job site as soon as practicable after award of the Contract and ascertain all conditions affecting necessary procedure and sequencing of Work operations in the execution of the Work, including condition of available roads and streets, or clearances, restrictions and other limitations affecting transportation and ingress and egress to the job site. The CONTRACTOR shall determine the nature and types of Work to be performed and shall be responsible for all Work to be accomplished.

The CONTRACTOR shall enter the job site as noted in Article 4, SITE SECURITY of the General Requirements. The CONTRACTOR will be restricted to the immediate Work areas on the job site and shall in no case go beyond the Work limits noted on the drawings or as otherwise directed by the PROJECT MANAGER. The job site shall be enclosed with a temporary chain link fence and gates which shall be removed upon completion of the Work. The CONTRACTOR shall confine all operations of the contracted Work to the boundaries of the job site(s) and shall not interfere with CITY personnel and CITY operations or the Work of other contractors working on or near the site.

CONTRACTOR'S employee access to the job site by private vehicles is prohibited.

No vehicle is allowed in the facility or on the job site except delivery trucks and CONTRACTOR'S identified vehicles and equipment. It shall be the CONTRACTOR'S sole responsibility to arrange and pay for offsite employee parking and transportation, if necessary, so as not to affect the availability of public parking on the grounds of the facility or park site. The CONTRACTOR shall fully cooperate with all authorities on the job site and other contractors not related to the Work of this Contract who might be at the job site and shall comply with all regulations in force at the job site.

27. RESPONSIBILITY FOR SITE

The CONTRACTOR shall be in full charge of and be responsible for the job site and the construction Work of this Contract, subject to the directions of the PROJECT MANAGER or the INSPECTOR. Article 33, INTERFACE/COORDINATION REQUIREMENTS of the General Requirements describes interfaces with other contractors working on the job site. No other operations of any nature shall be performed except as specifically authorized in the Contract Documents or as authorized by the PROJECT MANAGER.

The CONTRACTOR shall exercise care not to damage improvements and adjacent land. The CONTRACTOR shall correct any damage caused within seventy-two (72) hours by restoring the land and improvements damaged to their original condition and shall indemnify and hold the CITY harmless for any such damage as specified in INDEMNIFICATION of these General Conditions.

28. WORKMANSHIP AND MATERIALS

All materials, parts and equipment furnished by the CONTRACTOR for the Work shall be new, high grade and free from defects. Materials and Work quality shall be subject to the INSPECTOR'S approval.

29. INJURY AND ILLNESS PREVENTION - SAFETY MEASURES

Safety is the responsibility of the CONTRACTOR. The CONTRACTOR shall observe and comply with the safety provisions of all applicable laws, building and construction codes, safety and health regulations of the California Code of Regulations, and with applicable CITY Safety Policies.

If a Work procedure or condition exists that is a violation of said safety standards, the PROJECT MANAGER or INSPECTOR may order the CONTRACTOR to comply with said safety provisions, and the CONTRACTOR shall comply with such orders at its own expense. If the CONTRACTOR fails to act promptly, the PROJECT MANAGER or INSPECTOR is authorized to suspend the Work. Failure of the PROJECT MANAGER or the INSPECTOR to make such demands shall not relieve the CONTRACTOR of its obligations to secure the safe conduct of the Work.

In the event of an emergency constituting an immediate hazard to the health or safety of the public or CITY employees, property, or licensee, the CITY may undertake, at the CONTRACTOR'S sole expense, without prior notice, all Work necessary to correct such hazardous conditions when it was caused by Work of the CONTRACTOR not being in accordance with the requirements of this Contract.

First aid facilities and supplies shall be kept and maintained by the CONTRACTOR at the site of the Work. The CONTRACTOR shall cause all persons within the construction area to wear protective helmets. In addition, all employees of the CONTRACTOR and its Subcontractors shall be provided with, and required to use, personal protective and life saving equipment set forth in California Construction Safety Orders and the OSHA Safety and Health Standards for Construction.

30. PROTECTION OF PERSONS AND PROPERTY AND RESTORATION OF EXISTING IMPROVEMENTS

The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey monuments or reference points without authorization from the PROJECT MANAGER. No pavement breaking or excavation shall be started until all survey monuments or other reference points that will be disturbed by the construction operations have been properly referenced by the PROJECT MANAGER. It shall be the CONTRACTOR'S responsibility to notify the PROJECT MANAGER and the INSPECTOR of the time and location that Work will be done. Such notification shall be sufficiently in advance of construction so that there will be no delay due to waiting for survey points to be satisfactorily referenced for restoration. All survey monuments or reference points disturbed, without authorization by the PROJECT MANAGER, shall be accurately restored by the CITY at the CONTRACTOR'S sole expense after all street or roadway resurfacing has been completed.

All paved areas including asphaltic concrete beams cut or damaged as a result of construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement owner. All pavement which is subject to partial removal shall be neatly saw cut in straight lines.

In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

Where sidewalks have been removed for purposes of construction, the CONTRACTOR shall place suitable temporary sidewalks, properly protected, promptly after backfilling and shall maintain them in satisfactory condition until the final restoration thereof has been made.

All utilities encountered along the line of the Work shall be maintained continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the PROJECT MANAGER are made. Utilities shall include, but not be limited to, all above or below-ground conduit, pipes, ducts, cables, and appurtenances associated with oil, gas, water, steam, irrigation, process, sewer, storm drain, wastewater, air, electrical, power, instrumentation, communication, telephone, cable, TV, and lighting systems, whether or not owned by the CITY.

The CONTRACTOR shall protect all existing utilities and improvements not designated for removal. Necessary potholing shall be accomplished at the CONTRACTOR'S expense. The CONTRACTOR shall determine the exact locations and depths of all utilities indicated on the drawings. The CONTRACTOR shall make exploratory excavations of all utilities. All such exploratory excavations shall be performed as soon as practicable after award of the Contract and in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR'S Work. When such exploratory excavations show the utility location as indicated on the drawings to be in error, the CONTRACTOR shall so notify the INSPECTOR and the PROJECT MANAGER. The CONTRACTOR should not rely upon plan designation of location of underground utilities. The number of exploratory excavations and extent of potholing required shall be that number which is sufficient to determine the alignment and grade of the utility. No costs shall be allowed for such Work except those included in the CONTRACTOR'S proposal.

Prior to any excavation in the vicinity of any existing underground facilities, the CONTRACTOR shall notify the INSPECTOR and the PROJECT MANAGER, and the respective authorities representing the owners or agencies responsible for such facilities, not less than three (3) working days, nor more than five (5) working days, of their intention to begin excavation. The CONTRACTOR shall make arrangements for and provide access such that a representative of said owners or agencies may be present during such Work.

Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown on the drawings, the CONTRACTOR shall at its own expense, remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement to a place and in a manner as directed by the PROJECT MANAGER, and the owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal. When utilities that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the PROJECT MANAGER not less than fifteen (15) days in advance for necessary measures to be taken to prevent interruption of service.

The CONTRACTOR shall notify the PROJECT MANAGER thirty (30) calendar days in advance of any proposed connection, and shall notify the PROJECT MANAGER and the INSPECTOR twenty-four (24) hours prior to the actual connection, to any existing utility.

Any utility or improvement which is damaged by the CONTRACTOR shall be immediately repaired at the CONTRACTOR'S expense, to a condition equal to, or better than, the condition it was in prior to such damage or temporary relocation. If the CONTRACTOR fails or refuses to promptly repair the utility or improvement, the CITY may perform the necessary Work at the CONTRACTOR'S expense and no time extension shall be allowed to the CONTRACTOR. The CONTRACTOR is not relieved of provisions of this Article even in the event such damage occurs after backfilling or is not discovered until after completion of backfilling.

All repairs to a damaged improvement shall be inspected and approved by the INSPECTOR and an authorized representative of the improvement owner before being concealed by backfill or other Work. In case of damage, which in the opinion of the PROJECT MANAGER or the INSPECTOR, threatens the safety of persons or property, the CONTRACTOR shall immediately make all repairs necessary for removal of the hazard. Should the CONTRACTOR fail to promptly take all necessary action, the CITY has the option to remove any hazard resulting

from damages caused by the CONTRACTOR at the CONTRACTOR'S expense without waiving any other rights the CITY may have, and no time extension will be allowed to the CONTRACTOR.

In the event that the CONTRACTOR damages any existing utilities that are not shown on the drawings or the locations of which are not made known to the CONTRACTOR prior to excavation, the CONTRACTOR shall immediately notify the INSPECTOR and take all measures necessary to prevent further damage. The CONTRACTOR shall then immediately make a written report to the PROJECT MANAGER and shall make repairs as directed by the PROJECT MANAGER. Payment for this extra Work will be made pursuant to the provisions contained in Article 27, PAYMENT FOR CHANGES AND EXTRA WORK of the General Requirements.

Notwithstanding that an existing utility or substructure is not shown on the original Plans and Specifications, if the existence and location thereof was made known to the CONTRACTOR prior to excavation, the utility or substructure constitutes an existing known condition, and the CONTRACTOR is responsible for protecting the utility or substructure.

Damage to a utility known to the CONTRACTOR shall be repaired at the CONTRACTOR'S expense.

31. NON-CONFORMING WORK

Except as set forth in this Article, all non-conforming Work and materials, in place or not, shall be removed immediately from the site or corrected to conform to all requirements of the Contract Documents, by the CONTRACTOR, at the sole expense of the CONTRACTOR.

If the CONTRACTOR fails to remove, replace or correct any non-conforming Work or materials within seventy two (72) hours of discovery, the PROJECT MANAGER may cause such Work or materials to be removed and replaced. Such removal and replacement shall be at the sole expense of the CONTRACTOR and all such cost shall be deducted from any amounts that are due or may become due to the CONTRACTOR.

Failure of the INSPECTOR or the PROJECT MANAGER to notify the CONTRACTOR of any non-conforming Work shall not constitute acceptance of any non-conforming Work. The CONTRACTOR'S obligation to remove, replace or correct any non-conforming Work, whenever discovered, shall continue to the end of the guaranty-warranty period provided for in Article 16, GUARANTY-WARRANTY of the General Requirements. The CITY reserves and retains all rights and remedies at law against the CONTRACTOR and their Surety for correction of any and all latent defects discovered after the guaranty-warranty period.

The Contract Documents may be modified for the purpose of allowing non-conforming Work to become acceptable in lieu of the CONTRACTOR'S obligation to remove and replace all such non-conforming Work. Such modification shall be effective only upon the written agreement of the CONTRACTOR and the PROJECT MANAGER. Such written agreement shall be issued as a Change Order, which shall include all of the following provisions.

1. A statement that the Work as constructed is non-conforming Work.
2. The specifications by which the non-conforming Work will be made to conform to the requirements of the Contract Documents.
3. A statement that all modifications to the non-conforming Work shall be at the sole expense of the CONTRACTOR.
4. A statement that the CONTRACTOR waives and releases any and all claims against the CITY, including time and impacts, in any way whatsoever related to the non-conforming Work, the modification of such non-conforming Work, and the time to negotiate such a modification.
5. The amount representing the value of the Work specified in the Contract Documents less the value of the Work as constructed, as a credit to the CITY, which shall be deducted from the amount of the Contract.

No Work shall proceed which shall make the non-conforming Work more costly to correct nor to modify such non-conforming Work until the PROJECT MANAGER and the CONTRACTOR execute such a Change Order. The PROJECT MANAGER may grant permission, in response to a written request from the CONTRACTOR, to proceed with the Work before finalization of such a Change Order, if they find the request to be in the best interest of the CITY.

Any delays or impacts arising on the Work as a result of construction or delivery of non-conforming Work or materials shall be at the CONTRACTOR'S sole expense, regardless of whether the Work ultimately becomes the subject of a Change Order, and no time extension shall be allowed to the CONTRACTOR.

Acceptance by the INSPECTOR of such previous non-conforming Work, after execution of the Change Order, does not act to waive or otherwise negate the CONTRACTOR'S obligations to guarantee such Work as set forth in Article 16, GUARANTY-WARRANTY of the General Requirements.

Failure of the CONTRACTOR to comply with the requirements of this Article shall constitute default of the Contract by the CONTRACTOR and the CITY may terminate the Contract as provided for in TERMINATION OF CONTRACT BY CITY (CONTRACTOR DEFAULT).

32. SUBCONTRACTORS AND SUB-SUBCONTRACTORS (Revised as of 2/12/2016)

The Contractor shall perform on the site and with its own organization not less than thirty (30%) of the total Contract Price, unless a different percentage is designated on Schedule "A" SUBCONTRACTORS AND SUPPLIERS in the Instructions to Bidders, page 16. Any items designated "specialty items" in the Bid Proposal may be performed by subcontract and the amount of all such "specialty items" may be deducted from the Contract Price before computing the amount of Work required to be performed by the Contractor with its own organization. The dollar value included in the percentage performed by the Contractor shall include the value of labor, materials and equipment to be incorporated or used in the Work and directly purchased by the Contractor and shall not include the value of Work, including labor, materials and equipment, incorporated or used in the Work, performed or provided by Subcontractors.

Bidders must list all Subcontractors in the Bid, regardless of the dollar amount of the work to be performed, if the Bidder wishes to have the Subcontract amount credited toward meeting the MBE/WBE/SBE/EBE/DVBE/OBE levels of participation of the Project. Subcontractors added to the project following acceptance of the Bid and award of the Project will not be credited toward meeting the MBE/WBE/SBE/EBE/DVBE/OBE levels of participation for this Project.

Listed vendors and/or Suppliers will be limited to 60% of their listed dollar value toward achieving the anticipated MBE/WBE/SBE/EBE/DVBE/OBE levels of participation for this Project, unless the vendor and/or Supplier manufactures or substantially alters the materials/supplies.

The designated percentage of the total Contract Price the Contractor is to perform may not be reduced below that level by the addition of Subcontractor's added after Award of the Project.

The Inspector, acting on behalf of the Board of Recreation and Park Commissioners, will be responsible for approval of all Subcontractors, whether Bid-listed or not, and all Sub-subcontractors employed on the Project.

The Contractor must list in the original bid each Subcontractor who will perform Work or render services in an amount in excess of one-half of 1 percent of the Contractor's total Bid or \$10,000.00, whichever is greater.

Subletting or Subcontracting of any portion of the Work in excess of one-half of 1 percent of the Contractor's original total Bid or \$10,000.00, whichever is greater, for which no Subcontractor was designated in the original Bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the Inspector setting forth the facts constituting the emergency or necessity.

If the Contractor fails to specify a Subcontractor, or if the Contractor specifies more than one Subcontractor for the same portion of Work to be performed under the Contract in excess of one-half of 1 percent of the Contractor's total original Bid or \$10,000.00, whichever is greater, the Contractor agrees that it is fully qualified to perform that portion of Work itself, and that it shall perform that portion itself.

The Contractor shall set forth in its Bid the following: The name, location of the place of business, telephone number, California State Contractor's License Number and dollar amount of each Subcontractor who will perform Work, labor, service, supply specifically fabricated materials or equipment in an amount in excess of one-half of 1 percent of the Contractor's total Bid, or \$10,000.00, whichever is greater.

The Contractor shall list only one Subcontractor for each portion of Work as defined by the Contractor in its Bid.

Acceptance by the Board of Recreation and Park Commissioners of its Bid is dependent upon each Bid listed Subcontractor, and all subsequently approved additional Subcontractors, performing the dollar value of Work listed or approved. Any reduction, increase, or other change to any Subcontract amount without prior approval by Board of Recreation and Park Commissioners is considered an Unauthorized Subcontractor Substitution and is subject to a penalty of ten (10) percent of the Subcontract amount, whether Bid-listed or not. A Subcontract dollar value increased or reduced as the result of a Change Order issued by the Engineer to add or delete from the original scope of Work shall not be subject to a penalty for an Unauthorized Subcontract Substitution.

Acceptance by the Board of Recreation and Park Commissioners of its Bid shall not entitle Subcontractors to recognition for any direct or contractual relationship with the City, nor shall it constitute approval of the use of any materials other than those specified.

The Contractor shall be responsible for all acts of all Subcontractors at all tiers. The Contractor shall coordinate all work performed by subcontractors in the interest of the City.

All Subcontractors who will be working on the Project shall be approved in writing by the Inspector prior to beginning Work, regardless of the dollar amount of Work to be performed, and whether or not they were listed in the original Bid.

Requests for approval of all Subcontractors, or request for substitution of a Subcontractor, shall be made in writing to the Inspector located at the Public Works Building, 1149 S. Broadway, 3rd Floor, Los Angeles, CA, 90015, and said request shall contain the following information for each Subcontractor:

- 1) Project Name
- 2) Project Work Order Number
- 3) Subcontractor's Name
- 4) Subcontractor's Address
- 5) Subcontractor's Phone Number
- 6) Subcontractor's Status (WBE, MBE, SBE, EBE, DVBE, OBE)
- 7) Subcontractor's State of California Contractor License Number
- 8) Subcontractor's City Business Tax Registration Certificate Number (BTRC)
- 9) Dollar amount of Subcontract work to be performed
- 10) Description of Subcontract work to be performed

Failure to provide any of the information listed will result in denial of approval until such time as the information is provided.

Failure to obtain approval of the Inspector prior to each Subcontractor performing Work on the Project may result in suspension of Work by that Subcontractor, removal of Work performed by unapproved Subcontractors, assessment of penalties, and possible sanctions against the Contractor.

Additional Subcontractors may be added after the time of original Bid. The value of Work to be performed by additional Subcontractors may not be greater than one-half of 1 percent of the Contractor's original total Bid or ten thousand dollars (\$10,000.00), whichever is greater, unless the Subcontractor will be performing Work added by Change Order causing changes or deviations from the original Contract.

The Contractor shall provide the dollar amount of Work to be performed in all requests for additional Subcontractors. Failure to specify a dollar amount of Work to be performed will result in denial of additional Subcontractors until such time as the amount is provided.

Failure of the Contractor to request and obtain approval for a reduction in either a Bid-listed Subcontract amount or the Subcontract amount of a Subcontract added after the original Bid shall result in a penalty of ten percent of the Subcontract amount.

A Contractor whose Bid is accepted may not:

- 1) Substitute any person as Subcontractor in place of a Subcontractor listed in the original Bid, except that the Inspector, acting on behalf of the Board of Recreation and Park Commissioners, may consent to the substitution of another Subcontractor for one of the following situations:
 - A) When the Subcontractor listed in the original Bid or proposal after having had a reasonable opportunity to do so fails or refuses to execute a written contract, when that written contract, based upon the general terms, conditions, plans and specifications for the project involved or the terms of that Subcontractor's written bid, is presented to the subcontractor by the Contractor.
 - B) When the listed Subcontractor becomes bankrupt or insolvent.
 - C) When the listed Subcontractor fails or refuses to perform its subcontract.
 - D) When the listed Subcontractor fails or refuses to meet the bond requirements of the Contractor as set forth herein.
 - E) When the Contractor demonstrates to the Inspector's satisfaction that the name of the Subcontractor was listed as a result of an inadvertent clerical error.
 - F) When the listed Subcontractor is not licensed pursuant to the State of California Contractor's License Law.
 - G) When the listed Subcontractor refuses to obtain a City of Los Angeles Business Tax Receipt Certificate (BTRC).
 - H) When the Inspector concurs with the Contractor that the Work being performed by the listed Subcontractor is unsatisfactory and not in substantial accordance with the Contract Documents, or the listed Subcontractor is delaying or disrupting the progress of the work.
 - I) When the listed Subcontractor fails to submit an Affirmative Action Plan acceptable to the Inspector.
 - J) When the Board of Recreation and Park Commissioners determines that a listed Subcontractor is not a responsible contractor.
- 2) Permit a Subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original Subcontractor listed in the original Bid, without the consent of the Inspector.

- 3) Other than in the performance of Change Orders causing changes or deviations from the original Contract, sublet or Subcontract any portion of the Work in excess of one half of 1 percent of the Contractor's total Bid as to which its original Bid did not designate a Subcontractor.
- 4) Reduce the dollar amount of a Bid-listed Subcontract without the written approval of the Inspector.

A request for substitution of any Subcontractor, whether Bid-listed or not, must be made in writing to the Inspector and must include letter(s) of explanation as to the reason for the requested substitution.

It is considered a substitution if anyone other than the Bid-listed and/or approved Subcontractor(s), including the Contractor, performs any portion of the Work designated to be performed by said Subcontractor.

Failure to obtain approval for a Subcontractor substitution may result in rejection of the affected Work, penalties assessed for failure to obtain approval, and possible sanctions by the City.

All substitutions of Subcontractors, whether MBE/WBE/SBE/EBE/DVBE/OBE or not, shall be approved in writing by the Board of Recreation and Park Commissioners prior to any Work being performed by the substituting Subcontractor.

The Contractor shall conduct a Business Inclusion Program Outreach prior to approval of any requested Subcontractor substitution, regardless of the status (MBE/WBE/SBE/EBE/DVBE/OBE) of the contractor being substituted for. For MBE/WBE/SBE/EBE/DVBE/OBE Subcontractor substitution requests, the Contractor shall comply with the Business Inclusion Program Outreach requirements of Pages 15-15R of the Instructions to Bidders (Volume I). The Business Inclusion Program Outreach for any requested Subcontractor substitution must be reviewed and approved by the Special Research and Investigation Section of the General Services Division of the Bureau of Contract Administration, whether the Subcontractor was Bid listed or approved after the Award of the Project.

There shall be no decrease in dollar value of Work to be performed by Subcontractors approved as a substitute for a Bid-listed Subcontractor without a change in scope of the Work to be performed by the originally Bid-listed Subcontractor. Written evidence of a change of scope must be provided by the Engineer prior to approval of a change in dollar value of a Bid-listed Subcontractor.

Prior to approval of the Contractor's request for substitution, the Inspector shall give notice in writing to the Subcontractor affected by the Contractor's request to substitute and of the reasons for the request. The notice shall be served by certified or registered mail to the last known address of the Subcontractor. The listed Subcontractor who has been so notified shall have five (5) Workdays within which to submit written objections to the substitution. Failure to file these written objections within five (5) Workdays of notification shall constitute the listed Subcontractor's consent to the substitution. Notification by the Inspector may be made by phone in lieu of written notification via certified or registered mail if agreed to by the listed Subcontractor and followed by written request. Upon notification by phone, the listed Subcontractor may file written objections within five (5) days of notification.

If written objections are filed, the Inspector shall give notice of at least five (5) Workdays to the listed Subcontractor of a hearing on the Contractor's request for substitution.

The Contractor, as a condition to assert a claim of Inadvertent Clerical Error in the listing of a Subcontractor, shall within two Workdays after the time of the original Bid opening by the Board of Recreation and Park Commissioners give written notice to the Inspector and the Board of Recreation and Park Commissioners and copies of such notice to both the Subcontractor he claims to have listed in error and the intended Subcontractor who had bid to the Contractor prior to Bid opening.

Written notice of an Inadvertent Clerical Error shall be forwarded within two (2) days after the time of the original

Bid opening by every Contractor claiming such an error. Failure to submit such notice within the time prescribed shall make any such subsequent claim of Inadvertent Clerical Error invalid.

Any listed Subcontractor who has been notified by the Contractor of an Inadvertent Clerical Error shall be allowed six (6) Workdays from the time of the Bid opening to submit to the Inspector and to the Contractor written objection to the Contractor's claim of Inadvertent Clerical Error. Failure of such listed Subcontractor to file such written notice within the six (6) Workdays shall constitute agreement that an advertent clerical error was made.

The Inspector shall, in the absence of compelling reasons to the contrary, consent to the requested substitution based on an Inadvertent Clerical Error if:

- 1) The Contractor, the Subcontractor listed in error, and the intended Subcontractor each submit an affidavit to the Inspector along any additional information as the parties may wish to submit that an Inadvertent Clerical Error was in fact made, provided that the affidavits from each of the three parties are filed within eight (8) Workdays from the time of the original Bid opening, or
- 2) If such affidavits are filed by both the Contractor and the intended Subcontractor within eight days of the original Bid opening but the Subcontractor whom the Contractor claims to have listed in error does not submit within six (6) Workdays, to the Inspector and to the Contractor, written objection to the Contractor's claim of Inadvertent Clerical Error as provided in this article.

If such affidavits are filed by both the Contractor and the intended Subcontractor but the listed Subcontractor has, within six (6) Workdays from the time of the original Bid opening, submitted to the Inspector and to the Contractor written objection to the Contractor's claim of Inadvertent Clerical Error, the Inspector shall investigate the claims of all parties and schedule a public hearing before the Board of Recreation and Park Commissioners to determine the validity of such claims. Any determination shall be based on the facts contained in the declarations submitted under penalty of perjury by all three parties and supported by testimony given to the Board of Recreation and Park Commissioners. The Board of Recreation and Park Commissioners may, on its motion or that of any other party, admit testimony of other Contractors, any Bid registries or depositories, or any other party in possession of facts, which may have a bearing on the decision of the Board of Recreation and Park Commissioners. The findings of the Board of Recreation and Park Commissioners shall be final.

33. RESPONSIBILITY OF CONTRACTOR TO ACT IN EMERGENCY

In case of an emergency that threatens loss of or damage to property or injury to persons, the CONTRACTOR shall act, without instructions from the CITY, as the situation may warrant. The CONTRACTOR shall immediately inform the PROJECT MANAGER and the INSPECTOR of the emergency action taken. Any claim shall be submitted to the PROJECT MANAGER. If practical the amount of compensation, if any, shall be determined by agreement prior to the issuance of a Change Order. However, if the emergency is created or aggravated by the CONTRACTOR, it shall be liable for the resulting damages. If the CONTRACTOR fails to take the necessary action as required by such an emergency the CITY may assign another CONTRACTOR or use its own forces to perform the emergency Work at the CONTRACTOR'S sole expense.

34. ASSIGNMENT

The CONTRACTOR shall not assign, transfer, convey or otherwise dispose of this Contract or any of the proceeds there under unless written consent of the CITY has been obtained. No right under this Contract or claim for any proceeds due or to become due hereunder shall be asserted against the CITY, or persons acting for the CITY, by reason of any so-called assignment, transfer or conveyance of this Contract or any part thereof unless such assignment, transfer or conveyance has been authorized by the written consent of the CITY. The instrument of assignment, transfer or conveyance shall contain a clause subordinating the claim of the assignee, transfer or conveyor to all prior liens for services rendered or materials supplied for the execution of the Work.

35. INDEPENDENT CONTRACTOR

The CONTRACTOR represents that it is fully experienced and properly qualified to perform the class of Work required for the CONTRACT and that it is properly licensed, equipped, organized and financed to perform the Work. The CONTRACTOR shall be an independent contractor. The CONTRACTOR is not an agent of the CITY in the performance of the CONTRACT, and shall maintain complete control over its employees and its Subcontractors and Suppliers of any tier. Nothing contained in the CONTRACT or any Subcontract awarded by the CONTRACTOR shall create any relationship between any Subcontractor and the CITY. The CONTRACTOR shall perform the Work in accordance with its own methods, in compliance with the terms of the CONTRACT.

INDEMNIFICATION AND INSURANCE REQUIREMENTS

36. INDEMNIFICATION

Except for the active negligence or willful misconduct of the CITY, the CONTRACTOR undertakes and agrees to defend, indemnify and hold harmless, through legal counsel acceptable to the CITY, the CITY, and any and all of the CITY'S Boards, Officers, Agents, Employees, Assigns, and Successors in Interest from and against all suits and causes of action, claims, losses, demands and expenses, including, but not limited to, attorney's fees and cost of litigation, damage or liability of any nature whatsoever, arising out of or related to the performance or nonperformance by CONTRACTOR or its Subcontractors, Sub-Subcontractors, or Suppliers, of any tier, of any portion of the construction of the Project, including but not limited to CONTRACTOR'S negligent acts, errors, omissions, breach of contract, breach of warranty (express or implied), or willful misconduct.

It is agreed that such defense and indemnity shall extend to the CITY'S PROJECT MANAGER, Architect/Engineer or other Design Consultant providing services under written agreement with the CITY covering any portion of the Project. Provided, however, that the Design Consultant shall be solely responsible for the enforcement of any request made by said Consultant for indemnification or defense by the CONTRACTOR. It is further provided that the CITY shall have no liability whatsoever for any failure of the CONTRACTOR to comply with any request from the Consultant for indemnity or defense.

It is further agreed that the defense and indemnity obligations of the CONTRACTOR under this Article shall not extend to the liability of the Design Consultant or its agents, employees or subconsultants, arising as a result of such indemnitee's own active negligence, errors or omissions or from (1) the preparation or approval of maps, Plans, opinions, reports, surveys, change orders, designs or Specifications, or (2) the giving of or failure to give directions or instructions by the indemnitee provided that such giving or failure to give is the primary cause of the damage or injury.

37. INSURANCE

A. GENERAL

During the term of this Contract and without limiting the CONTRACTOR's indemnification of the CITY, the CONTRACTOR shall provide and maintain at its own expense, insurance having the limits customarily carried and actually arranged by the CONTRACTOR but not less than the amounts and types listed on the Insurance Requirements Form in Volume 1 of these Contract Documents, covering its operations hereunder subject to the following conditions as they may variously apply:

1. ADDITIONAL INSURED/ADDITIONAL INTEREST/LOSS PAYEE

The CITY, it's Recreation and Park Commissions, Officers, Agents, Employees and Design Consultant shall be included as:

- a. Additional Insureds in all required General Liability and property insurance and Additional Interests in all required Automobile Liability insurance.
- b. Named Insureds in all required Owners and Contractors Protective Liability insurance policies.
- c. Loss Payee As Its Interest May Appear in all required property, fidelity or Surety coverages.

- d. Listing of other entities as additional insures may be required for specific projects due to their funding source (such as, Prop A funded projects require that Los Angeles County be listed as an additional insured).

The CITY and other interests listed above need not be named on Workers' Compensation/Employer's Liability, Professional Errors and Omissions and Second-party Legal Liability coverages (such as Garage Keepers' Legal).

2. INSURANCE APPROVAL

All insurance required hereunder shall conform to the CITY requirements established by Charter, ordinance or policy. Evidence of insurance shall be submitted to the Department's Risk Control Coordinator and approved by the City Attorney prior to commencement of any Work or tenancy under this Contract in accordance with the Los Angeles Administrative Code.

3. ALTERNATIVE PROGRAMS

Alternative Risk Financing mechanisms such as Risk Retention Groups, Risk Purchasing Groups, off-shore carriers and captive insurance programs are subject to review of their financial statements by the CITY before an approval can be granted by the City Attorney.

4. ADMITTED CARRIER/LICENSED CALIFORNIA BROKER

Insurance shall be obtained from brokers or carriers authorized to transact insurance business in California. Surplus lines insurance from carriers who are not admitted in California must be submitted through a California-licensed broker or agent.

Surplus lines coverage must also contain a Service of Suite provision whereby the underwriters will submit as necessary to any court of competent jurisdiction in California and agree that all matters arising there under will be determined in accordance with the law and practice of such court. It must further give the name and address of the underwriter's agent for service of process located within California or must nominate the California Insurance Commissioner as such agent.

5. PRIORITY OF COVERAGE

The CONTRACTOR's insurance shall not call on the CITY's program for contributions.

6. CANCELLATION/REDUCTION IN COVERAGE NOTICE

With respect to the interest of the CITY, if an insurance company elects to cancel insurance before the stated expiration date, or declines to renew in the case of a continuous policy, or materially reduces the coverage period by changing the retroactive date (if any), or the extended discovery period (if any), or reduces the stated limits other than by impairment of an aggregate limit, or materially reduces the scope of coverage which affects the CITY's interest, the company will provide the CITY at least thirty (30) calendar days prior written of such election. Notice will be made by receipted delivery addressed as follows: CITY ATTORNEY, INSURANCE AND BONDS, 1240 City Hall East, 200 NORTH MAIN STREET, LOS ANGELES, CA 90012-4168. It is understood, however, that such notice to the CITY shall not affect the company's right to give a lesser notice to the Named Insured in the event of nonpayment of premium. (L.A. Admin. Code Section 11.54).

7. ACCEPTABLE EVIDENCE

The appropriate CITY Special Endorsement forms, contained in Volume 1 of these Contract Documents, are the preferred form of evidence of insurance. Alternatively, the CONTRACTOR may submit two (2) certified copies of the policy or other evidence acceptable to the City Attorney containing language which complies with subparagraphs 1) through 6) above.

With respect to Professional Liability insurance, either a signed copy of the Policy Declarations Page or a letter from the CONTRACTOR's insurance broker certifying coverage, together with a thirty (30)

day cancellation notice endorsement in favor of the CITY as specified in subparagraph 6) will satisfy this requirement.

8. SEPARATION OF INSUREDS

Except with respect to the insurance company's limits of liability, each liability insurance policy shall apply separately to each insured against whom a claim or suit is brought. The inclusion of any person or organization as an insured shall not affect any right which such person or organization would have as a claimant if not so included.

9. RENEWAL

Once the insurance has been approved by the CITY, evidence of renewal of an expiring policy may be submitted on a manually signed renewal endorsement or certificate form. If the policy or carrier has changed, however, new evidence as specified in paragraphs 1) through 8) above, must be submitted.

B. AGGREGATE LIMITS/REDUCTION IN COVERAGE

If any of the required insurance coverages contain aggregate limits, or apply to other operations or tenancy of the CONTRACTOR not related to this Contract, the CONTRACTOR shall give the CITY prompt, written notice of any incident, occurrence, claim, settlement or judgement against such insurance which in the CONTRACTOR's best judgement may diminish the protection such insurance affords the CITY. Further, the CONTRACTOR shall immediately take all reasonable and available steps to restore such aggregate limits or shall provide other insurance protection for such aggregate limits. The CITY may, at its option, specify a minimum acceptable aggregate for each line of coverage required.

The CONTRACTOR shall not make any substantial reductions in scope of coverage (e.g., elimination of contractual liability or reduction of discovery period) which may affect the CITY's protection without the CITY's prior written consent.

C. SELF-INSURANCE AND SELF-INSURED RETENTIONS

Self-insurance programs and self-insured retention in insurance policies are subject to separate approval by the CITY upon review of evidence of the CONTRACTOR's financial capacity to respond. Additionally, such programs or retention must provide the CITY with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

D. MODIFICATION OF COVERAGE

The CITY reserves the right at any time during the term of this Contract to change the amounts and types of insurance required hereunder by giving the CONTRACTOR ninety (90) calendar days advance written notice of such change. If such change should result in substantial additional cost to the CONTRACTOR, the CITY agrees to negotiate additional compensation.

E. FAILURE TO PROCURE INSURANCE

The required coverage and limits are subject to availability on the open market at reasonable cost as determined by the CITY. Non-availability or non-affordability must be documented by a letter from the CONTRACTOR'S insurance broker or agent indicating a good faith effort to procure the required insurance and showing, as a minimum, the names of the insurance carriers and the declinations or quotations received from each.

Within the foregoing constraints, the CONTRACTOR'S failure to procure or maintain required insurance or a self-insurance program during the entire term of this Contract shall constitute a material breach of this Contract under which the CITY may immediately suspend or terminate this Contract or, at its discretion, procure or renew such insurance to protect the CITY'S interests and pay any and all premiums in connection therewith, and recover all monies so paid from the CONTRACTOR.

F. UNDERLYING INSURANCE

The CONTRACTOR shall be responsible for requiring indemnification and insurance as it deems appropriate from its consultants, agents and Subcontractors, if any, to protect the CONTRACTOR's and the CITY'S interests, and for ensuring that such persons comply with any applicable insurance statutes. The CONTRACTOR is encouraged to seek professional advice in this regard.

G. WORKERS' COMPENSATION

By signing this Contract, the CONTRACTOR hereby certifies that it is aware of the provisions of Section 3700 *et seq.*, of the Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, and that it will comply with such provisions at all such times as they may apply during the performance of the Work pursuant to this Contract.

A waiver of subrogation in favor of the CITY will be required when Work is performed on CITY premises under hazardous conditions.

H. ALL RISK BUILDER'S RISK/INSTALLATION FLOATER

During the course of construction, the CONTRACTOR shall secure and maintain an All Risk Builder's Risk Insurance policy covering loss, damage or destruction of property, including materials in transit and stored on and off site, in an amount equal to the value of the construction and materials on hand.

An Installation Risk or "Floater" Policy, written to cover only specific types of equipment during construction, may be provided to cover damage to Work or high valued equipment or materials.

Coverage shall remain in force until the Work is completed and accepted by the CITY. Acceptable evidence of coverage shall be in the form of an endorsement to the policy which names the CITY as an additional named insured and as Loss Payee As Its Interest May Appear.

I. TYPICAL COVERAGES REQUIRED

The coverages required in A above shall be at least as broad as:

1. General Liability: Insurance Services Office Commercial General Liability coverage (Occurrence Form CG 00 01).
2. Automobile Liability: Insurance Services Office Form Number CA 00 01 (Ed. 1/87) covering Automobile Liability, code 1 (any auto).
3. Professional Liability: If applicable, errors and omissions liability appropriate to the consultant's profession, with a discovery period of not less than twelve (12) months after completion of Work or termination of Contract.

J. TYPICAL LIMITS OF LIABILITY

Unless otherwise specified in Form Gen. 146/IR, the CONTRACTOR shall maintain limits no less than:

1. General Liability: \$1,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability or other form with a general aggregate limit is used, either the general aggregate shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: \$1,000,000 per accident for bodily injury and property damage, combined or equivalent in split limits.
3. Employer's Liability: \$1,000,000 per accident for bodily injury or disease.
4. Professional Liability: \$1,000,000 per occurrence.

K. CONTRACT BONDS

Before the execution of the Contract by the RECREATION AND PARK COMMISSION, the bidder shall file with the RECREATION AND PARK COMMISSION Surety bonds satisfactory to the RECREATION AND

PARK COMMISSION in the amounts and for purposes noted below. Bonds shall be duly executed by a responsible corporate Surety, authorized to issue such bonds in the State of California and secured through an authorized agent with an office in California. Bonds shall be issued by a Surety who is listed in the latest revision of U.S. Department of Treasury Circular 570, is authorized to issue bonds in California, and whose bonding limitation shown in said circular is sufficient to provide bonds in the amount required by the Contract. The Bidder shall pay all bond premiums, costs, and incidentals. On Contracts estimated by the PROJECT MANAGER to be less than \$2 million, bonds may be obtained from an insurance company with a Certificate of Authority from the California Insurance Commissioner authorizing the company to write Surety insurance within the State of California.

Each bond shall be signed by both the Bidder and the Surety, and the signature of the authorized agent of the Surety shall be notarized.

The Bidder shall provide two good and sufficient surety bonds. The "Payment Bond" (Material and Labor Bond) shall be for not less than one hundred percent (100%) of the Contract price, to satisfy claims of material suppliers and of mechanics and laborers employed by it on the Work. The bond shall be maintained by the CONTRACTOR in full force and effect until the Work is accepted by the RECREATION AND PARK COMMISSION, and until all claims for materials and labor are paid, and shall otherwise comply with the California Civil Code.

The "Performance Bond" shall be for one hundred percent (100%) of the Contract price to guaranty faithful performance of all Work, within the time period prescribed, in a manner satisfactory to the RECREATION AND PARK COMMISSION, and that all materials and Workmanship will be free from original or developed defects, and comply with requirements and guaranty specified in Article 16, GUARANTY-WARRANTY of the General Requirements.

Should any Surety at any time be unsatisfactory to the RECREATION AND PARK COMMISSION, notice will be given the CONTRACTOR to that effect. No further payments shall be deemed due or will be made under the contract until a new Surety shall qualify and be accepted by the RECREATION AND PARK COMMISSION.

Changes in the Work, or extensions of time, made pursuant to the Contract, shall in no way release the CONTRACTOR or Surety from its obligations. Notice of such changes or extensions shall be waived by the Surety. In addition to the bonds detailed above, the CONTRACTOR shall provide a guarantee bond as detailed in Article 16, GUARANTY-WARRANTY of the General Requirements.

38. SERVICE OF NOTICE

The delivering of any notice, instruction, claim or protest, or other written communication, personally to the CONTRACTOR or the CONTRACTOR'S representative or to the PROJECT MANAGER, or to the City Clerk of the CITY shall constitute service therefore upon the CONTRACTOR, the PROJECT MANAGER, or the CITY, respectively.

The depositing of a post-paid (Registered Mail) wrapper directed to the official address of the CONTRACTOR, the PROJECT MANAGER, or the CITY in any post office, of any notice, instruction, claim or protest, or written communication, shall be deemed sufficient service thereof upon the CONTRACTOR, the PROJECT MANAGER, or the CITY, respectively, and the date of said service shall be the day following the date of postmark.

The official address of the CONTRACTOR shall be the address given in the accepted bid or such other address as the CONTRACTOR may subsequently designate in writing either to the PROJECT MANAGER or to the CITY. The official name and address of the PROJECT MANAGER and the CITY will be supplied to the CONTRACTOR after the award.

39. AGENT TO ACCEPT SERVICE

The CONTRACTOR shall maintain within Los Angeles County a duly authorized agent as identified in the Article entitled SERVICE OF NOTICE to accept service of legal process on its behalf, and shall keep the CITY advised of such agent's name and address during the duration of the CONTRACT and for three (3) years after the Final Payment, or as long as the CONTRACTOR has warranty obligations under Article 16, GUARANTY-WARRANTY

of General Requirements, whichever period terminates later. In the event that no such duly authorized agent is on file with the CITY, the CONTRACTOR agrees that the Secretary of State of the State of California shall be the Contractor's agent for service of legal process.

PROGRESS OF WORK

40. TEMPORARY SUSPENSION OF WORK

If the Work of the Contract is suspended or delayed, the CONTRACTOR shall so notify the PROJECT MANAGER in writing within twenty-four (24) hours after the start thereof. If the CONTRACTOR is entitled to reimbursement for such suspension or delay, as specified hereinafter, the CONTRACTOR shall submit a completely detailed statement of the costs thereof, to the PROJECT MANAGER, within twenty (20) calendar days after the termination thereof. Failure to submit such statement of costs or notification within the time specified shall be deemed a waiver of any claims for delay or damages or both by the CONTRACTOR.

If the Work of the Contract is suspended or delayed through no fault of the CITY, all expenses and losses shall be borne by the CONTRACTOR.

If the Work of the Contract is suspended or delayed by an act of the CITY, or by failure of the CITY to furnish required information, and the CONTRACTOR thereby incurs expenses or sustains losses which could not have been avoided by the judicious handling of forces and equipment, and if by a diligent prosecution of the Work the CONTRACTOR could not have completed the Work before such suspension, the CONTRACTOR will be paid such amount as the RECREATION AND PARK COMMISSION may find to be a fair and reasonable compensation for such part of the CONTRACTOR'S actual loss. In no case shall any compensation be made to cover any loss other than actual cash paid for wages, rental of equipment, and materials used in protection of the Work, all of which must be supported by satisfactory written evidence. Such wages shall not include the wages or salary of any individual not necessary for protection of the Work. The CONTRACTOR shall not be entitled to any mark-up for overhead or profit on damages or for extended duration.

The CONTRACTOR shall maintain complete and accurate daily records of all costs due to delay, clearly distinguishing them from the costs of other portions of the Work, and shall submit a detailed written report of such costs to the PROJECT MANAGER within twenty (20) calendar days of incurring the delay. Failure to comply shall result in waiver by the CONTRACTOR to any claims for additional payment and schedule change. In addition, the CONTRACTOR shall submit evidence of any cause of delay specified herein if it has not already done so.

As soon as practicable, following receipt of such report and evidence, if required, the PROJECT MANAGER will determine the nature and extent of such costs and will, if the PROJECT MANAGER finds that payment is due, issue a Change Order therefore, subject to the provisions in Article 27, PAYMENT FOR CHANGES AND EXTRA WORK of the General Requirements. If the PROJECT MANAGER determines that payment is not due, the CONTRACTOR will be so advised in writing. Should the CONTRACTOR disagree with such finding, CONTRACTOR may submit a notice of protest to the PROJECT MANAGER as provided in CLAIMS AND PROTESTS in these General Conditions. The CONTRACTOR shall provide the PROJECT MANAGER with access to its daily cost records or certified copies thereof as requested. All such records shall be retained by the CONTRACTOR and open to inspection and audit by the CITY and the PROJECT MANAGER'S authorized representatives. Except for the additional compensation provided herein before, the CONTRACTOR shall have no claim for damage or compensation for any delay or hindrance whether or not contemplated by the Contract.

41. UNAVOIDABLE DELAY

Should the CONTRACTOR be obstructed or delayed or completion of the Work from causes beyond its control and without its fault or negligence, and solely due to acts of God, acts of government in its sovereign capacity, riots, insurrections, wars, fires, floods, earthquakes, tidal waves, epidemics, quarantine restrictions, industry-wide strikes, freight embargoes, or unusually severe weather, it shall be entitled to a noncompensable extension of time.

The CONTRACTOR shall only be entitled to a noncompensable extension of time for Unavoidable delay in the Work which negatively impacts the critical path of the approved project schedule, and causes the Work of the project to extend beyond the approved Contract Completion date.

The CONTRACTOR shall be entitled to a noncompensable time extension only if it notifies the PROJECT MANAGER immediately at the time the CONTRACTOR is prevented from proceeding with the Work and follows with written notification of the causes of the delay within five (5) calendar days from the beginning of any delay. Also, the CONTRACTOR shall notify the PROJECT MANAGER immediately at the end of the delay and follow up with written notification of the cessation of delay within five (5) calendar days from the end of the delay.

Any claim for a time extension shall be made in writing within twenty (20) calendar days after the conclusion of the delay. The PROJECT MANAGER shall ascertain the facts and the extent of the delay and extend the time for completing the Work if, in his/her judgement, the findings of fact justify such an extension. The PROJECT MANAGER'S decision shall be final and conclusive, subject only to appeal as provided by CLAIMS AND PROTESTS of these General Conditions.

42. ARCHAEOLOGICAL AND PALEONTOLOGICAL DISCOVERIES

If discovery is made of items of archaeological or paleontological interest, the CONTRACTOR shall immediately cease excavation in the area of discovery and shall not continue until ordered by the PROJECT MANAGER. When resumed, excavation operations within the area of discovery shall be as directed by the PROJECT MANAGER.

Discoveries which may be encountered may include, but not be limited to, dwelling sites, stone implements or other artifacts, animal bones, human bones and fossils. The CONTRACTOR shall be entitled to an extension of time and compensation in accordance with the provision of TEMPORARY SUSPENSION OF WORK of these General Conditions.

43. OTHER CONTRACTS

The CITY may perform other Work related to the Project at the site by the CITY'S own forces, have other Work performed by utility owners or let other direct contracts therefore which shall contain General Conditions similar to these. If such other Work to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other Work; and, if the CONTRACTOR believes that such performance will involve additional expense to the CONTRACTOR or requires additional time and the parties are unable to agree as the extent thereof, the CONTRACTOR may make a claim therefore as provided under CLAIMS AND PROTESTS of these General Conditions.

The CONTRACTOR shall afford each utility owner and other contractor who is a party to such a direct contract (or the CITY, if the CITY is performing the additional Work with the CITY'S employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such Work, and shall properly connect and coordinate the Work with theirs. The CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other Work. The CONTRACTOR shall not endanger any Work of others by cutting, excavating or otherwise altering their Work and will only cut or alter their Work with the written consent of the PROJECT MANAGER and the others whose Work will be affected. The duties and responsibilities of the CONTRACTOR under this Article are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of the CONTRACTOR in said direct contracts between the CITY and such utility owners and other contractors.

If any part of the CONTRACTOR'S Work depends upon proper execution or results of the Work of any such other contractor or utility owner or the CITY, the CONTRACTOR shall inspect and promptly report to the PROJECT MANAGER in writing any delays, defects or deficiencies in such Work that renders it unavailable or unsuitable for such proper execution and results. The CONTRACTOR'S failure to do so will constitute an acceptance of the other Work as fit and proper for integration with the CONTRACTOR'S Work except for latent or nonapparent defects and deficiencies in the other Work.

44. TERMINATION OF CONTRACT BY CITY (CONTRACTOR NOT AT FAULT)

The CONTRACT may be terminated, in whole or in part, at any time, by the CITY, at its sole discretion, without cause and for the CITY'S convenience. Such termination will be accomplished by delivery of a notice of Termination to the CONTRACTOR, specifying the extent to which performance of the Work under the CONTRACT

or portion of the CONTRACT shall be terminated and the date upon which such termination shall become effective.

After receipt of a Notice of Termination, except as otherwise directed by the CITY the CONTRACTOR shall:

1. Stop Work under the CONTRACT on the date and to the extent specified in the Notice of Termination.
2. Notify the CITY in writing of all outstanding orders, Subcontracts and contracts entered into by CONTRACTOR for performance of the Work, including the (i) name and address of the vendor, supplier or Subcontractor; (ii) a copy of the complete contract, order or Subcontract; (iii) an accounting of the Work performed and compensation earned by the vendor, supplier or Subcontractor, and (iv) such other information as the CITY may request to assist it in determining whether to terminate or accept assignment of the order, Subcontract or contract.
3. Upon written notice by CITY, terminate all Subcontracts, orders and contracts, of any tier, related to the performance of the Work that the CITY determines shall be terminated and not assigned.
4. Place no further orders or Subcontracts for Goods or services, except as may be necessary for completion of that portion of the Work that has not been terminated.
5. Settle outstanding liabilities and claims arising out of such termination of orders and Subcontracts, with the Acceptance of the CITY if required (which Acceptance shall be final for the purposes of this Article). Assign to the CITY in the manner, at the times, and to the extent directed by the CITY all of the rights, titles, and interests of the CONTRACTOR under such orders, contracts and Subcontracts so terminated.
6. Transfer title and deliver to the CITY in the manner, at the times and to the extent directed by it, the:
 - a. Fabricated or unfabricated parts, Work in process, completed Work, supplies, and other Goods procured as a part of, or acquired in connection with the performance of the Work terminated; and
 - b. Completed or partially completed plans, drawings, information and other items that would have been required (per the Technical Specifications) to be furnished to the CITY if the Contract had been completed.
7. Use its best efforts to sell the property of the types referred to above in the manner, at the times, to the extent, and at the price(s) directed or authorized by the CITY, providing that the:
 - a. CONTRACTOR is not required to extend credit to any purchaser;
 - b. CONTRACTOR may acquire any such property under the prescribed conditions; and/or proceeds of any such transfer or disposition are applied or otherwise credited to reduce payments made by the CITY to the CONTRACTOR under the CONTRACT.
8. Take any action that may be necessary, or that the CITY may direct, for the protection and preservation of the property related to the CONTRACT that is in the possession of the CONTRACTOR and in which the CITY has or may acquire an interest.
9. Complete performance of that portion of the Work that has not been terminated by the Notice of Termination, as applicable and in accordance with the CONTRACT.

After receipt of a Notice of Termination for the CITY's convenience, the CONTRACTOR shall submit its termination claim to the CITY requesting payment of such sums as are permitted under the terms of this Article, in the form and with the certification(s) prescribed by the CITY for Claims and Protests. Such Claim shall be submitted promptly but in no event later than six months from the effective date of termination, unless one or more extensions are granted in writing by the CITY upon written request by the CONTRACTOR during such six month period or authorized extension thereof. However, the CITY may receive and act upon any termination claim at any time after the six month period or any extension thereof, if it determines that the facts justify such action. Upon failure of the CONTRACTOR to submit its termination claim within the time specified, the CITY will determine the

amount due the Contractor, if any, on the basis of information available, and will pay the CONTRACTOR the amount so determined. Such determination shall be final and binding and payment shall be in full settlement for the Work performed under the CONTRACT.

Subject to the provisions of this Article, the CONTRACTOR and the CITY may agree upon the total or partial amount to be paid to the CONTRACTOR by reason of the total of or partial termination pursuant to this Article. The agreed upon amount shall under no circumstances include any sum for lost profits on the terminated portion of the Work or for consequential damages, of any kind. If agreement is reached, the CONTRACT will be amended by Modification accordingly and the CONTRACTOR will be paid the agreed upon amount.

In the event of failure of the CONTRACTOR and the CITY to agree on the total amount to be paid the CONTRACTOR by reason of the termination of Work pursuant to this Article, the CITY will pay the CONTRACTOR the amounts determined by the City as follows, exclusive of any amounts agreed upon in accordance with the preceding Paragraph:

The CONTRACTOR'S actual cost for the Work properly performed by the CONTRACTOR as of the date of termination, including a 5% allowance for profit on such costs; plus, the reasonable cost of preserving and protecting property; plus other reasonable costs incidental to the termination of the Work under the CONTRACT, including expense incurred to determine the amounts due; provided however, that the maximum payable or paid for any portion of the completed Work shall not exceed the values listed in the corresponding bid item of Schedule of Values.

The total sum to be payable or paid to the CONTRACTOR, exclusive of the settlement amounts described in the Paragraph immediately above, shall not exceed the total CONTRACT Price less the:

1. Payments made previously by CITY for the Work; plus
2. A prorated portion of the total CONTRACT Price for the terminated portion of the Work as determined by the PROJECT MANAGER.

Except for normal spoilage and to the extent that the CITY will have otherwise expressly assumed the risk of loss, the fair value (as determined by the CITY) of property that is destroyed, lost, stolen, or damaged (so as to become undeliverable to the CITY or other buyer as described above) shall be excluded from the amounts paid to the CONTRACTOR.

In arriving at the amount due the CONTRACTOR under this Article, a deduction shall be made for the following:

1. Any claim that the CITY may have against the CONTRACTOR in connection with the CONTRACT; and
2. The agreed upon price for and/or proceeds from the sale of Goods or other items acquired or sold by the CONTRACTOR that have not been otherwise recovered by or credited to the CITY.

Under such terms and conditions as it may prescribe and at its sole discretion, the CITY may make partial payments against costs incurred by the CONTRACTOR in connection with terminated portion of the CONTRACT whenever the CITY decides that the aggregate of such payments is within the amount to which the CONTRACTOR is entitled hereunder. If the total of such payments is in excess of the amount finally agreed upon or determined to be due under this Article, such excess shall be payable by the CONTRACTOR or to the CITY upon demand together with interest at a rate equal to that set forth in California Code of Civil Procedure, Section 685.010.

Under no circumstances shall the CONTRACTOR be entitled to anticipatory or unearned profits or consequential damages as a result of a termination of partial termination under this Article, or for any other termination by the CITY. The payment to the Contractor determined in accordance with this Article shall constitute the exclusive remedy of the CONTRACTOR for termination hereunder.

Anything contained in the CONTRACT to the contrary notwithstanding, a termination under this Article shall not waive any right or claim to damages that the CITY may have; the CITY may pursue any clause of action that it may have by law or under the CONTRACT; and shall not relieve CONTRACTOR of its warranty obligations with respect to any Work performed prior to such termination.

If the termination hereunder is only for a part of the Work, the Contract Price shall be reduced by the amount of the Contract Price applicable to the portion of the Work, which is terminated, including overhead and profit, on the basis of one or more of the following:

1. Unit prices stated in the CONTRACT or agreed upon by the CITY and the CONTRACTOR.
2. A lump sum determined by the PROJECT MANAGER, based on the estimate costs including overhead and profit of the terminated portions of the Work.

45. TERMINATION OF CONTRACT BY CITY (CONTRACTOR DEFAULT)

In the event of conduct by the CONTRACTOR which is determined by the PROJECT MANAGER or the to constitute default, the CITY may either suspend the Work under the provisions of TEMPORARY SUSPENSION OF WORK of these General Conditions or, upon ten (10) calendar days' written notice to the CONTRACTOR, terminate the Contract as provided herein. Default by the CONTRACTOR shall occur whenever it shall declare bankruptcy; become insolvent or assign its assets for the benefit of its creditors; fail to provide materials, equipment, or workmanship meeting the requirements of the Specifications; disregard or violate provisions of the Contract Documents or the PROJECT MANAGER's instructions; fail to prosecute the Work according to the approved progress schedule; or fail to provide a qualified representative, competent workers or Subcontractors. Upon request, the RECREATION AND PARK COMMISSION will provide the CONTRACTOR a hearing by the RECREATION AND PARK COMMISSION to contest the recommendation of the PROJECT MANAGER as to default by the CONTRACTOR.

In the event the Contract is terminated pursuant to this Article, the CITY may take possession of the Work and of all materials, tools, equipment, and property of the CONTRACTOR, which have been provided in connection with the Work, and may complete the Work by whatever method or means the CITY may select. The unpaid balance of the Contract cost for completing the Contract Work shall be used to complete the Work in accordance with the Contract Documents. If cost of completing the Work exceeds the unpaid balance, the CONTRACTOR shall pay the excess amount to the CITY. If such cost is less than the unpaid balance, the CONTRACTOR shall not have claim to the difference except to such extent as may be necessary, in the opinion of the PROJECT MANAGER, to reimburse the CONTRACTOR or the CONTRACTOR'S sureties for any unpaid expense properly incurred for materials, tools, equipment, property, and labor devoted to the prosecution of the Work, or which the CITY shall have received the benefit. In computing such expenses, as it relates to equipment and property, the salvage value at completion of Work shall be deducted from the salvage value at the time the contract was terminated, and the difference shall be considered as an expense. If after termination for failure of the CONTRACTOR to fulfill contractual obligations (CONTRACTOR Default), it is determined by a Court of competent jurisdiction that the CONTRACTOR had not failed to fulfill contractual obligations, the termination shall be deemed to have been for the convenience of the CITY. In such an event, adjustment of the Contract price shall be made as provided in TERMINATION OF CONTRACT BY CITY (CONTRACTOR NOT AT FAULT) of these General Conditions.

46. PRE-FINAL INSPECTION

Approximately two weeks before completion of the Work, the contractor will schedule a Pre-final Inspection to be attended by the Bureau of Contract Administration Inspector, the Project Manager, the Contractor and invited parties associated with the Project. At this time, a list of items requiring correction or completion before the Final Inspection will be compiled. In addition, at this time the Contractor shall arrange for the delivery of manufacturers' data, manuals, and operating instructions and keys to the appropriate Department of Recreation and Parks personnel.

47. FINAL INSPECTION

Approximately seven (7) days prior to completion of the Work, the Contractor shall first notify the Bureau of Contract Administration Inspector and then the Project Manager that he desires a Final Inspection of the Project. During this inspection, which will be arranged as soon as possible, the Inspector, the Project Manager, the Contractor and other parties concerned with contractual requirements will compile a Final Inspection Correction List, incorporating all items of work and corrections required to complete the Project. This list must be completed within thirty (30) days of Final Inspection, or a new Final Inspection will be held and a new Final Inspection Correction List compiled.

48. PARTIAL ACCEPTANCE

The CITY shall have the right to utilize or place into service any item of equipment or other usable portion of the Work prior to completion of the entire project. Whenever the CITY plans to exercise said right, the CONTRACTOR will be notified in writing by the CITY, identifying the specific portion or portions of the Work to be so utilized or otherwise placed into service. Following inspection by the Bureau of Contract Administration's Final Inspector and establishment of a Final Inspection Correction List, a Statement of Partial Completion will be issued.

It shall be understood by the CONTRACTOR that until a Statement of Partial Completion is issued, all responsibility for care and maintenance of all items or portions of the Work to be placed in use shall be borne by the CONTRACTOR. Upon issuance of a Statement of Partial Completion, the CITY will accept responsibility for the protection and maintenance of all such items or portions of the Work described in the written notice, and it is further understood that the manufacturer's warranties of any affected equipment will commence not later than the date for commencement of the warranties indicated on the Statement of Partial Completion. However, the CONTRACTOR shall retain full responsibility for satisfactory operation of the total project and the CONTRACTOR'S guarantee period shall commence only after the final acceptance of the Contract by the RECREATION AND PARK COMMISSION. Such guarantee of total systems operation shall include that portion or portions previously placed into beneficial use by the CITY.

The issuance of a Statement of Partial Completion for any part of the Work shall not relieve the CONTRACTOR of its obligation to promptly remedy any omissions and latent or unnoticed defects in the Work covered by the Statement of Partial Completion. The CITY shall have the right to restrict the CONTRACTOR'S use of the occupied portion of the Work but shall allow the CONTRACTOR reasonable access to complete or correct items required by the Contract Documents.

The CITY may, if the Work is progressing satisfactorily, release part of the retention on portions of the Work for which a Statement of Partial Completion has been issued, provided that the following conditions have been met:

1. Partial final inspection corrections have been completed to the satisfaction of the INSPECTOR;
2. The CONTRACTOR submits a written request for release of retention which includes a verifiable valuation of the identified portions of the Work covered by the Statement of Partial Completion;
3. Impacted Subcontractors, major suppliers and the CONTRACTOR's Surety all agree in writing to release of retention;
4. If any minor corrections remain which do not directly affect operations or maintenance then twice the values of the remaining cleanup items shall be retained on each request for release; and
5. The CONTRACTOR signs a Change Order which specifically states the value of the retention being released.

The PROJECT MANAGER shall issue a no-change-in-contract-cost Change Order reflecting the Work for which a Statement of Partial Completion has been issued and the amount of the retention to be released. This Change Order shall authorize reduction of the retention on the next payment.

49. FINAL ACCEPTANCE

When all Work has been completed on the entire project, the CONTRACTOR shall notify the INSPECTOR and the PROJECT MANAGER in writing and request a final inspection by the INSPECTOR. The inspection conducted by the Final Inspector will include the CONTRACTOR and major Subcontractors' representatives. The CONTRACTOR shall promptly and diligently correct all items on the Final Inspection Correction List. The correction list Work will be reinspected until all Work is complete. If deemed necessary by the PROJECT MANAGER, a deductive Change Order may be issued for twice the value of final correction list items remaining to be corrected to attain completion, and permit the acceptance of the Contract by the RECREATION AND PARK COMMISSION.

Final payment to the CONTRACTOR is made following action by the RECREATION AND PARK COMMISSION that formally adopts the recommendation of the PROJECT MANAGER to accept the Contract. Said action by the RECREATION AND PARK COMMISSION establishes the following:

1. The start date of the CONTRACTOR'S material and workmanship warranty/guarantee for the total project.
2. The start date of any equipment or material warranties for which the "warranty clock" had not started.

50. LIQUIDATED DAMAGES

Time is of the essence in completing the Work required by the Contract. If the CONTRACTOR fails or refuses to complete the Work or any part thereof within the time fixed by the terms of the Contract, or any approved extension thereof, the actual damage to the CITY due to the delay will be difficult or impossible to determine. In lieu thereof, the CONTRACTOR shall pay to the CITY, as fixed and agreed, liquidated damages for each calendar day of delay in completion, the sum of **\$2,000.00 per day**. The CONTRACTOR shall be liable for the amount thereof. The CITY reserves the right, however, to terminate the CONTRACTOR's completing the Work, charging against the CONTRACTOR and its sureties any excess cost occasioned the CITY thereby, together with liquidated damages accruing until such time as the CITY may reasonably complete the Work.

Permitting the CONTRACTOR to continue and complete the Work, or any portion thereof, after the time fixed herein for completion, or after the expiration of any extensions of said time, shall in no way operate as a waiver on the part of the CITY of any of its rights under the Contract.

51. COMPENSATION FOR DELAY, DISRUPTION, AND UNANTICIPATED OVERHEAD

Notwithstanding anything to the contrary in the Contract Documents, CONTRACTOR agrees the provisions of this Article, set forth CONTRACTOR'S sole and exclusive rights to compensation for costs, expenses or damages, of any kind, arising from or relating to (i) delay, disruption, hindrance, interference, schedule compression, and the impact, ripple or cumulative effect thereof; or (ii) additional supervision, administration, excess, extended or extraordinary overhead, loss of productivity, or similar costs, expenses or damages incurred as a result of or related to extras, changes, additions or deletions in the Work, errors, omissions, conflicts or ambiguities in the Contract Documents, suspensions of the Work, acts or omissions of CITY or its representatives, agents, contractors or consultants, Differing Site Conditions, or other unforeseen circumstances, of any kind.

CONTRACTOR shall not be entitled to, and hereby conclusively waives, any right to recovery of compensation, costs, expenses or damages for delays, disruptions, hindrances or interferences (including without limitation interruption of schedules, extended, excess or extraordinary field and indirect overhead costs, loss of productivity and the impact, ripple or cumulative effect on other Work) that are the result of Unavoidable Delays or which are caused by the acts or omissions of CONTRACTOR or of its SUBCONTRACTORS, of any tier.

CONTRACTOR'S rights to recovery of compensation, costs, expenses and damages for delay, disruption, hindrance and interference (including without limitation interruption of schedules, extended, excess and extraordinary field and indirect overhead costs, loss of productivity and the impact, ripple or cumulative effect on other Work) that are the result of extras, changes, additions or deletions in the Work for which CONTRACTOR is entitled to an adjustment of the Contract Price as set forth in CHANGES AND EXTRA WORK of these General Conditions and shall constitute the sole, exclusive and complete compensation that the CITY is obligated to pay CONTRACTOR for all such costs, expenses and damages incurred by CONTRACTOR and its SUBCONTRACTORS, of every tier.

Time extension in calendar days will be granted only if delays are caused by unforeseen events beyond the control of both the CONTRACTOR and the City. Such delays will entitle the CONTRACTOR to an extension of time as provided herein, but the CONTRACTOR shall not be entitled to damages or additional payment due to such delays. War, government regulations, labor disputes, strikes (when not brought solely against the CONTRACTOR, its subcontractors or material suppliers), fires, floods, adverse weather necessitating cessation of work, other similar action of the elements, inability to obtain materials, equipment or labor, required "extra work", or other specific reasons as may be further described in the specifications may constitute such a delay.

No extension of time will be granted for a delay caused by the inability to obtain materials unless the CONTRACTOR furnishes to the Project Manager documentary proof of the inability to obtain such materials in a

timely manner in accordance with the sequence of the CONTRACTOR'S operations and the approved construction schedule.

The amount of time given to the CONTRACTOR is limited to the amount of time the Project is directly impacted by the above described delays. Direct impact means no other project work can proceed.

The CONTRACTOR may be compensated for delays caused solely by the failure of the City to furnish necessary rights-of-way, failure to deliver materials shown in the CONTRACTOR Documents to be furnished by the City, or for the suspension of the work by the City for its own convenience or benefit. If compensable delays could not have been avoided by the judicious handling of forces, equipment or plant, there shall be paid to the CONTRACTOR such amount as the General Manager may find to be fair and reasonable compensation for such part of the CONTRACTOR'S actual loss as was unavoidable.

If the CONTRACTOR desires payment for a delay as specified above or an extension of time, it shall, within thirty (30) days after the beginning of the delay, file with the General Manager a written request and report as to the cause and extent of the delay. The request of payment or extension must be made at least fifteen (15) days before the specified completion date, so as to allow for appropriate investigation. Failure by the CONTRACTOR to file these items within the times specified will be considered grounds for refusal by the City to consider such a request.

Any and all extensions of time granted under the Provisions of these Specifications shall not release the sureties on the bonds accompanying the Contract for the work required herein. The bonds shall remain in full force and effect until the discharge of the Contract.

CHANGES TO THE CONTRACT

52. CHANGES AND EXTRA WORK

The PROJECT MANAGER may, at any time, with or without notice to the Sureties, by written order designated or indicated to be a Change Order, order performance of extra work or make any change, addition or deletion in the Work, including but not limited to changes in the Specifications including Plans and Designs; in the time, method or manner of performance of the Work; in the CITY furnished facilities, equipment, materials, services, or site; or directing acceleration in the performance of the Work.

Upon receipt of such Change Order, the CONTRACTOR shall promptly proceed with the Work covered thereby, which shall be performed in accordance with the provisions of the Contract Documents except as otherwise specifically provided.

In the event that CONTRACTOR receives any written order or direction by the CITY, PROJECT MANAGER that is not so designated or indicated to be a Change Order, but which CONTRACTOR believes to constitute an extra, change, addition or deletion in the Work, then CONTRACTOR shall, prior to performance of any Work related thereto, give written confirmation notice to the PROJECT MANAGER confirming CONTRACTOR'S belief that such order or direction is believed to be a Change Order within one (1) working day of CONTRACTOR'S receipt of such order or direction.

CONTRACTOR conclusively waives any right to additional compensation, costs, expenses, damages or extension of time associated with an extra, change, addition or deletion to the Work that is performed by CONTRACTOR without either (i) a written order signed by the CITY, PROJECT MANAGER designated or indicated to be a Change Order and any change, addition or deletion, or (ii) a written confirmation notice issued by CONTRACTOR in accordance with the provisions of this Article.

Should a change be required and it is not feasible to delay construction of that portion of the Work until such time as a regular Change Order can be issued, and the estimated increase in Contract cost does not exceed the amount which can be authorized by the PROJECT MANAGER, an Emergency Change Authorization, in writing, will be issued in the field by the PROJECT MANAGER, and the CONTRACTOR shall then proceed with the Work without delay. Such Emergency Change Authorization shall be followed by a subsequent regular Change Order.

Except as provided in this Article, no order, Statement, or conduct of the PROJECT MANAGER shall be treated as a change under this Article or shall entitle the CONTRACTOR to an adjustment in the Contract Price or Contract Completion Date.

If any change under this Article causes an increase or decrease in the CONTRACTOR'S cost or the time required to perform any part of the Work under this Contract, whether or not said costs or time are specified by any order, the PROJECT MANAGER will make an adjustment to the Contract Price and modify the Contract in writing. Except for claims based on defective Specifications, no claim for any change under this Article shall be allowed for any costs incurred more than twenty (20) calendar days before the CONTRACTOR gives written notice as required. Except as otherwise provided in the Contract Documents, in the case of defective specifications for which the PROJECT MANAGER is responsible, the adjustment shall include any increased cost the CONTRACTOR reasonably incurred in attempting to comply with those defective specifications.

If the CONTRACTOR intends to assert a claim for an adjustment in the Contract Price under this Article, it must, within twenty (20) calendar days after receipt of a written Change Order or the furnishing of a written confirmation notice as hereinbefore specified, submit a written statement to the PROJECT MANAGER setting forth the general nature and monetary extent of such claim and all factual grounds therefor. The CONTRACTOR may include the statement of claim in the written notice as hereinbefore specified. Failure to comply with the twenty (20) calendar day notice requirement shall be deemed a waiver of claims by the CONTRACTOR.

No adjustment shall be made under this Article for any suspension, delay, interruption, change or any other cause, to the extent that an adjustment is provided for or excluded under any other provision of the Contract.

Recovery of compensation, costs, expenses or damages resulting from delay, disruption, hindrance, or interference in the performance of the Work (including without limitation interruption of schedules, extended, excess or extraordinary field overhead and indirect overhead costs, loss of productivity and the impact, ripple or cumulative effect on other Work), shall not be permitted, and all rights thereto are conclusively waived by CONTRACTOR, except to the extent allowed by COMPENSATION FOR DELAY, DISRUPTION AND UNANTICIPATE OVERHEAD of these General Conditions.

No claim by the CONTRACTOR shall be allowed if the claim is made after final payment under this Contract.

53. DIFFERING SITE CONDITIONS

The following provisions shall apply only in the event that there is not a Geotechnical Baseline Report for the Project. If a Geotechnical Baseline Report is so identified, then the provisions of this Article shall not apply and the CONTRACTOR'S rights arising from Differing Site Conditions shall be governed solely by the provisions of the General Requirements pertaining to the CONTRACTOR'S rights in the event of Differing Site Conditions.

Upon discovery and before further disturbance of any unforeseen conditions, the CONTRACTOR shall immediately notify the INSPECTOR and the PROJECT MANAGER, followed by a written notice to the PROJECT MANAGER within twenty-four (24) hours of subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work of the character provided for in this Contract; or materially differing from that represented in the Contract Documents which the CONTRACTOR believes may be hazardous waste, as defined in the California Health and Safety Code, that is required to be removed to a Class I, Class II or Class III disposal site in accordance with provisions of existing law.

The PROJECT MANAGER shall promptly investigate the conditions. If the PROJECT MANAGER finds that conditions materially differ and will cause an increase or decrease in the CONTRACTOR'S cost or the time required to perform any part of the Work under this contract, whether or not changed as a result of such conditions, the PROJECT MANAGER shall, make an adjustment in the Contract Price by Modification to the Contract in writing.

If the CONTRACTOR intends to seek an adjustment to the Contract Price or Contract Completion Date based upon this Article, it must, within twenty (20) calendar days after it first discovered or should have discovered in the exercise diligence and extreme care the existence of Differing Site Conditions, submit a written statement setting

forth a detailed cost breakdown in the form required by Article 27, PAYMENT FOR CHANGES AND EXTRA WORK of the General Requirements, setting forth the basis of CONTRACTOR'S calculation of the costs saved or, detailed information demonstrating the effect on the CONTRACTOR'S schedule of performance in the same manner as required by the Contract Documents for obtaining approval of extensions of time, identification of the Escrow Bid Documents that formed the basis of the CONTRACTOR'S bid estimate to perform the Work affected by such conditions, and a complete and detailed explanation of the factual basis for the request.

Failure by CONTRACTOR to strictly comply with the requirements of this Article concerning the timing and content of any notice of Differing Site Conditions or of any request for adjustment in Contract Price or Contract Completion Date based on Differing Site Conditions shall be deemed waiver of any claim by the CONTRACTOR for increase in the Contract Price or extension of the Contract Completion Date by reason of such conditions.

CONTRACTOR'S right to compensation for (i) delay, disruption, hindrance, interference, schedule compression, and the impact, ripple or cumulative effect thereof; or (ii) additional supervision, administration, excess, extended or extraordinary overhead, loss of productivity, or similar costs, expenses or damages incurred as a result of or related to any Claim based on Differing Site Conditions shall be limited to such sums as are allowable under COMPENSATION FOR DELAY, DISRUPTION, AND UNANTICIPATED OVERHEAD of these General Conditions.

No claim by the CONTRACTOR for an adjustment hereunder be allowed if asserted after final payment under this Contract.

LEGAL REQUIREMENTS

54. CLAIMS AND PROTESTS

A Claim or Protest that involves an extra, change, addition or deletion to the Work as set forth in CHANGES AND EXTRA WORK of these General Conditions shall arise upon issuance of a final decision of the PROJECT MANAGER denying, in whole or in part, a request for adjustment in the Contract Price or Contract Completion Date; provided however, that failure to comply with the requirements of CHANGES AND EXTRA WORK of these General Conditions shall be conclusively deemed to constitute grounds to deny such Claim or Protest.

A Claim or Protest that does not involve an extra, change, addition or deletion to the may be asserted only if the CONTRACTOR shall immediately and prior to performing the Work affected thereby give written notice to the PROJECT MANAGER of such circumstances and of CONTRACTOR'S intention to file a Claim or Protest based thereon. Unless otherwise directed by the PROJECT MANAGER the CONTRACTOR shall proceed without delay to perform the Work and to conform to any order, instruction, or decision of the PROJECT MANAGER with respect thereto.

The CONTRACTOR shall, within twenty (20) calendar days after it first knew, or in the exercise of diligence and extreme care should have known, of the circumstances giving rise to the Claim or Protest, file a written Claim or Protest with the PROJECT MANAGER, stating in detail all objections, grounds and reasons therefore. The CONTRACTOR shall, upon instruction by the PROJECT MANAGER provide, within ten (10) days or such other time as agreed to between the PROJECT MANAGER, the INSPECTOR, and the CONTRACTOR, any and all documents, records or other materials identified by the PROJECT MANAGER as necessary for the resolution of the CONTRACTOR's Claim or Protest.

Claims or Protests seeking time extensions shall be accompanied by such documentation as is required by Article 18, CONTRACTOR'S CONSTRUCTION SCHEDULE AND REPORTS of the General Requirements. Claims or Protests seeking recovery of compensation or adjustments to the CONTRACT PRICE, whether or not based on extras, changes, additions or deletions to the Work, shall be in the form of Change Order Cost Quotations prepared in accordance with and subject to all of the requirements of Article 27, PAYMENT FOR CHANGES AND EXTRA WORK of the General Requirements, including without limitation the prohibition on use of total cost and modified total cost methodologies.

CONTRACTOR waives all rights to assert any claims or seek any relief in the form of extensions of time or recovery of additional compensation, costs, expenses, damages from the CITY that are not presented as a Claim or Protest in the manner specified and within the time stated herein. CONTRACTOR further hereby agrees that in the interest of avoiding the additional expense and potential inequity of piecemeal resolution of Claims or

Protests, all decisions by PROJECT MANAGER shall be final and binding not only as to all matters asserted in the Claim or Protest, but also as to all matters (including without limitation all rights to extensions of time and recovery of extra compensation, costs, expenses and damages) not asserted in the Claim or Protest that were known to CONTRACTOR, or that could have been reasonably discovered by CONTRACTOR in the exercise of diligence and extreme care, at the time of submission of the Claim or Protest and that are in any way related to the subject matter of the Claim or Protest. All orders, instructions and decisions of the PROJECT MANAGER will be limited to matters properly falling within their respective authority as specified in AUTHORITY OF THE RECREATION AND PARK COMMISSION, PROJECT MANAGER AND INSPECTOR of these General Conditions.

The CONTRACTOR will be informed of the PROJECT MANAGER's decision within thirty (30) days after the CONTRACTOR last submits data pertinent to the protest previously mentioned. In the case of a Claim or Protest that involves an extra, change, addition or deletion to the Work as set forth in CHANGES AND EXTRA WORK of these General Conditions, if the Contractor accepts the decision of the PROJECT MANAGER, then the CONTRACTOR and CITY shall enter into a Change Order adjusting the Contract Price and Contract Completion Date in accordance with such decision. In the case of a Claim or Protest does not involve an extra, change, addition or deletion to the Work as set forth in CHANGES AND EXTRA WORK of these General Conditions and the CONTRACTOR accepts the decision of the PROJECT MANAGER, then the CONTRACTOR and CITY shall enter into a Modification of the Contract setting forth the terms of the decision and, if appropriate, its effect on the Contract Price or Contract Completion Date. If the CONTRACTOR does not accept the decision of the PROJECT MANAGER, then further appeal of the PROJECT MANAGER's or the decision must be made to the RECREATION AND PARK COMMISSION in writing within twenty (20) calendar days after receipt of the PROJECT MANAGER's decision. The RECREATION AND PARK COMMISSION shall afford the CONTRACTOR an opportunity to be heard and to offer evidence in support of its appeal. All determinations of the RECREATION AND PARK COMMISSION with respect to Claims or Protests shall be final and binding.

In all matters concerning the validity, interpretation, performance, effect or otherwise of the Contract, the Federal regulations (if and to the extent expressly incorporated by reference in the Contract Documents), the laws of the State of California, and the Charter of the City of Los Angeles shall govern and be applicable. Pending final disposition of a protest, the CONTRACTOR shall proceed diligently with the performance of the Contract and in accordance with the previously mentioned decision.

Any Claim or Protest, including without limitation any Claim or Protest filed on behalf of or having its source in a claim by Subcontractor, Sub-Subcontractor, or Supplier, at any tier, which the CONTRACTOR chooses to make to the CITY, shall be accompanied by the certification language set forth below signed by a responsible managing officer of the CONTRACTOR'S organization, who has the authority to sign Subcontracts or Purchase Orders on behalf of the CONTRACTOR, and who has personally investigated and confirmed the truth and accuracy of the matters set forth in such certification. Submission of certification in accordance herewith is a condition precedent to the CITY's consideration of or decision on the Claim or Protest and to the filing and maintenance of any legal action or proceeding to enforce or recover monies under such Claim or Protest. Failure to submit such a certification along with the Claim or Protest, shall result in the Claim or Protest being returned to the CONTRACTOR without any decision and shall waive the CONTRACTOR's right to pursue the Claim or Protest either on its own behalf or on behalf of such Subcontractor or Supplier.

I hereby certify under penalty of perjury that I am a managing officer of (CONTRACTOR'S name) and that I have reviewed this Claim or Protest presented herewith on CONTRACTOR'S behalf and/or on behalf of (Subcontractor's/Supplier's name(s)) and that the following statements are true and correct:

1. The facts alleged in or that form the basis for the Claim or Protest are true and accurate; and,
2. CONTRACTOR does not know of any facts or circumstances, not alleged in the Claim or Protest, that by reason of their not being alleged render any fact or statement alleged in the Claim or Protest materially misleading; and,
3. CONTRACTOR has, with respect to any request for money or damages alleged in or that forms the basis for the Claim or Protest, reviewed the job cost records (including those maintained by CONTRACTOR and by any Subcontractor or Supplier, of any tier, that is asserting all or any portion of the Claim or Protest) and confirmed with mathematical certainty

that the losses or damages suffered by CONTRACTOR and /or such Subcontractor or Supplier were in fact suffered in the amounts and for the reasons alleged in the Claim or Protest; and,

4. CONTRACTOR has, with respect to any request for extension of time or claim of delay, disruption, hindrance or interference alleged in or that forms the basis for the Claim or Protest, reviewed the job schedules (including those maintained by CONTRACTOR and by any Subcontractor or Supplier, of any tier, that is asserting all or any portion of the Claim or Protest) and confirmed on an event-by-event basis that the delays or disruption suffered by CONTRACTOR and /or such Subcontractor or Supplier were in fact experienced for the durations, in the manner, and with the consequent effects on the time and/or sequence of performance of the Work, as alleged in the Claim or Protest; and,
5. CONTRACTOR has not received payment from CITY for, nor has CONTRACTOR previously released CITY from, any portion of the Claim or Protest.

Signature:

Name: _____

Title: _____

Company: _____

Date: _____

No Claim or Protest by the CONTRACTOR shall be allowed if made after final payment under this Contract.

55. COMMENCEMENT OF STATUTE OF LIMITATIONS

Unless otherwise provided in this Contract, all claims, counterclaims, disputes and other matters in question between the CITY and the CONTRACTOR arising out of or relating to this Contract or the breach of it will be decided by a Court of competent jurisdiction. It is understood that this Contract is executed and to be performed within the City and County of Los Angeles.

Any applicable statute of limitations shall commence to run and any alleged cause of action by the CONTRACTOR against the CITY arising out of or related to the Project shall be deemed to have accrued in any and all events no later than 30 days after CONTRACTOR'S submittal of its last application for progress payment.

56. GOVERNING LAW

The terms and conditions of this Contract shall be construed and interpreted under, and all respective rights and duties shall be governed by, the laws of the State of California. Wherever applicable each provision of these Contract Documents shall be interpreted in such a manner as to be effective and valid under applicable law, but if any provision of these Contract Documents shall be prohibited by or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of these Contract Documents.

57. VENUE

This Contract will be executed and performed within the City and County of Los Angeles, California.

58. NO WAIVER OF RIGHTS

Neither the inspection by the CITY, nor any order by the CITY for payment of money, nor any payment for or acceptance of the whole or any part of the Work by the CITY, nor any extension of time, nor any possession taken by the CITY, shall operate as a waiver of any provision of this Contract, or any power herein reserved to the CITY,

or any right to damages herein provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach.

59. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE

The acceptance by the CONTRACTOR of final payment shall release the CITY, the PROJECT MANAGER, the INSPECTOR, their officers, agents, representatives, or employees, as representatives of the CITY, from all claims and all liability to the CONTRACTOR for all things done or furnished in connection with the Work and every act of the CITY relating to or arising out of the Work.

60. PATENTS AND COPYRIGHTS

The CONTRACTOR shall include in its bid the patent fees or royalties on any patented article or process which may be furnished or used in the Work. The CONTRACTOR shall indemnify and hold the CITY harmless from any legal action that may be brought for infringement of patents. The CONTRACTOR'S attention is directed to "Notice of Patents, Data, and Copyright Regulations" of the Federal Labor Standards.

The CONTRACTOR shall bear all costs arising from the use of patented goods and /or processes used on and/or incorporated into the Work. When use of these goods and/or processes are judged to be an infringement and their use is banned, the Contractor, at its own expense, shall, with concurrence of the PROJECT MANAGER, do one of the following:

1. Secure for the CITY the right to continue using goods and/or processes by suspension of the injunction or by procuring a license(s);
2. replace said goods and/or processes with non-infringing goods and /or processes;
3. modify said goods and/or processes so that they become non-infringing; or
4. remove said goods and/or processes and refund the sum paid therefore without prejudice to any other rights of the CITY.

The preceding Subarticle shall not apply to any goods manufactured to the detailed design of the CITY contained in the Contract Documents.

61. PUBLIC RECORDS ACT

All records, documents, plans, specifications and all other information relating to the conduct of the CITY's business, including information submitted by the CONTRACTOR, shall become the exclusive property of the CITY and except as provided by law shall be deemed public records. Said information shall be subject to the provisions of the California Public Records Act (Government Code Sections 6250 *et seq.*).

Under no circumstances, will the CITY be responsible or liable to the CONTRACTOR, submitter or any other party for the disclosure of any records or information submitted to the CITY, regardless of whether such records or information are labeled "TRADE SECRET", "CONFIDENTIAL", or "PROPRIETARY" (or words to similar effect) and regardless of, whether the disclosure is required by law or a court order or occurs through inadvertence, mistake, or negligence on the part of the CITY or its officers, employees, and/or contractors.

The CITY will not advise as to the nature or content of documents entitled to protection from disclosure under the California Public Records Act", including interpretations of the Act or the definition of "Trade Secret". The submitting party shall be solely responsible for all determinations made under the Act, and where appropriate for clearly and prominently marking each and every page or sheet of information with "TRADE SECRET", "CONFIDENTIAL", or "PROPRIETARY". Each submitting party is advised to contact its own legal counsel concerning the California Public Records Act and its applicability to the submitting party's own circumstances.

In the event of litigation concerning the disclosure of any information submitted by the submitting party, the CITY's sole involvement will be as a stake holder, retaining the information until otherwise ordered by a court. The submitting party, at its sole expense and risk, shall be responsible for any and all fees and costs for prosecuting or defending any action concerning the information, and shall indemnify and hold the CITY harmless from all costs and expenses including attorneys' fees, in connection with such action.

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GENERAL REQUIREMENTS

FOR CONSTRUCTION OF

DEPARTMENT OF RECREATION AND PARKS SOUTH PARK RENOVATION PUBLIC RESTROOM RENOVATION

WORK ORDER NO: E1908366



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CONTENTS
GENERAL REQUIREMENTS

Article

Page

GENERAL	1
1. ABBREVIATIONS AND REFERENCE STANDARDS	1
CONTRACT DOCUMENTS	4
2. ISSUANCE OF PLANS AND SPECIFICATIONS (revised as of 03/21/14)	4
3. DIVISIONS OF SPECIFICATIONS	4
THE CONTRACTOR'S RESPONSIBILITIES.....	4
4. SITE SECURITY	4
5. ENVIRONMENTAL CONTROL AND MITIGATION	5
6. MOBILIZATION.....	9
7. REMOVAL, CLEANUP, AND DEMOBILIZATION.....	10
8. RECORD DRAWINGS.....	10
9. EXCAVATION SHORING, FORMS, AND FALSEWORK	11
10. SUBMITTALS.....	12
11. SUBSTITUTIONS AND "OR EQUAL" SUBMITTAL	13
MATERIALS, EQUIPMENT, AND APPLIANCES	14
12. SURVEYING.....	14
13. SITE INVESTIGATION	15
14. INSPECTION OF THE WORK.....	15
15. SAMPLING, TESTING AND FABRICATION INSPECTION	16
16. GUARANTY/WARRANTY.....	18
17. STORAGE OF MATERIALS AND EQUIPMENT	19
PROGRESS OF THE WORK	19
18. CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK	19
19. WORK BY CITY OR OTHERS.....	22
PAYMENT FOR WORK.....	22
20. PARTIAL PAYMENTS (Revised as of 02/12/16).....	22
21. PAYMENT FOR MOBILIZATION.....	24
22. PAY ITEM DEFINITIONS.....	25
23. SCHEDULE OF VALUES	26
24. NOTICE TO WITHHOLD AND/OR STOP NOTICE	26
25. FINAL PAYMENT.....	27
26. CHANGE ORDER REQUESTS	27
27. PAYMENT FOR CHANGES AND EXTRA WORK.....	27
28. PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA	34
29. PAYMENT FOR MATERIALS OR EQUIPMENT DELIVERED AND STORED ON THE JOB	35

CONTENTS
GENERAL REQUIREMENTS

<u>Article</u>	<u>Page</u>
30. PAYMENT FOR MATERIALS OR EQUIPMENT STORED OFF THE JOBSITE.....	36
31. PAYMENT FOR PERMITS	37
32. AUDIT AND ACCESS TO RECORDS	37
MISCELLANEOUS.....	38
33. INTERFACE/COORDINATION REQUIREMENTS	38
34. PROGRESS PHOTOGRAPHS.....	39
35. COMMUNITY RELATIONS.....	39
36. PROJECT CLOSEOUT.....	39
ATTACHMENTS	1
ATTACHMENT TO GENERAL REQUIREMENTS ARTICLE 27	1
CHANGE ORDER COST QUOTATION FORM.....	2

GENERAL

1. ABBREVIATIONS AND REFERENCE STANDARDS

A. ABBREVIATIONS

Wherever the following abbreviations are used they shall have the meanings indicated:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AGMA	American Gear Manufacturers' Association
AI	The Asphalt Institute
AISC	American Institute of Steel Construction
AISI	American Iron & Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
CBM	Certified Ballast Manufacturers
CRS	Concrete Reinforcement and Steel Institute
EPA	Environmental Protection Agency
ETL	Department of Building & Safety Electrical Test Laboratory
FCI	Fluid Control Institute, Inc.
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
LABC	City of Los Angeles Building Code
NAAMM	National Architectural Association of Metal Manufacturers
NEC	National Electrical Code
NECA	National Electrical Contractors Association

NEMA	National Electrical Manufacturers Association
NOAA	National Oceanic and Atmospheric Administration (Dept. of Commerce)
OSHA	Occupational Safety and Health Administration (Dept. of Labor)
PCA	Portland Cement Association
RCSC	Research Council on Structural Connections of the Engineering Foundation
SAMA	Scientific Apparatus Manufacturer's Association
SSPWC	Standard Specifications for Public Works Construction
SWRCB	State Water Resources Control Board
UBC	Uniform Building Code, International Conference of Building Officials
UL	Underwriters Laboratories, Inc.
USGS	United States Geological Survey
WATCH	Work Area Traffic Control Handbook
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WRI	Wire Reinforcement Institute
WWPA	Western Wood Products Association

B. REFERENCE STANDARDS

1. APPLICABLE PUBLICATIONS - Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.
2. SPECIALISTS' ASSIGNMENTS - In certain instances, specification text requires (or implies) that specific Work is to be assigned to specialists or expert entities, which must be engaged for the performance of that Work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of Work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of Contract requirements remains with the CONTRACTOR.
3. CODES AND SAFETY STANDARDS - Without limiting the generality of other requirements of the Specifications, Work specified herein shall conform to or exceed the applicable requirements of the following Codes and Safety Standards.
 - a. Applicable Codes:
 - City of Los Angeles Building Code
 - City of Los Angeles Mechanical Code
 - City of Los Angeles Plumbing Code
 - City of Los Angeles Fire Code
 - City of Los Angeles Electrical Code
 - b. References herein to "Building Code" shall mean City of Los Angeles Building Code. Similarly references to "Mechanical Code," "Plumbing Code," "Fire Code," and "Electric Code" shall mean City of Los Angeles Mechanical Code, City of Los Angeles Plumbing Code, City of Los Angeles Fire Code and City of Los Angeles Electric Code respectively.
 - c. Applicable Safety Standards:
 - OSHA Regulations for Construction
 - OSHA Standards
 - Cal-OSHA
 - d. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
 - e. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
 - f. References herein to "Cal-OSHA" shall mean State of California, Department of Industrial

Relations, as amended to date, and all changes and amendments thereto which are effective as of the date of construction.

- g. The latest edition of the codes as approved and adopted for use by the CITY as of the date of award shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.
4. STANDARD SPECIFICATIONS - References in the Contract Documents to "Standard Specifications" shall mean the Standard Specifications for Public Works Construction (SSPWC), including all current supplements, addenda, and revisions thereof, except that the provisions therein for measurement and payment shall not apply.
5. STANDARD PLANS - References herein to "Standard Plans" shall mean the Standard Plans issued by the City of Los Angeles which drawings are hereby incorporated in and made a part of these Contract Documents, and copies of which are available for a fee.
6. CONFLICT BETWEEN CODES, SAFETY STANDARDS, REFERENCE STANDARDS, DRAWINGS AND OTHER CONTRACT DOCUMENTS - In case of conflict between codes, reference standards, drawings and other Contract Documents, the most stringent requirements shall govern. Conflicts shall be brought to the attention of the PROJECT MANAGER for clarification and directions prior to ordering or providing any materials or labor. The CONTRACTOR shall bid for the most stringent requirements.

CONTRACT DOCUMENTS

2. ISSUANCE OF PLANS AND SPECIFICATIONS

- A. Unless otherwise provided in the Contract Documents, the PROJECT MANAGER will furnish to the CONTRACTOR TEN (10) sets each of the Plans, Specifications and, Geotechnical Report without charge. Additional sets desired by the CONTRACTOR or Subcontractors will be furnished upon request, but at the CONTRACTOR's expense.
- B. Drawings, Specifications, Special Provisions, and copies thereof are the property of the CITY. They are not to be used on other work. Necessary bid documents will be available to prospective bidders. Bidders will be issued plans and specifications for a fee. This fee is stated in the "Notice Inviting Bids" of the Contract Documents.
- C. Standard Plans for the CITY, which are noted on the drawings, are available for a fee. Also see the City of Los Angeles, Bureau of Engineering Web pages for Standard Plans at <http://eng.lacity.org/techdocs/stdplans>.

3. DIVISIONS OF SPECIFICATIONS

The specifications are arranged into the Construction Specifications Institute (CSI) sixteen (16) Division format with an additional Division 17 for Instrumentation and Controls (if applicable).

- A. The organization of the Specifications into divisions, sections, parts, and paragraphs shall not control or limit the CONTRACTOR in dividing the Work among Subcontractors of any tier. The CONTRACTOR shall be solely responsible for all subcontract arrangements of Work regardless of the organization of the specifications.
- B. Titles of Specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

THE CONTRACTOR'S RESPONSIBILITIES

4. SITE SECURITY

- A. In addition to the responsibilities specified in other Articles of these Requirements, and the General Conditions, the CONTRACTOR shall be responsible for the security of all its construction equipment, materials, tools, facilities, and vehicles (personal, private, or contractual) while performing the Work of this Contract. This requirement shall be effective twenty-four (24) hours per day for the duration of the Contract. CONTRACTOR shall familiarize themselves with the location of the job site and scan the premises by means necessary to protect the property, including but not limited to, provision of fencing, guards, security system or other means as necessary.

5. ENVIRONMENTAL CONTROL AND MITIGATION

A. CONTROL

1. Fugitive Dust and Smoke Control:

Comply with the requirements of Title 8, California Code of Regulations, concerning handling of asbestos dust.

- a. Criteria for Fugitive Dust - Detailed descriptions and explanations of specific impact mitigation measures are contained in South Coast Air Quality Management District (SCAQMD) Rules and Regulations (Rule 403, Limitation on Fugitive Dust Emissions). Key features of mitigation options described are as follows:
- i. Do not cause or allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond property line of the emission source.
 - ii. Take precautions to minimize fugitive dust emissions from operations involving demolition, excavation, grading, clearing of land and disposal of solid waste. Utilizes at least one Reasonably Available Control Measure (RACM) for each potential source of fugitive dust. Do not cause or allow particulate matter to exceed 50 mg/m³ when determined as difference between upwind and downwind samples collected on high volume particulate matter samplers or other EPA approved equivalent method for PM-10 monitoring at the property line for a five hour period during the time of active operations.
 - iii. Take precautions to prevent visible particulate matter from being deposited upon public roadways as a direct result of their operations. Precautions include, removal of particulate matter from equipment before movement to paved streets or prompt removal of material from paved streets onto which such material has been deposited.
- b. As a minimum - Use the following procedures and techniques:
- i. Cover loads of materials, debris and soil transported from construction sites. Trim or remove loose material from loads before leaving Project.
 - ii. Daily or more frequently, if necessary, water down and sweep adjacent streets and sidewalks that have construction vehicles carrying debris and excavated materials.
 - iii. Establish regular cycles and locations for cleaning trucks that haul soil from site.
 - iv. Water down construction sites whenever required to suppress dust, particularly during handling of excavation soil or debris or during demolition.
 - v. If conveyors are used, cover all transfer points along conveyor system moving soil. Minimize drop height to the stockpile. Provide a sprinkler system that will apply water to soil before it drops to stockpile.

- vi. Any adapted measures developed by SCAQMD on Best Available Control Measures (BACM) for Fugitive Dust and Rule 403 will be incorporated into the site operations for Fugitive Dust Control.
- vii. Burning of wastes is prohibited. Remove scrap and waste material and dispose of in accordance with laws, codes, regulations, ordinances and permits.
- viii. Use construction equipment designed and equipped to prevent or control air pollution in conformance with most restrictive regulations of EPA, State and local authorities. Maintain evidence of such design and equipment and make available for inspection by Authority or its designee.
- ix. Establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on Project. Keep records available for inspection by Authority or its designee.
- x. Comply with the requirements of Title 8, California Code of Regulations, concerning handling of asbestos dust.
- xi. Implement Fugitive Dust Measures listed in tables 1 and 2 of SCAQMD Rule 403 and perform record keeping in accordance with Sections (e)(1) of said rule. Make records available to Authority or its designee for inspection.

2. Rubbish Control

- a. Through all phases of construction, including suspension of Work and until final acceptance of the Project, keep the site of the Work and other areas used by it in a neat and clean condition, and free from an accumulation of rubbish and debris. Dispose of rubbish and waste materials of any nature occurring at the worksite and establish regular intervals of collection and disposal of such materials and waste. Keep CONTRACTOR haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Take care to prevent spillage on haul routes. Remove such spillage immediately and clean the area. Confine equipment and material storage to areas approved by the PROJECT MANAGER. Dispose of rubbish and surplus materials off the construction site, at the CONTRACTOR's expense, in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and the requirements of the OSHA Safety and Health Standards for Construction. Include cleanup cost in the CONTRACTOR's Bid.

3. Sanitation

- a. Fixed or portable chemical toilets shall be provided for the use of the CONTRACTOR's employees. These accommodations shall be maintained in a neat and sanitary condition. Toilets at construction job sites shall conform to the requirements of Title 8, California Code of Regulations.
- b. Wastewater conveyance and disposal shall not be interrupted. Should the CONTRACTOR disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill. Establish a regular schedule for collection of sanitary and organic waste. Dispose of wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations away from the site in a manner satisfactory to the INSPECTOR and in accordance with laws and regulations pertaining thereto. Dispose of such wastes at the CONTRACTOR's expense.

4. Chemicals

The following paragraph does not relieve the CONTRACTOR from its responsibility for obtaining

prior approval from the PROJECT MANAGER for chemical usage when otherwise required.

- a. Provide four (4) copies of the MSDS to the PROJECT MANAGER for all chemicals used during Project construction or furnished for Project operation, prior to bringing them on site, whether soil conditioning agents, lubricants, defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, soil conditioning agents, lubricants, reactant, or of other classification, which shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

5. Odor Control

- a. The CONTRACTOR shall furnish all labor, materials, and equipment required and shall carry out effective measures wherever and as often as necessary to prevent the discharge of a nuisance odor from its operation into the atmosphere in such quantity as will violate the regulations of any legally constituted authority. During construction, the CONTRACTOR shall notify the PROJECT MANAGER and the INSPECTOR at least forty-eight (48) hours in advance when potential odor-causing activities are scheduled for construction.

6. Noise and Vibration - Comply with requirements of CITY noise ordinances and mitigation specified below.

- a. Lighting – Shield worksite lighting to prevent disturbance to adjacent properties.

B. MITIGATION

1. General

- a. The CONTRACTOR shall mitigate the adverse environmental impacts associated with the Work of the Contract. The CONTRACTOR shall indemnify and hold harmless the CITY from any and all fines, penalties or damages incurred by the CITY for violation of any environmental mitigation measures or permit caused by the CONTRACTOR's failure to comply with environmental mitigation measures of this Article. The measures that the CONTRACTOR shall take to mitigate environmental impacts include, but are not limited to the following:

- b. The CONTRACTOR, a minimum of thirty (30) days prior to beginning Work on each new major activity, shall submit a written plan to the PROJECT MANAGER, detailing how the environmental impacts for the activity shall be mitigated. The plan shall include, at a minimum:

- i. Anticipated site conditions;
- ii. Equipment to be utilized;
- iii. Means and methods of construction;
- iv. Impacts likely to occur;
- v. Mitigation methods to be employed.

2. Storm Water Pollution Control

- a. Comply with the State General Construction Activity Storm Water Permit.

- b. Minimum Water Quality Protection Requirements – The Contractor is required to meet the following minimum standards of good housekeeping:

- i. Eroded sediments and other pollutants must be retained on site and may not be transported from the site via sheet flow, swales, area drains, natural drainage, or wind.

- ii. Stockpiles of earth and other construction-related materials must be protected from being transported from the site by wind or water.
 - iii. Fuels, oils, solvents, and other toxic materials must be stored in accordance with their listing and are not to contaminate the soil nor the surface waters. All approved toxic storage containers are to be protected from the weather. Spills must be cleaned up immediately and disposed of in a proper manner. Spills may not be washed into the drainage system.
 - iv. Excess or waste concrete may not be washed into the public way or any drainage system. Provisions shall be made to retain concrete wastes on-site until they can be appropriately disposed of or recycled.
 - v. Trash and construction-related solid wastes must be deposited into a covered receptacle to prevent contamination of rainwater and dispersal by wind.
 - vi. Sediments and other materials may not be tracked from the site by vehicle traffic. The construction entrance roadways must be stabilized so as to inhibit sediments from being deposited into the public ways. Accidental depositions must be swept immediately and may not be washed down by rain or by any other means.
- c. Wet Weather Erosion Control Plan (WWECP) – Pursuant to Section 61.02 of the LAMC, whenever it appears that the construction site will have grading between October 1 and April 15, the Contractor shall submit a WWECP to the Project Manager for approval within 30 days after award of contract or get approval 30 days prior to the beginning of the rainy season, whichever is longer. Note: Guidance on preparing the WWECP can be found in the Development Best Management Practices Handbook – Part A, Construction Activities adopted by the Board of Public Works on August 2, 1999, as authorized by Section 64.72 of the Los Angeles Municipal Code. This handbook can be obtained at cost at the public/permit counters of the Bureau of Engineering.
- d. The Contractor shall file a “Notice of Intent” (NOI) with the State Water Resources Control Board to comply with the California General Construction Activity Stormwater Permit (NPDES No. CAS000002) and prepare and implement a Stormwater Pollution Prevention Plan (SWPP). Whenever the CONTRACTOR is required to get any type of permit from the Department of Building and Safety (DBAS), the CONTRACTOR shall show a Waste Discharge Identification Number (WDID) to the DBAS as proof of submittal of the NOI. If the CONTRACTOR does not need any type of permit from the DBAS, the CONTRACTOR shall show the WDID to the PROJECT MANAGER.

3. Noise and Vibration

a. General

- i. The Work specified in this Article consists of eliminating excessive noise and vibration generated by construction activities, complying with applicable noise regulations and specifications requirements, monitoring and reporting noise and vibration measurements.
- ii. Use equipment with effective noise-suppression devices and employ other noise control measures such as enclosures and noise barriers necessary to meet the noise limits specified and to protect the public. Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.

- iii. Noncompliance Corrective Action – If, at any time prior to or during the construction, complaints are received from the public, the PROJECT MANAGER shall direct the CONTRACTOR to undertake immediate corrective action through equipment modification, additional noise abatement equipment or a change in operating procedures.
- b. Construction Vibration
 - i. Ground-borne vibrations from equipment may have the potential of causing an impact to the existing structure. The CONTRACTOR shall mitigate and/or repair any damage caused by vibration.

6. MOBILIZATION

A. GENERAL

Mobilization shall include, but not be limited to, the following items, all as required for the proper performance and completion of the work:

1. Obtaining all permits, insurance, and bonds.
2. Moving onto the job-site all CONTRACTOR's plant and equipment as required.
3. Erecting temporary buildings and other construction facilities.
4. Installing temporary construction power and wiring.
5. Establishing fire protection system for its temporary facilities.
6. Developing construction water supply.
7. Providing field office trailers for the CONTRACTOR AND INSPECTOR, complete with all specified furnishings and utility services, including telephones.
8. Providing connections to onsite sanitary facilities as specified.
9. Providing for potable water facilities as specified. This includes a means by which all on site contractor, subcontractor or supplier personnel can wash their hands with soap.
10. Arranging for and erection of CONTRACTOR's work and storage yards and sheds.
11. Submittal of all required Subcontractor insurance certificates and bonds.
12. Posting all CAL-OSHA required notices and establishment of safety programs.
13. Have the CONTRACTOR's representative at the job site full time.
14. Furnishing of Construction Schedule, Bid Breakdown and Submittal Schedules.

B. TEMPORARY CONSTRUCTION UTILITIES AND WORKSITE FACILITIES

The Contractor shall provide the following worksite facilities, as indicated below:

Yes (1) The Contractor shall provide adequate sanitary conveniences for use of persons employed on the work. These conveniences shall be properly secluded from public observation and maintained in a neat and sanitary condition in the manner and places required by the Project Manager. The use of these conveniences shall be strictly enforced, and they shall be maintained at all times until completion of the work, when they shall be removed from the premises and the area left clean and free from any nuisance. They shall also comply with all applicable laws, ordinances and regulations pertaining to the public health and sanitation of dwelling and camps.

Wastewater shall not be interrupted. Should the Contractor disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill.

Yes (2) The Contractor shall provide the power and light needed for construction until permanent meter

installation is completed. The Contractor shall make all necessary arrangements with the City Department of Water and Power; assume all costs; and make and remove all connections to power facilities as necessary for required tests.

Yes (3) The Contractor shall provide the water needed for construction until permanent meter installation is completed. The Contractor shall make all necessary arrangements with the City Department of Water and Power; assume all costs; and make and remove all connections to water facilities as necessary for required tests.

Yes (4) The Contractor shall provide the gas needed for construction until permanent meter installation is completed. The Contractor shall make all necessary arrangements with the Gas Company; assume all costs; and make and remove all connections to gas facilities as necessary for required tests.

Yes (5) The Contractor shall provide a temporary shed on the site for the safe storage of his material and equipment. The floor shall be weathertight with a wood floor above grade. The shed shall be removed upon completion of the work or by order of the General Manager.

Yes (6) The Contractor shall provide an office for the Inspector for the entire period of construction or until the General Manager orders its removal. The office, to be located as the General Manager directs, shall be weathertight and have not less than 100 square feet floor area; screened windows that open in opposite walls; a door with latch set and hasp for padlocking; a built in counter of sufficient size for a full set of job blue prints with a drawer for filing 9" x 12" folders; a stool and a plan rack for drawings; an electric heater, a 12" electric fan and electric lights.

Yes (7) The Contractor shall provide a job telephone for the use of City personnel only. The Contractor shall make all necessary arrangements with the telephone company; assume all costs and pay for all calls. The telephone is to be located so that it is easily accessible from the job office and provided with an outside extension bell.

Yes (8) The Contractor shall maintain temporary drainage to keep excavations, pits and trenches free of water accumulation, by pumping if necessary. The Contractor shall protect against damage caused by water backing up in sewers and drains.

Yes (9) The Contractor shall exercise every reasonable precautions to protect channels, storm drains and bodies of water from pollution; and shall conduct and schedule construction operations so as to minimize or avoid muddying and silting of said channels, drains and waters. Water pollution control work shall consist of constructing any facilities which may be required to prevent, control and abate water pollution.

The Project Manager, authorized representative of the General Manager, in charge of this project is:

Wayne Chow at (213) 485-4365

All correspondence should be addressed to the Project Manager at [Note new address as of 03/29/12]:

**Department of Public Works, Bureau of Engineering
Architectural Division
1149 S. Broadway, Suite 830,
Los Angeles, California 90015**

7. REMOVAL, CLEANUP, AND DEMOBILIZATION

- A. Upon completion of the contracted Work, remove all CONTRACTOR tools, materials and other articles from the CITY's property. Should the CONTRACTOR fail to take prompt action to this end, the CITY at its option and without waiver of such other rights as it may have, on thirty (30) calendar days notice, may treat them as abandoned property. Sweep floors broom clean, clean exterior and interior surfaces and windows and remove rubbish and debris resulting from the contracted Work and maintain the job site in a clean, orderly and safe condition at all times until completion of the physical Work and written Notice of Partial Acceptance. Failure to comply with this requirement shall be grounds for the CITY to assess clean-up costs in the amount of 5% of the mobilization cost.

8. RECORD DRAWINGS

- A. Record Drawings are full size drawings (Plans) which are marked up during construction to delineate the actual in-place constructed conditions. Record Drawings shall be provided by the CONTRACTOR for this Project. Requirements for Record Drawings as specified elsewhere shall supplement the requirements specified herein.
- B. Record Drawings shall include all changes in the plans including those issued as Change Orders, Plan Clarifications, Addenda, Notice to Bidders, responses to Requests for Information, Jobsite Memos, and any additional details needed for the construction of the Project but not shown on the plans. Substructures encountered while excavating that are left in place shall be located by survey, to the satisfaction of the PROJECT MANAGER, shown, and identified on the Record Drawings. Substructures, including but not limited to concrete structures, electrical conduit and duct banks, drains and sanitary sewer pipelines, process piping, water lines, etc, whose installed location differs from that shown on the original plans shall be precisely located by survey to the satisfaction of the PROJECT MANAGER and recorded on the as-built drawings before backfilling.
- C. Mark Record Drawings with red ink or chemical fluid on one (1) set of full size prints to produce a record of the complete installation. Prepare additional drawings that may be required to indicate record conditions on 24" x 36" paper. Additions to Contract Drawings shall employ and use drafting standards, which are consistent with the drafting standards, used in the Contract Drawings.
- D. Keep Record Drawings on the job and update during construction and make available for the PROJECT MANAGER'S inspection and copying at all times. The PROJECT MANAGER will review the Record Drawings before submittal of monthly payment requests. If in the opinion of the PROJECT MANAGER, the Record Drawings are not current, approval of the monthly payment may be withheld until the drawings are made current. Submit a signed certification with each monthly payment request stating that the Record Drawings are current and accurate as of the date of the payment request.
- E. Where the plans are diagrammatic or lacking precise details, produce dimensioned full size sheets as the Record Drawings. For installations outside of structures, the locations shall be given by coordinates and elevations. Where substructures are encased in concrete, the outside dimensions of the encasement shall also be given.
- F. In the case of those drawings which depict the detail requirements for equipment to be assembled and wired in the factory, the Record Drawings shall be updated by indicating those portions which are superseded by final Shop Drawings and by including appropriate reference information describing the Shop Drawings by manufacturer, drawing and revision numbers.
- G. At the completion of the Work and after final inspection, copy the Record Drawing (as installed) data, using red ink, onto a new set of high quality prints provided by the CITY. Certify to the completeness and accuracy of the "as installed" information indicated on the prints with its signature. Then deliver as a submittal to the PROJECT MANAGER for review and approval both the field developed prints and the final signed prints as a condition precedent to the CITY'S release of any retained funds.

9. EXCAVATION SHORING, FORMS, AND FALSEWORK

- A. Whenever Work under the Contract involves trench excavation five (5) feet or more in depth, or any kind of shoring, design and prepare plans for the required shoring, bracing, and sloping. In addition to the Division 2 specified requirements, submit plans and calculations to the PROJECT MANAGER in advance of excavation to ensure workers' protection from the hazard of caving ground during the excavation. If such plan varies from the shoring system standards established by the Cal-OSHA Construction Safety Orders, the plan shall be prepared by a California registered civil or structural PROJECT MANAGER employed by the CONTRACTOR, and include all costs therefore in the price named in the Contract for completion of the Work as set forth in the Contract Documents. Nothing in this Article shall be deemed to allow the use of a shoring, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this Article shall be construed to impose liability on the CITY, PROJECT MANAGER, INSPECTOR, or any of their officers, agents, representatives, or employees.

- B. Secure approval, in advance, from authorities concerned for the use of any bridges proposed by it for public use. Temporary bridges shall be clearly posted as to load limit, with signs and posting conforming to current requirements set forth in the Traffic Manual published by the California Department of Transportation, covering "signs". This manual shall also apply to the street closures, barricades, detours, lights, and other safety devices required.
- C. Comply fully with the requirements of the Cal-OSHA Construction Safety Orders, regarding the design of forms, false work, and shoring for concrete placement, and the inspection of same before placement of concrete. Where the Construction Safety Orders requires the services of a civil PROJECT MANAGER registered in the State of California to approve design calculations and Working Drawings of the false work or shoring system, to inspect such system prior to placement of concrete, employ a registered civil PROJECT MANAGER for these purposes, and all costs therefore shall be included in the price named in the Contract for completion of the Work as set forth in the Contract Documents.
- D. No Work under this Article shall start until the PROJECT MANAGER has accepted the plans and the CONTRACTOR has obtained permits required and furnished a copy to the PROJECT MANAGER.

10. SUBMITTALS

- A. Furnish a schedule and list of required submittals to the PROJECT MANAGER, in accordance to CONTRACTOR'S CONSTRUCTION SCHEDULE AND REPORTS of these General Requirements, including required submittals by Subcontractors.
- B. Wherever called for in these specifications or on the plans, or where required by the PROJECT MANAGER, furnish to the PROJECT MANAGER for review 10 copies of each submittal. The term "submittal" as used herein shall be understood to include detail design calculations, design drawings, Shop Drawings, Working Drawings fabrication and installation drawings, erection drawings, lists, graphs, operating instructions, catalog sheets, data sheets, samples, and similar items. Unless otherwise required, Submit said submittals to the PROJECT MANAGER at a time sufficiently early (see paragraph F. below) to allow review of same by the PROJECT MANAGER and to accommodate the rate of construction progress required under the Contract without delaying the Contract Work and with due regard for the possibility of resubmittals. Submittals shall be in English.
- C. Design or Shop Drawings or other submittal shall be accompanied by the standard "CONTRACTOR'S SUBMITTAL TRANSMITTAL" form. A submittal not accompanied by such a form, or where all applicable items on the form are not completed, or are incorrectly completed, may be returned, at the PROJECT MANAGER'S discretion, for resubmittal.
- D. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates a review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the PROJECT MANAGER.
- E. Shop Drawings shall show in detail the size, sections, and dimensions of all the member(s); the arrangement and construction of all connections and joints; all holes, straps, and other fittings required for attaching Work; and other pertinent details. When required, PROJECT ENGINEERING computations shall be submitted. Be responsible for delivering reviewed copies of Shop Drawings to all others whose Work is dependent thereon. Maintain at the site of the Project, a complete file of approved Shop Drawings and manufacturers' data for this Project, at all times.
- F. Except as may otherwise be provided herein, the PROJECT MANAGER will make a reasonable attempt to return prints of each submittal to the CONTRACTOR, with its comments noted thereon, within 30 calendar days following their receipt by the PROJECT MANAGER. It is considered reasonable that the

CONTRACTOR shall make a complete and acceptable submittal to the PROJECT MANAGER by the second submission of a submittal item. The CITY reserves the right to withhold moneys due the CONTRACTOR to cover additional costs of the PROJECT MANAGER's review beyond the third submittal. Submittal will be returned to the CONTRACTOR with one of three (3) markings:

- G. If three (3) copies of a submittal are returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN/PROCEED," formal revision and resubmission of said submittal will not be required.
- H. If three (3) copies of a submittal are returned to the CONTRACTOR marked "MAKE CORRECTIONS NOTED/PROCEED CONDITIONALLY," formal revision and resubmission of said submittal will not be required.
- I. If one (1) copy of a submittal is returned to the CONTRACTOR marked "REJECTED-RESUBMIT/DO NOT PROCEED," revise said submittal and resubmit TEN (10) copies of said revised submittal to the PROJECT MANAGER.
- J. Work for which Shop Drawings are required shall be performed in accordance with the reviewed and approved copies. Fabrication of an item shall not commence before the PROJECT MANAGER has reviewed the pertinent submittal and returned the copies to the CONTRACTOR marked either "NO EXCEPTIONS TAKEN/PROCEED," or "MAKE CORRECTIONS NOTED/PROCEED CONDITIONALLY." Revisions indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for claims for extra Work.
- K. CONTRACTOR submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR prior to submission to the PROJECT MANAGER. Each submittal shall be dated, signed, and certified by the CONTRACTOR as being correct and in strict conformance with the Contract Documents. No consideration for review by the PROJECT MANAGER of any CONTRACTOR submittal will be made for any items that have not been so certified by the CONTRACTOR. Non-certified submittals will be returned to the CONTRACTOR without action taken by the PROJECT MANAGER, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.
- L. The PROJECT MANAGER's review of CONTRACTOR submittal shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions and conformance to the specifications. Assume all responsibility and risk for any misfits due to any errors in the submittal. Any fabrication or other Work performed in advance of the receipt of accepted submittals shall be entirely at the CONTRACTOR's risk and expense. Be responsible for the dimensions and the design of adequate connections and details.

11. SUBSTITUTIONS AND "OR EQUAL" SUBMITTAL

- A. Make "Or Equal" submittals within thirty (30) calendar days after issuance of Notice-to-Proceed. A request or submittal received after the specified period will be considered as NOT EQUAL to that so specified and will be processed as a substitution described hereinafter.
- B. Clearly identify manufacturers' data submitted to the PROJECT MANAGER for review and acceptance each proposed substitute with the corresponding Contract Drawing detail and Specification section. If the PROJECT MANAGER decides to accept for use in the Project a material, process or article which is not the equal of that specified, make substitution in the manner described in Article 52 CHANGES AND EXTRA WORK of the General Conditions, with a credit to the CITY for the difference in value.
- C. The PROJECT MANAGER will determine whether the material offered is equivalent to that specified. Any revision to structures, piping, mechanical, electrical, instrumentation, or any other Work made necessary by such substitution must be approved by the PROJECT MANAGER, and the entire cost both direct and indirect of these revisions shall be borne by the CONTRACTOR.
- D. Materials, processes, or articles may be requested as a substitution by the CONTRACTOR, in lieu of that

specified, under the following conditions:

1. Submit in writing and in the manner described in SUBMITTAL of these General Requirements.
2. Submit thirty (30) calendar days before starting the Work, as established by the PROJECT MANAGER, so as not to cause any delay in completion of the Project. No other request will be considered after expiration of the period specified, except that in exceptional cases where it is determined to be in the best interest of the CITY, as approved by the PROJECT MANAGER.
3. Agree to pay for all PROJECT ENGINEERING and design services, if required, to make changes and adjustments in material and Work of trades directly or indirectly affected by the substitute, to the satisfaction of the PROJECT MANAGER, at no cost to the CITY.
4. All requests for substitution shall be made through the CONTRACTOR. Submissions by the CONTRACTOR shall imply the CONTRACTOR's approval of such substitution.
5. No requests for substitutions will be considered during the bidding period.
6. Furnish adequate data with each request for approval of a substitute to enable the PROJECT MANAGER to evaluate the proposed substitution.

MATERIALS, EQUIPMENT, AND APPLIANCES

12. SURVEYING

A. DEFINITIONS

1. CONTRACTOR's Surveyor - Shall be a registered (licensed) Land Surveyor or Registered Civil Engineer authorized to practice land surveying by the State of California in compliance with Business and Professions Code Section 8700, *et. Seq.* cited as the Land Surveyor's Act.
2. Construction Stakes - Durable markers that will maintain elevations, station, and offset for the duration of use as reference markers for construction.
3. Surveying - Described in Section 8726 of the Land Surveyor's Act.
4. Survey Manual - City of Los Angeles, Bureau of PROJECT ENGINEERING Manual, Part J – Survey.

B. SURVEY SERVICES

1. The CONTRACTOR's Surveyor shall comply with State Law and the latest edition of the Standard Specifications for Public Works Construction, "Green Book", and its supplement.
 - a. The contractor shall employ the Contractor's Surveyor.
 - b. All work shall utilize CCS 83, Zone 5, and NAVD 88 control systems.
 - c. CONTRACTOR's Surveyor to utilize horizontal & vertical control provided by PROJECT MANAGER and referenced on drawings.
 - d. Work shall conform to the lines, elevations, and grades shown on the plans.
 - e. CONTRACTOR's Surveyor shall notify the PROJECT MANAGER, in writing, of all material discrepancies between existing survey control and the current Work. Any material discrepancies shall be resolved prior to start of construction.
 - f. During progress of construction, CONTRACTOR's Surveyor to provide surveying services as necessary, or as requested by PROJECT MANAGER or INSPECTOR, to assure construction complies with Contract Documents.

- g. CONTRACTOR's Surveyor shall fulfill duties of "PROJECT MANAGER" described in Standard Specifications for Public Works Section 2.9, Surveying, except that the City forces shall be notified 7 days prior to the CONTRACTOR disturbing any street centerline control monuments so they can be preserved by City forces.
 - 2. Safety - CONTRACTOR's Surveyor shall conform to recommended safety standards for all Work, as set forth in the latest edition of Work Area Traffic Control Handbook (WATCH) adopted by the City of Los Angeles Board of Public Works. Compliance with the Confined Space Regulations in the California Code or Regulations, Title 8, Section 5157 of the Cal/OSHA Safety Orders is mandatory.
- C. CONSTRUCTION SURVEYS:
- 1. Conform to Survey Manual Part J, Section J 600 of Bureau of PROJECT MANAGER.
 - 2. CONTRACTOR's Surveyor - Provide all reference stakes and form checks necessary for construction and inspection of improvements. Document construction staking in survey field notes as described in Part C.4 in this Article. Staking may include, but is not limited to - removals, joins, rough grade, slope, utilities, storm drain, sewer, curb, walk, paving, wall, tunnels, building stakes and other staking necessary for construction and inspection.
 - 3. Form Checks - CONTRACTOR's Surveyor to check forms where durable points may be disturbed, removed, or is impractical to be used to verify the design location. Record measured location in survey field notes as described in Part C.4 in this Article. Notify PROJECT MANAGER of all variations from plan locations.
 - 4. Staking Interval and Offset Lines - Staking intervals shall be in accordance with Survey Manual, Figure J 615.225A. CONTRACTOR's Surveyor to set stake lines at an offset distance from the improvement to ensure proper grade, station and alignment.
 - 5. Utility Stakes - CONTRACTOR's Surveyor shall provide stakes for utilities, public or private, which require location or relocation unless PROJECT MANAGER states otherwise.

13. SITE INVESTIGATION

- A. Before beginning the Work, inspect related and appurtenant Work and report in writing to the PROJECT MANAGER conditions which will prevent proper completion of the Work. Except as provided for in Article 53, DIFFERING SITE CONDITIONS, of the General Conditions, failure to report any such conditions shall constitute acceptance of all site conditions, and required removal, repair, or replacement caused by unsuitable conditions shall be performed by the CONTRACTOR at its sole cost and expense without any adjustment in the Contract Price or extension of the Contract Completion Date.

14. INSPECTION OF THE WORK

- A. Whenever the CONTRACTOR intends to carry on the Work of this Contract on a Saturday, Sunday, or holiday, or more than two eight (8) hours a day shifts on Monday through Friday, or any variation in the time of the workday as set forth in the GENERAL CONDITIONS, length of the workday and work week, notification shall be given to the INSPECTOR and the PROJECT MANAGER of such intention at least forty-eight (48) hours in advance so that inspection may be arranged. No Work shall be allowed during these times without the approval of the INSPECTOR and no demolition will be permitted on Saturdays, Sundays, or holidays without the prior approval of the Board. All CITY inspection required by the CONTRACTOR on holidays, weekends and overtime for the sole convenience of the CONTRACTOR shall be accomplished at the sole expense of the CONTRACTOR by issuance of a deductive Change Order.
- B. Conduct the Work under the general observation of the PROJECT MANAGER and be subject to inspection by the INSPECTOR to ensure compliance with the requirements of the Contract Documents. Such inspection may include mill, Plant, shop or field inspection, as required. The INSPECTOR shall be permitted access to all parts of the Work, including Plants where materials or equipment are manufactured or

fabricated. Materials and articles furnished by the CONTRACTOR shall be subject to inspection, and no materials or articles shall be used in the Work until they have been inspected and accepted by the INSPECTOR.

- C. Do not backfill, bury, cast concrete, hide or otherwise cover Work until it has been inspected by the INSPECTOR, and other Agencies from which a permit is required. Whenever the CONTRACTOR is ready to backfill, bury, cast in concrete, hide, or otherwise cover any Work under the Contract, notify the INSPECTOR not less than forty-eight (48) hours in advance to request inspection before beginning such Work of covering. Failure of the CONTRACTOR to notify the INSPECTOR at least forty-eight (48) hours in advance of such inspections will be cause for the INSPECTOR to require a sufficient delay in the progress of Work to allow time for such inspections and any remedial or corrective Work required, and costs of such delays, including its effect upon other portions of the Work, shall be borne by the CONTRACTOR. Work so covered in the absence of inspection shall be subject to uncovering at the sole expense of the CONTRACTOR. Where uninspected Work cannot be uncovered, such as in concrete cast over reinforcing steel, such Work shall be subject to demolition, removal, and reconstruction under proper inspection, and no additional payment will be allowed therefore.
- D. The presence of the PROJECT MANAGER or the INSPECTOR, shall not relieve the CONTRACTOR of the responsibility for the proper execution of the Work in accordance with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the PROJECT MANAGER or the INSPECTOR. If the CONTRACTOR fails to replace any defective or damaged Work or material after reasonable notice, the INSPECTOR may cause such Work or materials to be replaced. The replacement shall be deducted from the amount to be paid to the CONTRACTOR, otherwise the CONTRACTOR shall pay the CITY if there remains insufficient or no amount to be paid by the CITY to the CONTRACTOR.
- E. The INSPECTOR will have the right, at all times and places, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of these specifications, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work at the site. If the INSPECTOR, through an oversight or otherwise, has not rejected materials or Work which is defective or which is contrary to the specifications, such material, no matter in what stage or condition of manufacture, delivery, or erection, may be rejected by the INSPECTOR upon discovery. Promptly remove rejected articles or materials from the site of the Work after notification of rejection. Costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the CONTRACTOR.
- F. At the completion of Work, after completion of all corrections, a final inspection will be made by the INSPECTOR, the PROJECT MANAGER, and the CONTRACTOR, as applicable. The INSPECTOR will provide a Final Inspection Correction List itemizing all Work necessary to complete the Project satisfactorily.

15. SAMPLING, TESTING AND FABRICATION INSPECTION

A. GENERAL

- 1. Materials and fabricated articles furnished by the CONTRACTOR may be subject to inspection and testing and no materials or fabricated articles shall be incorporated into the Work until they have been accepted by the INSPECTOR. The CONTRACTOR shall ensure that all items requiring shop inspection are inspected at their source as required by the CONTRACT.
- 2. Fabrication may be subject to inspection by the INSPECTOR, to ensure strict compliance with the requirements of the Contract Documents. Such inspection may include mill, plant, shop or field inspection, as required. The PROJECT MANAGER or INSPECTOR shall be permitted access to all parts of the Work, including Plants where materials or equipment are manufactured or fabricated. When a third party inspector is approved, meetings may be scheduled with the PROJECT MANAGER or INSPECTOR at the manufacturing facility to review the progress of the Work and the

inspection activities.

3. Fabricate items using Shop Drawings that have been submitted to the PROJECT MANAGER and approved in accordance with SUBMITTALS of the GENERAL REQUIREMENTS. Provide shop inspection on materials and/or equipment so designated on the CONTRACTOR's approved Shop Drawings.
4. Material which is subject to or requires shop inspection and arrives at the job site without inspection by the INSPECTOR will be rejected by the INSPECTOR and shall be removed from the job site by the CONTRACTOR at the CONTRACTOR's sole expense.

B. SAMPLES AND TEST SPECIMENS

1. CONTRACTOR shall obtain, perform and pay for all testing. Testing shall be performed at a certified laboratory approved by the PROJECT MANAGER.
2. Samples and test specimens required under these specifications shall be furnished, prepared for testing, and delivered, to the approved testing laboratory at no cost to the CITY.
3. In addition to any other inspection or quality assurance provisions that may be specified, the PROJECT MANAGER or the INSPECTOR shall have the right to independently select, test, and analyze, at the expense of the CITY, additional test specimens of any or all of the materials to be used. Whenever any portion of the Work fails to meet the requirements of the specifications as shown by the results of independent testing or investigation all costs of such independent inspection and investigation, and all costs of removal, correction, and reconstruction or repair of any such Work shall be borne solely by the CONTRACTOR.
4. When the manufacturer, fabricator, supplier, or subcontractor provides the results of tests from samples taken at the mill, factory, or warehouse, the PROJECT MANAGER or INSPECTOR will accept the test reports provided the following conditions are met:
 - a. The Testing Agency was approved by the PROJECT MANAGER or INSPECTOR prior to performing the tests, and that all necessary certifications were valid at the time the tests were performed.
 - b. The tests were performed in conformity with the specifications for the specified materials or items.
 - c. The reports are made in the form of an affidavit specified hereinafter.
5. Whenever the approved independent testing laboratory or inspector takes samples of materials other than at the site, the deliveries to the site of materials represented by such samples shall be identified as specified for the specific material. The results of such tests shall be reported to the INSPECTOR in the form of affidavits attested to by the testing agency. Such affidavits shall furnish the following information with respect to the material sampled:
 - a. Manufacturer's name and brand.
 - b. Place of sampling.
 - c. Sufficient information to identify the lot, group, bin, or silo from which the samples were taken.
 - d. Amount of material in the lot sampled.
 - e. Statement that the material has passed the requirements.
 - f. Notarized signature and title of the person making the affidavit and the date of execution of the affidavit.
6. **THIRD PARTY INSPECTION REQUIREMENTS**
 - a. The proposed third party inspection and/or testing company must gain approval by the PROJECT MANAGER after award. Obtain this approval before producing any material or

manufacturing any product or equipment. The approved inspection and/or testing agency shall not sublet or assign its Work to any other agency.

- b. Comply with requirements as identified in the CONTRACT.
- c. The Work and activities of the third party inspection and/or testing agency shall be monitored by the INSPECTOR during meetings to ensure compliance with the Contract Documents.

7. THIRD PARTY TESTING AND INSPECTION LABORATORY APPROVAL PROCEDURES

- a. The PROJECT MANAGER will approve third party inspection and/or testing agencies/laboratories.
- b. Requests for approval of a third party inspection agency and/or test laboratory shall be in writing from the CONTRACTOR to the PROJECT MANAGER.
- c. The letter requesting approval of a third party test laboratory and/or private inspection agency shall contain all of the following information:
 - i. Complete title of Project.
 - ii. Project Work order number.
 - iii. Name of proposed testing laboratory or inspection agency.
 - iv. Address and telephone number of proposed testing laboratory/inspection agency.
 - v. Contact person at proposed testing laboratory/inspection agency.
- d. The PROJECT MANAGER will notify the CONTRACTOR by letter if the testing laboratory/inspection agency has been approved.

16. GUARANTY/WARRANTY

- A. The CONTRACTOR shall and does hereby warrant and guaranty that Work executed under this Contract will be free from defects of materials and workmanship for a period of one (1) year from the date of final acceptance of the Project by the Recreation and Park Commission, except certain specific items of Work, materials and equipment requiring a guaranty or warranty for a greater period of time as hereinafter specified. In the event, that portions of the Work are sufficiently complete to allow use or occupancy by the CITY in the manner and for the purposes intended prior to final completion and acceptance of the Project, the guarantee period for those portions will commence on the date shown on the Statement of Partial Completion.
- B. The CONTRACTOR hereby agrees to indemnify and save harmless the CITY, and their officers, agents and employees against and from all claims and liability arising from damage and injury due to said defects. The CONTRACTOR shall repair or replace, at no cost to the CITY, any and all such defective Work and all other Work damaged thereby, which becomes defective during the term of the above-mentioned guaranties and warranties.
- C. Within thirty (30) calendar days prior to completion of all Work the CONTRACTOR shall submit to the PROJECT MANAGER original copies of all manufacturers guaranties covering all supplied and installed equipment and, where applicable, systems.
- D. In addition to the requirements of Contract Bonds, of the General Conditions, it shall be understood that the Surety for the faithful performance bond, submitted in conformance with the terms of the Contract for this Project, is liable on its bond for all obligations of the CONTRACTOR including guaranty provisions.
- E. The CONTRACTOR shall, within twenty-four (24) hours of notice from the PROJECT MANAGER of any Work not in accordance with the requirements of the Contract, or any defects in the Work, commence and prosecute with due diligence all work necessary to fulfill the terms of this Article and to complete the Work within a period of time as approved by the PROJECT MANAGER. In the event of failure by the

CONTRACTOR and/or its surety to respond to the notice or to complete the Work required by this Article within the time specified, the CITY shall proceed to have such Work done at the CONTRACTOR's expense. The CONTRACTOR or its Surety shall promptly reimburse the CITY all direct and indirect cost associated with performing this Work.

17. STORAGE OF MATERIALS AND EQUIPMENT

- A. Store and protect materials and equipment in accordance with the manufacturer's instructions, with seals and labels intact and legible. Exercise measures necessary to ensure preservation of the quality, quantity, and fitness of the materials or equipment and perform the manufacturers recommended maintenance of the material or equipment. Absorb any and all cost incurred to store, protect, and maintain the materials and equipment without modification to the Contract Amount.
- B. Do not store construction materials in streets, roads, or highways for more than 5 days after unloading. Materials or equipment not installed or used in construction within 5 days after unloading shall be stored elsewhere by the Contractor at its expense unless authorized additional storage time.
- C. Do not store construction equipment at the worksite before its actual use on the Work, nor after use for more than 5 days after it is no longer needed.
- D. Excavated material, except that which is to be used as backfill in the adjacent trench within three days shall not be stored in public streets unless otherwise permitted. Remove excess material after placing backfill from the site immediately.

PROGRESS OF THE WORK

18. CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK

- A. After notification of award and prior to start of any work, the Contractor shall submit its Schedule of Values to the Project Manager for review and approval. Upon approval of the Schedule of Values, and prior to start of any contract work, other than mobilization, the Contractor shall submit its Baseline Schedule to the Project Manager for acceptance. The Baseline Schedule shall be based on the approved Schedule of Values. The approved Schedule of Values work items shall be the basis for the construction elements for the accepted Baseline Schedule and the Monthly Billing items. As a minimum the Baseline Schedule shall indicate the work plan of all specifications sections. The Baseline Schedule shall include, but is not limited to: all items noted on I.2.a. through I.2.f. and I.2.h. through I.2.o. The Baseline Schedule shall recognize the protection, removal, or relocation of utilities and how they affect construction. The Baseline Schedule shall also reflect completion of all work under the Contract within the specified time and in accordance with the Specifications.

Unless otherwise provided, the Contract time shall commence as indicated in the Notice-to-Proceed letter. The Work shall start within 10 days thereafter, and be diligently prosecuted to completion within the time provided in the Specifications or as modified through change order.

Upon acceptance of the Baseline Schedule by the Project Manager, the Contractor shall maintain a copy of the accepted schedule in the jobsite office, recording thereon progress of the work at the end of each calendar week.

- B. Methodology: The Baseline Schedule and all Updated Progress/Recovery Construction Schedules (UPRS) shall be in the form of a Critical Path Method schedule showing chronological relationship of all activities of the project. The principles and definitions of the terms used herein shall be as set forth in the Associated General Contractor's publication "As-Planned CPM Schedule - Handbook", latest edition. To the extent there are any conflicts between the Associated General Contractor's publication and the Specifications, the Specifications shall govern. The Contractor shall utilize Primavera Sure-Trak 3.0 or Microsoft Project 2000 as the computer program for formatting the Baseline Schedule, and subsequent updated schedules.
- C. The Contractor shall have the right to complete the job in advance of the scheduled completion date and within the allowable days allotted for the project. In the event that the Contractor elects to finish the project in advance, a Change Order shall be issued to reflect reduced duration and revised completion date. The

Contractor shall not be entitled to any additional compensation for early project completion.

- D. A schedule showing the Work completed in less than the Contract Time, which has been accepted by Owner and amended by Change Order, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the Work and Contract Substantial Completion. Project Float is a resource available to both City and Contractor. No compensation shall be due to the Contractor for use of this float time by either party.
- E. Float Ownership: Neither City nor Contractor owns float. The Project owns the float. As such, liability for delay of any Substantial Completion date rests with the party whose actions, last in time, actually cause delay to a Substantial Completion date.
- F. The Contractor shall forward to the General Manager, along with the monthly Request for Payment, the Updated Schedule, referred to in Section B of this Article, indicating the progress of any part of the work not up to Baseline Schedule, stating the existing status, cause of delay, impact of change orders and approximate time of completion.
- G. If the Contractor should fall behind the progress schedule by more than one month, the Contractor must provide the General Manager with an Updated Progress/Recovery Schedule (UPRS). Failure to comply with the full requirements of this Article shall be cause for withholding all future progress payments until full compliance. Failure to provide more than 2 consecutive Updated Schedules or UPRS shall constitute grounds for cancellation of the project.
- H. The Department reserves the right to request a two-week "look ahead" schedules if the Department determines that the submitted UPRS does not reflect the as-built condition, manpower utilization or sequential progress necessary to fulfill the intent of the UPRS.
- I. Network Details:
 - 1. The Schedule shall include time-scaled network diagram, based on working days, as well as tabulations. It shall be constructed to show the order in which the Contractor proposed to carry out the Work, to indicate restrictions of access and to show availability of work areas, and availability and use of manpower, materials and equipment. The Contractor shall utilize the Schedule in planning, scheduling, coordinating, and performing the Work under the Contract (including activities of Subcontractors, equipment vendors, and Suppliers). Provide the Project Manager with written confirmation of the concurrence of listed trade Subcontractors and Suppliers with the Schedule. Major trade Subcontractors and Suppliers shall approve the Schedule before they are submitted.
 - 2. The Schedule shall provide the Project Manager and Inspector with a tool to monitor and follow the progress of all phases of the Work. The Schedule submitted to the Project Manager shall comply with all limits imposed by the scope of Work, and with all constraints, restraints or sequences included in the Contract. The degree of detail shall include factors to the satisfaction of the Project Manager, including, but not limited to:
 - a. Physical breakdown of the Project including estimated starting and completion dates of activities.
 - b. Float Time.
 - c. Contract milestones and completion dates, building occupancy date, constraints, restraints, sequences of Work shown in the Contract, the maintenance period and the final completion date. Durations shall be in calendar day.
 - d. Type of Work to be performed, and the sequences.
 - e. Purchases, submittals, submittal reviews, manufacturing, tests, delivery, and installation activities for all major materials and equipment.
 - f. Deliveries of City furnished equipment and/or materials in accordance with the dates or schedule windows of such items set forth in the Contractor furnished by the Project Manager,

or items to be salvaged and delivered to the City.

- g. Preparation, submittal and approval of Shop Drawings and material samples showing a thirty (30) day minimum time specified for the Project Manager's review of normal or routine submittals. A forty (40) day review time for all major submittals and the same time frame shall be allowed for at least one (1) re-submittal on all major submittals.
 - h. Impact of Change Orders issued to the Contract.
 - i. Approvals required by regulatory agencies or other third parties.
 - j. Plans for all subcontract Work.
 - k. Access to and availability of Work areas including all anticipated shutdowns.
 - l. Identification of linkage between preceding, concurrent and follow-on Sub- contractors and utilities that are shown on the Plans or called out in the Specifications.
 - m. Actual tests, submission of test reports, and approval of test results.
 - n. Training and classes required under the Contract.
 - o. Pre-Final and Final Inspection punch lists and final cleanup, allow time for preparation of the punch lists.
 - p. Clearly identify any manpower, material, or equipment restrictions, as well as any activity requiring unusual shift Work, specified overtime, or Work at times other than regular days or hours.
3. Durations of the labor, equipment, and materials required to perform each activity shall be based on a normal work day unless otherwise approved by the Project Manager.
 4. Critical or near critical paths resulting from the use of manpower or equipment restraints shall be kept to a minimum. Near critical paths shall be defined as those paths having fifteen (15) working days or less of total float as shown on the accepted Baseline Schedule.
 5. Time scale shall show a continuous flow of information from left to right. The critical path shall be clearly and graphically identified on the schedule.

J. SCHEDULE REPORTS

1. The Schedule submitted to the Project Manager shall include the time scaled network diagram. Network diagrams shall be based on early start and early finish dates of activities shown and any related calculations generated by the scheduling program which describes the events and activities depicted.

K. APPROVAL OF BASELINE SCHEDULE

1. Acceptance Process:
2. The Project Manager will accept or reject, in writing, the Contractor's submission within fourteen (14) days after receipt of required information. The Construction Schedule, once accepted, becomes the Baseline Schedule which shall be used for monitoring and evaluating all facets of Contract performance, including, but not limited to: payment progress, changes, and delays.
3. Revise the Schedule, periodically per B, F, G, and H of this Article.

L. REVISIONS TO ACCEPTED BASELINE SCHEDULE

1. No change to the accepted Baseline Schedule shall be made without the prior written approval of the Project Manager.

M. UPDATES TO ACCEPTED BASELINE SCHEDULE AND PROGRESS PAYMENTS

1. Updated Schedules or UPRS:

- a. See Section F of this Article.
- b. The Update Report shall show the activities or portions of activities completed during the reporting period and their total value as the basis for the Contractor's monthly request for payment. Payments made pursuant to Partial Payments of these General Requirements will be based on the total value of such activities completed or partially completed after verification by the Inspector. The report shall state the percentage of the Work actually complete as of the report date.

N. RESPONSIBILITY FOR COMPLETION

- 1. Whenever it becomes apparent from the Updated Schedule or UPRS that phasing, milestone, constraint, restraint, or Contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
 - a. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of Work.
 - b. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog or Work. Contractor shall be responsible for all additional costs associated in having the Inspector present at the job site for all periods in excess of the basic work day.
 - c. Reschedule the Work in conformance with the Specification requirements.
- 2. Before implementing any of the above actions, the Contractor shall notify and obtain written approval from the Project Manager.
- 3. Under no circumstances will the addition of equipment or construction forces, increasing the working hours or any other method, manner, or procedure to return to the contractually required completion date be considered justification for a Change Order or be treated as acceleration where the need for a UPRS has been caused by the Contractor and/or its Subcontractors or Suppliers, at any tier.
- 4. The Project Manager may elect to withhold progress payments until the Contractor's progress indicates that the milestone date(s) and/or the Contract completion date will be met.

19. WORK BY CITY OR OTHERS

- A. Be responsible for ascertaining the nature and extent of any simultaneous, collateral and essential work by others. The CITY, its employees and contractors, and others, shall have the right to operate within or adjacent to the worksite to perform such Work.
- B. The CITY, the CONTRACTOR, and each of such employees, contractors and others, shall coordinate their operations and cooperate to hold interference to a minimum.
- C. Include in its Bid all costs involved as a result of coordinating its Work with others. The CONTRACTOR shall not be entitled to additional compensation from the CITY for damages resulting from such simultaneous, collateral and essential Work. The CONTRACTOR's coordinating efforts shall include redeployment of his Work forces to other parts of the Work.

PAYMENT FOR WORK

20. PARTIAL PAYMENTS (Revised as of 02/12/16)

- A. Unless otherwise prescribed by law, three (3) working days prior to the last work day of each month, or other such date mutually agreed upon by the CONTRACTOR and the INSPECTOR, the CONTRACTOR shall prepare and submit to the INSPECTOR, an estimate of the cumulative amount and value of acceptable Work performed by the CONTRACTOR at the jobsite up to that date. Said amount shall also include the value of all acceptable materials and equipment for the Contract that have been delivered and suitably stored but not yet used in the Work, subject to the requirements of PAYMENTS FOR MATERIALS OR EQUIPMENT DELIVERED AND STORED ON THE JOBSITE and PAYMENT FOR MATERIALS OR

EQUIPMENT STORED OFF THE JOBSITE of these General Requirements.

- B. Payments for undelivered, specifically manufactured equipment to be incorporated into the Work, excluding "off the shelf " or catalog items, will be made when all of the following conditions exist:
 - 1. The equipment must be specifically designated in the Technical Specifications for partial payment prior to delivery.
 - 2. The equipment to be specifically manufactured for the Project could neither be readily utilized on nor diverted to another job, and,
 - 3. A fabrication period of more than six (6) months is anticipated,
- C. Upon verification and approval by the INSPECTOR, such estimate shall be processed by the INSPECTOR in accordance with the provisions of the California Public Contracts Code.
- D. The CITY may retain a portion of the amount otherwise due to the CONTRACTOR, as follows:
 - 1. Retention of **five percent (5%)** will be held on the original Contract value on each approved payment claim until the amount paid of the original Contract equals fifty percent (50%). The CITY may then, at its sole discretion discontinue further retention on the original Contract value for all subsequently approved payment claims.
 - 2. At any time during the course of the Contract, the CITY may, at its sole discretion, reinstate the **five percent (5%)** retention.
 - 3. Additional deductions will be made from each monthly payment request for amounts due the CITY as follows:
 - a. Equipment or materials furnished by the CITY.
 - b. Services rendered to the CONTRACTOR by the CITY.
 - c. Amounts due the CITY for liquidated damages or penalties under the terms of the Contract.
 - d. Amounts required to be deducted by federal, state, or local governmental authority or other provisions of these Contract Documents.
- E. From the balance thus determined will be deducted the amount of all previous payments, and the remainder shall constitute the monthly payment due the CONTRACTOR. Within thirty (30) calendar days after receipt of the INSPECTOR's recommendation by the Department of the monthly payment due the CONTRACTOR and subject to the deductions provided, herein, the CITY will pay the amount found due.
- F. On lump-sum items the INSPECTOR's estimate of the monthly payment due the CONTRACTOR will not be required to be made by strict measurement, and an approximate estimate will suffice.
- G. The monthly payments may be withheld or reduced, for the following reasons:
 - 1. If the CONTRACTOR is not diligently or efficiently complying with the express intent of the Contract.
 - 2. If there are unresolved Notices of Non-Compliance.
 - 3. If Technical Manuals are not submitted.
 - 4. If Record Drawings are not kept up-to-date.
 - 5. If progress photographs are not submitted, and
 - 6. If construction schedules are not submitted in accordance with these General Requirements.
 - 7. The CONTRACTOR shall promptly submit the following in response to requests by the INSPECTOR:
 - 8. Information and records necessary to determine the cost of the Work for purposes of estimating monthly payment.
 - 9. Itemized statements, in a form satisfactory to the INSPECTOR, of the actual cost of all acceptable

materials delivered by the CONTRACTOR to the site.

- H. The making of any payment to the CONTRACTOR shall not relieve the CONTRACTOR from contractual obligations. These payments shall not be construed as the transfer of ownership of any equipment or materials to the CITY.
- I. Responsibility of ownership shall remain with the CONTRACTOR who shall be obligated to store, protect, repair, replace, rebuild or otherwise restore any fully or partially completed Work or structure for which payment has been made. The CONTRACTOR shall replace any materials or equipment required to be provided under the Contract that may be damaged, lost, stolen, or otherwise degraded in any way prior to acceptance of the Work under the Contract.
- J. At its own expense, the CONTRACTOR has the option, to substitute for any money being withheld by the CITY, securities equivalent to the amount being withheld. Securities eligible for such substitution are bank or savings and loans certificates of deposit or such securities eligible for investment pursuant to California Government Code. Any such security or securities so substituted for monies withheld, shall be owned by the CONTRACTOR who shall receive earned interest.
- K. Such security shall, at the request and expense of the CONTRACTOR, be deposited with CITY or with a State or Federally Chartered Bank as the escrow agent who shall pay such monies to the CONTRACTOR upon notification by the CITY that payment can be made. Such notification will be given at the expiration of sixty (60) calendar days from the date of acceptance of the Work by the Board, or as prescribed by law, provided, however, that there will be a continued retention of necessary securities to cover such amounts as are required by law to be withheld by properly executed and filed notices to stop payment, or as may be authorized by the Contract to be further retained.
- L. Any escrow agreement entered into pursuant to this provision shall contain as a minimum, the following provisions - the amount of securities to be deposited; the terms and conditions of conversion to cash in case of the default of the CONTRACTOR; and the termination of the escrow upon completion of the Contract and the other requirements as herein above provided.

21. PAYMENT FOR MOBILIZATION

A. General Mobilization

- 1. Payment for general mobilization shall be limited to those items of Work described in MOBILIZATION, of these General Requirements.
- 2. The CONTRACTOR shall submit to the PROJECT MANAGER for approval a breakdown of the amount established for mobilization. The payment for each item of mobilization will be made when that item of mobilization has been completed and as specified below:
- 3. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is five percent (5%) or more of the original Contract amount, the total amount earned for mobilization may be up to fifty percent (50%) of the Contract item price for mobilization or five percent (5%) of the original Contract amount, whichever is less will be included in the said estimate for payment.
- 4. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is ten percent (10%) or more of the original Contract amount, the total amount earned for mobilization may be up to seventy-five (75%) of the Contract item price for mobilization or seven point five percent (7.5%) of the original Contract amount, whichever is less will be included in the said estimate for payment.
- 5. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is twenty percent (20%) or more of the original Contract amount, the total amount earned for mobilization may be up to ninety-five percent (95%) of the Contract item price for mobilization or nine point five percent (9.5%) of the original Contract amount, whichever is less will be included in the said estimate for payment.

6. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is fifty percent (50%) or more of the original Contract amount, the total amount earned for mobilization may be up to one hundred percent (100%) of the Contract item price for mobilization or ten percent (10%) of the original Contract amount, whichever is less will be included in the said estimate for payment.
7. After acceptance of the Contract by the BOARD, the amount, if any, of the Contract item price for mobilization in excess of ten percent (10%) of the original Contract amount will be included for payment in the final monthly payment.
8. The Contract lump sum price paid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the Work involved in mobilization as specified herein.
9. The adjustment provisions in PAYMENT FOR CHANGES AND EXTRA WORK of these General Requirements, and the retention of funds provisions of PARTIAL PAYMENTS of these General Requirements shall not apply to the Contract lump sum item for Mobilization.
10. When other Contract items are adjusted as provided in PAYMENT FOR CHANGES AND EXTRA WORK of these General Requirements, if the costs applicable to such item of Work include mobilization costs, such mobilization costs will be deemed to have been recovered by the CONTRACTOR by the payments made for mobilization and will be excluded from consideration in determining compensation under said Article.
11. When the Contract does not include a Contract pay item for mobilization as specified above, full compensation for any necessary mobilization required shall be considered as included in the prices paid for the various Contract items of Work involved and no additional compensation will be allowed.

22. PAY ITEM DEFINITIONS

This Article describes methods of measurement and payment for lump sum and unit priced items listed on the Schedule of Work and Prices, contained in the Contract Proposal.

- A. The Contractor shall not take advantage of any apparent error or omission on the Drawings or Specifications, and the PROJECT MANAGER shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents.
- B. All portions of the Work are either in an applicable allowance, lump sum, or unit price item listed on the schedule of Work and Prices. Work for which there is not a separate item will be considered incidental to the contract and no additional compensation shall be allowed.
- C. ALLOWANCES
 1. Fixed allowances may have been allocated to the Schedule of Work and Prices for certain items of work. Requirements for each Allowance Item are specified below or a reference is given to the General Requirements article that describes the work. Allowance item work is to be performed only as directed by the PROJECT MANAGER. Unless otherwise noted, Allowances will be paid on a time and materials basis in accordance with Section C, PARTIAL PAYMENTS of these General Requirements.
 2. If allowance items are not executed or are only partially executed or the allowance for any item is not expended or partially expended, then a deductive change order shall be issued for the amount that is not expended. If, however, these items are over expended then an appropriate change order shall be executed in accordance with, PAYMENT FOR CHANGES AND EXTRA WORK, of these General Requirements.
- D. LUMP SUM ITEMS:
 1. Payment of the lump sum items established in the contractor's Bid under the various line items in the Bid Form shall be full compensation for all labor, materials, and equipment required to furnish, install,

construct, and test the Work covered under the lump sum bid item.

2. Payment for the lump sum items established in the Contractor's Bid shall also fully compensate the Contractor for any other work which is not specified or shown, but which is necessary to complete the Work.
3. Payments for Lump Sum Work other than Mobilization will be based upon physical progress for each activity in accordance with the breakdown of the Lump Sum prices agreed to in the Schedule of Values.

E. UNIT PRICE ITEMS:

1. Payment for all work shall be in accordance with the unit price bid items in the schedule of Work and Prices and shall be full compensation for all labor, materials, and equipment required to furnish, install, construct and test the Work covered under the unit price bid item. Work for which there is not a price schedule item will be considered incidental to the Work and no additional compensation shall be allowed.
2. Payment will be made only for the actual quantities of work performed in compliance with the Drawings and Specifications. The Contractor will receive reimbursement equal to the approved quantity times applicable unit price.

23. SCHEDULE OF VALUES

- A. The Schedule of Values will be used as a basis for determining progress payments on a lump sum Contract or any designated lump sum bid item. The Schedule of Values shall be a schedule of cost loaded construction activities equal, in total, to the lump sum bid and shall be in such form and sufficient detail to correctly represent a reasonable apportionment of the lump sum. Prior to submitting an invoice for payment, the CONTRACTOR shall have submitted a detailed Schedule of Values and obtained approval from the PROJECT MANAGER.
- B. Each lump sum bid item on the Schedule of Work and Prices as set forth in the Bid must be broken down separately. The breakdown of each lump sum bid item must cover the cost of construction required by the plans and specifications for that item. The sum of the values for the construction activities, within a bid item must equal the total amount bid for that item.
- C. Each activity in the Schedule of Values shall delineate one construction activity. For example, the placement of concrete between construction joints, the construction of an electrical duct bank or pipeline between points A & B. The costing for each activity should include all costs for the labor and materials or equipment required to complete the activity. For example, concrete construction activities should include all costs for the forming, placing of reinforcement, placing concrete and curing. The cost for pipeline construction activities should include materials, equipment and installation including pipeline supports or thrust blocks. The excavation and backfill for a pipeline or structure may be separate activities. No non-construction activity shall be cost loaded.

24. NOTICE TO WITHHOLD AND/OR STOP NOTICE

- A. When a "Notice to Withhold" or "Stop Notice" is served upon the CITY, or the BOARD, pursuant to the lien statutes of the State of California, to withhold sufficient funds from payments to the CONTRACTOR in support of a claim resulting from default by the CONTRACTOR in payment for labor or materials used in prosecution of the Contract, the CITY shall withhold from payment due the CONTRACTOR an amount of money equal to the amount of the claim stated in the "Notice to Withhold" or "Stop Notice," and an additional amount equal to twenty-five percent (25%) of the amount of said claim, to defray the costs of litigation in the event of court action on the claim, for a total withholding of one and one quarter times the stated amount of the claim. At the discretion of the CITY, the CITY may allow the CONTRACTOR to file with the CITY the bond referred to in the Civil Code of the State of California after which said monies will not be withheld on account of such "Notice to Withhold" or "Stop Notice."
- B. In the event the Contract is terminated for CONTRACTOR default, any funds due the CONTRACTOR and

retained by the CITY in accordance with PARTIAL PAYMENTS of these General Requirements, shall become the property of the CITY to the extent necessary to repay to the CITY any excess in the Contract price above the cost of the Work completed at the time of termination. After issuance of notice to discontinue Work, no further payments will be made to the CONTRACTOR for the Work covered by the notice until completion of Work and final settlement has been made.

25. FINAL PAYMENT

- A. Final payment to the CONTRACTOR is made following action by the BOARD that formally adopts the recommendation of the PROJECT MANAGER to accept the Contract.
- B. After acceptance of the Work by the BOARD and not more than sixty (60) calendar days after filing Notice of Completion, the CITY will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract, including the following items:
 - 1. Liquidated damages, as applicable;
 - 2. Lien claims or Stop Notices filed on behalf of suppliers, Subcontractors, and labor performed in connection with the Project; except, that upon submittal of a Stop Notice Release Bond issued by an approved Surety Company executed in favor of the CONTRACTOR, the CITY will release such portion of the retainage funds to said CONTRACTOR that is being held solely to cover Stop Notice Claims.
 - 3. No claim of the CONTRACTOR under this Article shall be allowed unless the CONTRACTOR has given the required written notice. Nor shall a claim by the CONTRACTOR for an equitable adjustment hereunder be allowed if asserted after final payment under this Contract.

26. CHANGE ORDER REQUESTS

- A. The CONTRACTOR's quotations for preliminary change orders for extras, changes, additions, or deletions to the Work as described in Article 52 CHANGES AND EXTRA WORK of the General Conditions shall be submitted to the PROJECT MANAGER, in writing, on the Change Order Cost Quotation Form provided by the PROJECT MANAGER, and in conformance with the requirements of PAYMENT FOR CHANGES AND EXTRA WORK of these General Requirements. Examples of these forms are bound at the end of these General Requirements. The quotation shall be firm for a period of not less than sixty (60) calendar days from the date of receipt of the quotation by the PROJECT MANAGER. Submit its written cost quotation and Time Impact Analysis not later than two (2) weeks after being requested to provide such quotation, unless the PROJECT MANAGER allows more time. Delays in submitting quotations beyond the two (2) weeks set forth herein, which cause a delay in the issuance of a Change Order or a delay to the completion date of the Project, shall not be cause for a claim or a time extension under the Contract.
- B. The PROJECT MANAGER's request for quotation on a preliminary change shall not be considered authorization to proceed with the changed Work prior to the issuance of a formal Change Order, unless directed otherwise in writing by the PROJECT MANAGER, nor shall such request constitute justification for a delay to the existing Work or a time extension under the Contract.

27. PAYMENT FOR CHANGES AND EXTRA WORK

Payment to the CONTRACTOR, or credit to the CITY, for any extra, change addition or deletion to the Work under the Contract, or settlement of any claim under the Contract, covered by any Change Order, shall be determined by the methods set forth herein. The PROJECT MANAGER may change the plans and specifications, character of the Work, or quantity of Work provided the total arithmetic dollar value of all such changes, both additive and deductive, does not exceed twenty-five percent (25%) of the Contract price. Should it become necessary to exceed this limitation, the change shall be by written Supplemental Agreement between the CONTRACTOR and the CITY, which shall be executed by a Change Order.

A. LUMP SUM

A total sum for the changed Work may be mutually determined by the PROJECT MANAGER and the

CONTRACTOR. The CONTRACTOR shall furnish a breakdown of the costs satisfactory to the PROJECT MANAGER, of the proposed lump sum, in complete accordance with C through J of this Article. Such lump sum costs shall be full and final compensation as described in D of this Article. All cost proposals for lump sum Change Orders shall be presented in accordance with C through J of this Article.

B. COST REIMBURSEMENT (TIME AND MATERIALS) WORK

The costs of all changed Work submitted under the cost reimbursement (time and materials) method shall be formulated in accordance with the provisions of C through J of this Article.

Additionally, if the method or amount of payment cannot be agreed upon prior to the beginning of the Work, the PROJECT MANAGER may issue a unilateral Change Order in the amount determined reasonable by the PROJECT MANAGER for the changed Work and direct the CONTRACTOR to proceed with the changed Work or the PROJECT MANAGER may direct in writing that the Work be done on a cost reimbursement (time and materials) basis, and the CONTRACTOR shall provide all labor, equipment, and materials necessary to complete the Work in a satisfactory manner and within a reasonable period of time. For Work performed, payment shall be made for the documented actual cost, in accordance with the following provisions.

1. Labor, up to and including general foremen, who are directly assigned to the changed Work. Employees identified as superintendents shall not be charged as labor on changed Work, but shall be covered under overhead costs. These costs shall include actual documented payroll costs including wages, payroll taxes as established by law (i.e., FICA, Federal and State Unemployment Taxes), fringe benefits as established by negotiated labor agreements, and any insurance costs (such as Worker's Compensation and General Liability Insurance but shall not include Automobile Liability Insurance, OCIP coverage, or any other insurance costs which are provided for in B.6 below which are currently assessed against labor costs. A detailed breakdown of the subcomponents of labor costs, by all crafts shall be submitted to the PROJECT MANAGER, by the CONTRACTOR and all SUBCONTRACTORS, for approval, as part of the documentation of labor costs, within forty-five (45) days after issuance of the Notice to Proceed. No other subcomponents of labor costs shall be considered, unless approved in writing by the PROJECT MANAGER.
2. Materials - The cost of materials used in performing the changed Work will be the cost, including sales tax, to the purchaser, whether CONTRACTOR, Subcontractor or other forces, from the supplier thereof, except as the following are applicable:
 - a. Cash or trade discounts available to the purchaser shall be credited to the CITY notwithstanding the fact that such discounts may not have been taken by the CONTRACTOR.
 - b. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost will be deemed to be the price paid to the actual supplier as determined by the PROJECT MANAGER. Markup, except for actual costs incurred in the handling of such materials, will not be allowed.
 - c. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on Contract items or the current wholesale price for such materials delivered to the job site, whichever price is lower.
 - d. If, in the opinion of the PROJECT MANAGER, the cost of materials is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such materials, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned, delivered to the job site less cash or trade discount. The CITY reserves the right to furnish materials for the Work and no claim shall be made by the CONTRACTOR for costs and profit on such materials.
 - e. For the purposes of this Article, a "Supplier" is defined as any person or persons, firm or business, who supplies materials, of construction and/or permanent equipment, but who does

not perform any portion of the Work of the Contract on site, for the CONTRACTOR, except that labor or labor supervision which may be required by some manufacturers as part of their equipment installation for warranty or other purposes.

3. EQUIPMENT COSTS, including ownership, lease or rental costs, as well as operating costs, for individual equipment units whose replacement value is in excess of \$1,000. Transportation and set up costs shall be included, but only if the equipment is imported to the worksite solely to perform Work on the changed Work included in the Change Order and the CONTRACTOR can demonstrate that the changed Work cannot or could not be performed economically with equipment already at the site. Equipment costs shall be determined in accordance with the requirements set forth in H of this Article.
4. SUBCONTRACTOR COSTS, provided that such costs are direct costs to the CONTRACTOR for performing the changed Work as set forth in E of this Article.
5. BOND COSTS on the incremental change in the value of the Contract shall be determined and paid for as set forth in I.1 of this Article.
6. INSURANCE COSTS (other than labor insurance or OCIP coverage) shall be determined and paid for as set forth in I.2 of this Article.

C. GENERAL

1. It is the intent of the CITY to settle all Change Orders full and final at the time the Change Order is issued. Therefore, the following paragraph will be incorporated, in writing, on all Change Orders.

“The compensation (time and cost) set forth in a Change Order comprises the total compensation due the CONTRACTOR, all Subcontractors, and all Suppliers, for the Work or change defined in the Change Order, including impact on unchanged Work. By signing the Change Order, the CONTRACTOR acknowledges and agrees on its behalf and on the behalf of all Subcontractors, and all Suppliers, that the stipulated compensation includes payment for all Work contained in the Change Order, plus all payment for the interruption of schedules, extended field overhead costs, delay, and all impact, ripple effect or cumulative impact on all other Work under this Contract. The signing of the Change Order indicates that the Change Order constitutes full mutual accord and satisfaction for the change, and that the time and/or cost under the Change Order constitutes the total adjustment to price or time or performance owed the CONTRACTOR, all Subcontractors, and all Suppliers as a result of the change. The CONTRACTOR, on behalf of himself, all Subcontractors, and all Suppliers, agrees to waive all rights, without exception or reservation of any kind whatsoever, to file any further claim related to this Change Order. No further claim or request for adjustment of any type, excepting only bond and insurance cost as set forth in these General Requirements of the Contract Documents for any reasonably foreseeable cause shall arise out of or as a result of this Change Order or the impact of this Change Order on the remainder of the Work under this Contract.”

2. Costs which shall not be paid in Change Orders under this Contract include, but are not limited to, interest costs of any type; claim preparation or filing costs; legal expenses; the costs of preparing or reviewing proposed Change Orders or Change Order proposals; lost revenue; lost profits; lost income or earnings; rescheduling costs; costs of idled equipment when such equipment is not at the site or has not yet been employed on the Work; lost earnings or interest on unpaid retainage; claims consulting costs; and the costs of corporate officer or staff visiting the site; any compensation due to the fluctuation of foreign currency conversion or exchange rates; loss of other business; changes in taxes or increased tax rates of any kind or any costs identified as unallowable under the provisions of the Federal Acquisition Regulations.
3. Extensions of time shall be based solely upon the effect of delays to the Work as a whole. Extensions of time shall not be granted for delays to the Work, unless the CONTRACTOR can clearly

demonstrate, through analysis of the current updated schedule, that the delay to the Work as a whole arose or will arise from causes other than normal weather, beyond the control and without fault or negligence of the CONTRACTOR, or any Subcontractor, at any tier, and that such delays did or will, in fact, delay the progress of the Work as a whole. The CONTRACTOR shall not be entitled to a time extension unless it submits a Time Impact Analysis which is a calculation of the extent of the delay to the end date of the Work and which shows that the Work has been or will be extended beyond the current Contract completion date. A Time Impact Analysis is an estimating procedure which utilizes the networking techniques (fragnets) and a written analysis of the facts associated with the alleged delay to demonstrate the effect of the alleged delay on the critical path of the schedule. A "fragnet" is defined as a sequence of new activities and/or activity revisions that are proposed to be added to the existing current updated schedule to demonstrate (mathematically and graphically) the influence of the alleged delay on the end date of the Work and shall be the sole method for incorporating delays and impacts into the schedule. The objective of a Time Impact Analysis is to pinpoint, isolate, and quantify all time impact associated with a specific issue and determine its time relationship to past or current delays. Time extensions shall not be allowed for delays to parts of the Work that are not on the critical path of the currently approved monthly updated Project Schedule. Time extensions shall not be granted, nor delay damages of any kind whatsoever paid to the CONTRACTOR, until all available float, slack, or contingency time on the Project is used and the end date of the Work is moved beyond the current, adjusted Contract completion date.

4. The CONTRACTOR'S Cost Breakdowns submitted under the lump sum method described in paragraph A and its Change Order Quotations submitted under the cost reimbursement (time and materials) method described in paragraph B (including without limitation requests for cost reimbursement for delay, disruption, hindrance and interference associated with extras, changes, additions or deletions) shall be itemized in a manner that, with mathematical certainty and without reliance upon probabilities or inferences, segregates the direct, actual reimbursable costs associated with each individual extra, change, addition, deletion and (on an event-by-event basis) each individual delay or disruption event. Such Change Order Cost Quotations shall not be based, in whole or in part, upon any methodology (such as "total cost" or "modified total cost" methodologies) that purports to calculate the CONTRACTOR'S additional costs of performance of the extra, change, addition or deletion (including without limitation the additional costs of delay, disruption or other impact) based on the difference between CONTRACTOR'S total actual Project or line item costs (with or without fee) and its original bid estimate for the Project or any original bid estimate line item. In connection with the foregoing, CONTRACTOR represents and warrants that it has the ability to generate and maintain complete and accurate cost accounting records that will reflect:
 - a. The actual costs incurred or saved for each individual item of extra work, change, addition, deletion (including without limitation any costs of associated delay, disruption, interference, hindrance and the cumulative impact of each extra, change, addition, deletion on other parts of the Work); and,
 - b. On an event-by-event basis, the effect of each delay or disruption that forms the basis of each request for extension of time, regardless of their scope, number, complexity, cumulative effect, or time of issuance or occurrence.
5. Except as provided in Article 51, COMPENSATION FOR DELAY, DISRUPTION, UNANTICIPATED OVERHEAD of the General Conditions, CONTRACTOR shall have no right to recovery of any compensation, costs, expenses or damages resulting from delay, disruption, interference, or hindrance in the performance of the Work (including without limitation interruption of schedules, excess or extraordinary extended field and indirect overhead costs, loss of productivity and the impact, ripple or cumulative effect on other Work).
6. CONTRACTOR waives any claim or rights and remedies based on abandonment, quantum merit, rescission or other similar legal theory by reason of any of the following circumstances, which the CONTRACTOR acknowledges and agrees are within the reasonable contemplation of the parties:

- a. Extras, changes, additions and deletions to the Work after execution of the CONTRACT and issued from time to time throughout the period of construction, regardless of their scope, number, cumulative value, or complexity, to correct errors, omissions, conflicts, and ambiguities in the Contract Documents, or to implement discretionary changes the scope of Work requested by the CITY;
- b. The issuance and performance of extras, changes, additions and deletions in a manner that is not in sequence with the as-built or as-planned progress of the Work;
- c. Changes due to Differing Site Conditions;
- d. Suspensions of the Work or parts thereof, or limitations on access to portions or all of the Work, for the convenience of CITY or in the interests of the Project;
- e. Delay or disruption to the Work due to failure of the CITY, PROJECT MANAGER or INSPECTOR to timely perform any contractual obligation.

D. OVERHEAD COSTS

To the costs under Paragraphs C.1., C.2., and C.3., above, an added fixed fee to provide compensation for all overhead costs shall be allowed as established in Paragraph E.1 below. This overhead rate is not applicable to the costs under Paragraphs C.4. through C.6. above.

The overhead rates determined in Paragraphs 1 and 2 below shall be applied to all additive and deductive Change Orders, of this Article.

1. GENERAL AND ADMINISTRATIVE OVERHEAD RATE:

- a. An allowance of eight percent (8%) for overhead costs will be allowed to the CONTRACTOR, only when CONTRACTOR uses its own organization to perform a part of the Work under the Change Order based upon the value of labor, material and construction equipment required to accomplish said part of the change Paragraphs C.1., C.2., and C.3.
- b. An allowance of twelve percent (12%) for overhead costs will be allowed to the Subcontractors (at any tier), only when Subcontractors use their own organization to perform a part of the Work under the Change Order, based upon the value of labor, material, and construction equipment required to accomplish said part of the change Paragraphs C.1., C.2., and C.3.
- c. Overhead percentages shall be considered to include all insurance costs other than specifically mentioned in this Article, all field and office supervisors and assistants, all onsite project administration, security costs, the cost of small tools and consumables, incidental job burdens, and all general home office expenses and no separate allowance will be made therefore. Assistants to field and office supervisors include all clerical, stenographic, and general office help. Incidental job burdens include, but are not necessarily limited to, office equipment and supplies, temporary toilets, telephone and conformance to OSHA requirements. Items such as, but not necessarily limited to, review and coordination, estimating, PROJECT MANAGER, scheduling, and expediting relative to Change Orders, and updating and furnishing Record Drawings to incorporate changes, are associated with field and office supervision and are considered to be included in the CONTRACTOR's overhead percentage set forth herein.
- d. For those Change Orders with both additive and deductive costs, the overhead rate shall be determined by the net amount of the additive and deductive work.

E. SUBCONTRACTOR COSTS

- 1. Where Work under the Change Order is performed in whole or in part by a Subcontractor, at any tier, the cost of the Change Order shall include the cost to the Subcontractor. Subcontractor's costs shall be presented in strict accordance with A., B., and C., above, and D. through J. as applicable.
- 2. An additional fixed fee of six percent (6%) based upon the sum of the costs of all Subcontractors, at

any tier, involved in the Work of the Change Order, shall be allowed to the CONTRACTOR for profit and General and Administrative Overhead Costs. An additional fixed fee of six percent (6%) shall be allowed to first tier Subcontractors for profit and General and Administrative Overhead costs for any Work involved in the Change Order that is performed by Sub-subcontractors. No additional fixed fee shall be allowed for Change Order Work performed by Subcontractors to Sub-subcontractors, at any tier.

F. PROFIT

To the costs of C.1., C.2., and C.3., above, plus applicable overhead costs from D.1.a. or D.2.b., if a SUBCONTRACTOR at any tier above, an added fixed fee for Profit shall be allowed as established herein.

1. An allowance of ten percent (10%) for Profit for the party performing the Work under the Change Order, shall be included on all Change Orders that are negotiated full and final in advance of any changed Work being performed.
2. An allowance of five percent (5%) for Profit for the party performing the Work under the Change Order shall be included on all Change Orders where any portion of the Work is performed before the Change Order is executed full and final by both the PROJECT MANAGER and the CONTRACTOR.
3. No added fixed fee for Profit shall be allowed for any cost other than those costs under C.1., C.2., and C.3., of this Article, if Subcontractor at any tier above. No fixed fee for profit shall be allowed on the costs of C.4., C.5., C.6., or F of this Article.
4. On Change Orders with both additive and deductive cost components, the profit allowance on net additive Change Orders shall be based on the Change Order amount after overhead rates have been added. The profit allowance shall be as set forth in Paragraphs 1 and 2 above as applicable. No profit allowance shall be included for net deductive Change Orders.

G. CITY FURNISHED MATERIALS AND EQUIPMENT

The CITY reserves the right to furnish such materials and equipment as it deems expedient, and the CONTRACTOR shall have no claim for profit or overhead on the cost of such materials and equipment.

H. EQUIPMENT COSTS

Full rental costs for rental or leased equipment shall not exceed the rates as set forth in the Rental Rate Blue Book (the Blue Book) published by Dataquest, Inc., Palo Alto, California, as adjusted to the regional area of the Work under this Contract. Owned equipment costs shall not exceed the rates listed in the Cost Reference Guide (the CRG) for Construction Equipment, published by Dataquest, Inc., Palo Alto, California. The most recent published edition in effect at the commencement of actual equipment use shall be used.

1. RENTED OR LEASED EQUIPMENT

- a. For equipment rented or leased (including lease with purchase option) in arm's length transactions from outside vendors, the CONTRACTOR shall be paid the actual invoiced, rented or leased rates provided that the invoiced lease or rental rates do not exceed the rates set forth in the Blue Book. Arm's length rental or lease transactions are those in which the firm involved in rental or lease of such equipment is not associated with, owned by, have common management, directorship, facilities, or stockholders with the firm renting the equipment. Submittal by a CONTRACTOR of a rental or leased invoice from the lessor will be prima facie proof of compliance with the above. However, such invoices are not conclusive proof; if questioned, the burden of proof remains with the CONTRACTOR. In no event shall the leased equipment rate billed to the CITY be at rates exceeding those prescribed in the following table:

Actual Usage (Change Order & Contract Work Combined)	Blue Book Payment Category
--	----------------------------

Less than 8 hours	Hourly Rate
8 or more hours but less than 7 days	Daily Rate
7 or more days but less than 30 days	Weekly Rate
30 calendar days or more	Monthly Rate

b. When in Use:

Actual equipment use time documented by the INSPECTOR or PROJECT MANAGER shall be the basis that the equipment was utilized on the changed Work and paid for under the Change Order. In addition to the lease or rental rate, equipment operating costs shall not exceed the estimated hourly operating rate as set forth in the Blue Book. The hours of operation shall be based upon actual equipment usage on the changed Work as recorded by the INSPECTOR or PROJECT MANAGER. For multiple shift Work sequences, the allowable equipment rate shall not exceed fifty percent (50%) of the base rate, for second or third shifts.

c. When Idle:

Idle equipment is equipment on site and necessary to perform the Work under the change but not in actual use due solely to the impact of the changed Work. Equipment operating costs due to idle time, documented by the INSPECTOR or PROJECT MANAGER, shall be paid at the rate determined in Paragraph I above. Idle time shall include a reasonable time allowance to and from the Project site.

2. OWNED AND OTHER EQUIPMENT

a. Equipment rates for owned equipment or equipment provided in other than arm's length transactions will not exceed the total hourly costs as set forth in the Cost Reference Guide. Adjustments to the listed rates provided for under the section of the Cost Reference entitled "Cost and Production Formulas" shall not be allowed. Except as noted herein below, this equipment hourly rate plus the estimated operating cost per hour from the Cost Reference Guide will be paid for each hour the equipment actually performs Work on the changed Work. Daily records listing the equipment units and their respective operators, identification code, and actual usage on the Work under the Change Order, as certified at the end of each Work day (or work shift if the Work is being performed in multiple work shift sequence) by the INSPECTOR or PROJECT MANAGER shall be the record upon which actual equipment use shall be based. For multiple shift Work sequences, the allowable equipment rate shall not exceed the hourly depreciation and operating costs listed in the Cost Reference Guide, for second or third shifts. It is agreed that this rate shall represent payment in full for all the CONTRACTOR's direct costs.

b. When Idle:

Equipment necessary to be on the site to complete the Work, but not in actual use due solely to the impact of the changed Work, shall not exceed fifty percent (50%) of the hourly rates identified in the "Ownership" column under the heading "Hourly Operating and Overhaul Expenses" set forth in the Cost Reference Guide, provided that its presence and necessity on the site has been documented by the INSPECTOR or PROJECT MANAGER, and further provided that the equipment was idled solely by actions of the CITY. Idle equipment time will only be paid as a function of delays specifically directed or caused by the CITY's actions. In no event shall the idle time claimed in a day for a particular piece of equipment exceed the normal Work schedule established for the Project - usually eight (8) hours per day or forty (40) hours per week, and excluding Saturdays, Sundays, and holidays. For multiple shift Work sequence, the allowable idle equipment rate shall not exceed fifty percent (50%) of the hourly depreciation costs listed in the Cost Reference Guide, for second or third shifts. It is agreed that this rate shall represent payment in full for all the CONTRACTOR's direct costs.

3. EQUIPMENT HAULAGE AND SET UP COSTS

- a. Documented and actual equipment haulage and set up costs shall be paid for, if applicable as set forth in C of this Article.
4. OTHER EQUIPMENT COST GUIDES
- a. In the event that a piece of equipment used on a Change Order is not listed in the Blue Book or the CRG, costs may be derived from the Associated General CONTRACTOR's of America Equipment Ownership Guide, the Associated Equipment Dealers Guide, or the Equipment Rate Guide published by the U.S. Army Corps of PROJECT MANAGERS as adjusted appropriately for the type of Work and use and the regional area of the Work under this Contract.
- I. BONDS AND INSURANCE COSTS
- 1. Bond premium adjustment, consequent upon the Change Orders issued by the PROJECT MANAGER, shall be paid at the time of completion of the Work and will not be included in individual Change Orders. Additional bond costs on the incremental value of all Change Orders issued under the Contract shall be paid for through issuance of a separate Change Order upon receipt, by the PROJECT MANAGER, or a fully paid invoice from the CONTRACTOR's and Subcontractor's sureties. No allowances for overhead or profit shall be included in such separate Change Order.
 - 2. Insurance costs, other than insurance assessed on labor costs, consequent upon the Change Orders issued by the PROJECT MANAGER, shall be paid for by the PROJECT MANAGER at the time of completion of the Work and will not be included in individual Change Orders. Additional insurance costs on the incremental value of all Change Orders issued under the Contract shall be paid through issuance of a separate Change Order upon receipt of a fully paid invoice from the CONTRACTOR's and Subcontractor's insurance carriers. On Contracts where the duration exceeds 365 calendar days from Notice to Proceed, the CONTRACTOR and its Subcontractors will be allowed to submit such fully paid invoices at the end of every year after issuance of the Notice to Proceed, and again at the end of the Project.
- J. RECORDS
- 1. The CONTRACTOR's records shall make clear the distinction between the direct costs of Work paid for under the Change Order and the costs of the base scope Work under the Contract. Furnish the INSPECTOR with daily report sheets in duplicate of each day's cost reimbursement Work no later than the working day following execution of said Work. The daily report sheets shall itemize the materials and equipment used in the Work. The daily report sheets shall provide for identification and classification of workers; the hourly rates of pay and hours worked; and the size, type, identification number, and hours operated for each piece of equipment. The Daily Report sheets shall itemize the materials used in the Work.
 - 2. Substantiate material charges by copies of vendor's invoices. Submit such invoices with the daily report sheets or, if not available at that time, submit with subsequent daily report sheets. Sign daily report sheets by the CONTRACTOR or his authorized agent and the INSPECTOR at the time of submittal.
 - 3. On a weekly basis submit to the PROJECT MANAGER an approximate accounting of the Contract expended on the cost reimbursement Work to date and an estimate of the Impact to the time of performance of Work.

28. PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA

- A. If the PROJECT MANAGER determines that any price, including profit or fee, negotiated in connection with any Change Order under this contract, or any cost reimbursable under this Contract, was increased because:
 - 1. The CONTRACTOR furnished cost or pricing data which was not accurate, complete, and current as certified in the CONTRACTOR's Certificate of Current cost or Pricing Data;

2. A Subcontractor or prospective Subcontractor furnished cost or pricing data was submitted in support of a subcontract cost estimate furnished by the CONTRACTOR but which was not accurate, complete, and current as of the date certified in the CONTRACTOR's Certificate of Current Cost or Pricing Data.
3. The CONTRACTOR or a Subcontractor or prospective Subcontractor, at any tier, furnished any data not within paragraph 1 or 2 above, which was not accurate as submitted;

then price shall be reduced accordingly and the Contract shall be modified in writing as may be necessary to reflect such reduction. However, any reduction in the Contract price due to defective subcontract data of a perspective Subcontractor, when the subcontract was not subsequently awarded to such Subcontractor, will be limited to the amount (plus applicable overhead and profit allowances) by which the actual subcontract or actual cost to the CONTRACTOR if there was no Subcontract, was less than the prospective subcontract cost estimate submitted by the CONTRACTOR; provided that the actual subcontract price was not affected by defective cost or pricing data.

B. The following certification from the CONTRACTOR is required to be provided on all Change Order quotations or requests for adjustment in excess of \$10,000.

1. CERTIFICATION OF CURRENT COST AND PRICING DATA.
2. This is to certify that, to the best of my knowledge and belief, cost or pricing data submitted in writing, or specifically identified in writing if actual submission of the data is impracticable, to the CITY in support of [CONTRACTOR is to insert appropriate identification such as Change Order quotation, proposal quotation, price adjustment, etc.] are accurate, complete, and current as of [CONTRACTOR to insert date].

CONTRACT NO.: _____
 PROPOSED CHANGE ORDER NO.: _____
 FIRM: _____
 NAME: _____
 TITLE: _____
 DATE: _____
 SIGNATURE: _____

29. PAYMENT FOR MATERIALS OR EQUIPMENT DELIVERED AND STORED ON THE JOB

- A. Partial payment for materials or equipment delivered to the worksite and stored shall be subject to the following conditions:
 1. Payment will not be made for any materials or equipment unless each individual piece of the material or equipment becomes a permanent part of the Work and has a value of more than \$5,000.
 2. The material or equipment is required by the specifications, and is specifically manufactured for the Project and could not readily be utilized or diverted to another job.
 3. The CONTRACTOR shall provide secure storage facilities as required in STORAGE OF MATERIALS AND EQUIPMENT of these General Requirements.
 4. No payment will be made for living or perishable Plant material, or for degradable materials such as rock, sand, cement, or for reinforcing steel, miscellaneous piping, off the shelf and catalog items,

and similar items of construction, until they are incorporated into the Work.

5. The payment for the materials or equipment shall not exceed ninety-five percent (95%) of the invoice cost. The amount paid shall not exceed the total amount of the bid item less an amount estimated for installation.
6. Include cost loaded activities for the materials and equipment, for which payment will be requested, in the Schedule of Values. The CONTRACTOR shall provide all documentation necessary to establish the cost of the materials or equipment.
7. Suppliers, fabricators, or manufacturers who intend to furnish materials or equipment to the CITY must file a notice with the CITY in accordance with the State of California lien laws.
8. Each supplier, fabricator or manufacturer shall file a list, with the INSPECTOR, indicating the materials or equipment to be furnished to the Project. They shall also provide a notarized declaration from their company indicating the employees authorized to sign an unconditional release for the company. The persons signing the declaration and the unconditional release shall be identified by name and title.
9. Each request for payment shall include a notarized Unconditional Release, which conforms to the California Civil Code. The release shall be signed by an authorized employee identified in the corporate declaration. The request shall include the suppliers invoice for the materials or equipment.
10. Absorb costs incurred to meet the requirements of this Article without modification to the Contract amount.

30. PAYMENT FOR MATERIALS OR EQUIPMENT STORED OFF THE JOBSITE

- A. Partial payment for materials or equipment stored off the jobsite shall be subject to the following conditions:
 1. Payment will not be made for any materials or equipment unless each individual piece of the material or equipment becomes a permanent part of the Work and has a value of more than \$5,000, unless otherwise approved by the city.
 2. The materials or equipment is required by the specifications, and is specifically manufactured for the Project and could not readily be utilized or diverted to another job.
 3. No payment will be made for living or perishable Plant material, or for degradable materials such as rock, sand, cement, or for reinforcing steel, miscellaneous piping, off the shelf and catalog items, or similar items, until they are incorporated into the Work.
 4. Payment for the materials or equipment stored shall not exceed sixty percent (60%) of the invoice cost of the materials or equipment. Percent of the invoice paid shall be at the discretion of the CITY. The amount paid shall not exceed the total amount of the bid item less an amount estimated for installation.
 5. Include cost loaded activities for the materials and equipment, for which payment will be requested, in the Schedule of Values. Provide documentation necessary to establish the cost of the materials or equipment.
 6. Suppliers, fabricators, or manufacturers who intend to furnish materials or equipment to the CITY must file a notice with the CITY in accordance with the State of California lien laws.
 7. Each supplier, fabricator or manufacturer shall file a list, with the INSPECTOR, indicating the materials or equipment to be furnished to the Project. They shall also provide a notarized declaration from their company indicating the employees authorized to sign an unconditional release for the company. The persons signing the declaration and the unconditional release shall be identified by name and title.
 8. Each request for payment shall include a notarized Unconditional Release, which conforms to the California Civil Code. The release shall be signed by an authorized employee identified in the

corporate declaration. The request shall include the suppliers invoice for the materials or equipment.

9. Store the materials and equipment as required in STORAGE OF MATERIALS AND EQUIPMENT of these General Requirements, in a bonded warehouse or facility approved by the INSPECTOR. The storage site shall be located within 50 miles of the geographic limits of the CITY. The materials and equipment shall be physically segregated from all other materials or equipment within the facility and shall be identified as being the "PROPERTY OF THE CITY OF LOS ANGELES". Exercise measures necessary to ensure preservation of the quality, quantity, and fitness of such materials or equipment and perform the manufacturers recommended maintenance of the materials or equipment. Inspect the materials and equipment, and submit a monthly written report to the INSPECTOR listing the equipment stored, results of their inspection, and the maintenance performed.
10. Grant the INSPECTOR and the PROJECT MANAGER access to the storage facility at any time and assist the INSPECTOR and the PROJECT MANAGER in conducting a full view, piece by piece, inventory of all such material or equipment.
11. Provide additional insurance necessary to insure the materials or equipment against loss of damage. The insurance provided shall be provided as stated in Article 37, INSURANCE of the General Conditions. The insurance shall cover the material or equipment, while stored at the approved site, while in transit to the project site, while being off-loaded at the site and until the material or equipment is incorporated into the Work and the Contract is accepted by the BOARD.
12. Be responsible for damage to, defects therein, misfabrication thereof, or loss of the materials or equipment.
13. Be responsible for any resulting Project delays or consequential damages as if the CONTRACTOR were the owner of the material or equipment until it is incorporated in the Work and accepted by the CITY.
14. Absorb any and all cost incurred to meet the requirements of this Article without modification in the Contract amount.
15. Present the storage arrangements in writing and sign a Security Agreement, which shall be submitted to the INSPECTOR for approval by the CITY ATTORNEY. This agreement shall set forth the terms of ownership, storage and insurance necessary to insure the material or equipment against damage or loss.

31. PAYMENT FOR PERMITS

See PAYMENT FOR MOBILIZATION of these General Requirements.

32. AUDIT AND ACCESS TO RECORDS

- A. Maintain books, records, documents and other evidence directly pertinent to performance of Work under this Contract in accordance with generally accepted accounting principles and practices consistently applied. Also maintain the financial information and data used by the CONTRACTOR in the preparation or support of cost submissions required for this Contract, or any Modifications or claims, and a copy of the cost summary submitted to the CITY. The CITY authorized representatives shall have access, at all times during normal business hours, to such books, records, documents and other evidence for the purpose of inspection, audit and copying. Provide proper facilities for such access and inspection.
- B. Agree to make A through G of this Article applicable to this Contract and Modifications or claims affecting the Contract price. Agree to include A through G of this Article in all his contracts and all tier Subcontracts in excess of \$5,000, and to make A through G of this Article applicable to Modifications and claims related to Project performance.
- C. Audits conducted under this Article shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit agency.
- D. Agree to the disclosure of information and reports resulting from access to records under A and B of this

Article, to the CITY and affected agencies.

- E. Records under A and B of this Article shall be maintained and made available during performance of Work under this Contract until final payment, or until settlement of all disputes, claims, or litigation, whichever occurs later. In addition, those records which relate to any portion of this Contract, to any Modification, to any dispute, to litigation, to the settlement of claims arising out of such performance, or to costs or items to which an audit exception has been taken, shall be maintained and made available until final payment or until final resolution of such dispute, litigation, claim or exception, whichever occurs later.
- F. This right of access Article applies to financial records pertaining to this Contract and all Contract Modifications. In addition this right of access applies to all records pertaining to all contracts, contract modifications, and contract amendments:
 - 1. To the extent the records pertain directly to Contract performance;
 - 2. If there is any indication that fraud, gross abuse or corrupt practices may be involved; or
 - 3. If the Contract is terminated for default or for convenience.
- G. Access to records is not limited to the required retention periods. The authorized representatives designated in A of this Article shall have access to records at any reasonable time for as long as the records are maintained.
- H. Provided that CITY has made demand for access or audit pursuant to this Article, CONTRACTOR's compliance with provisions A through G of this Article shall be a condition precedent to maintenance of any legal action or proceeding by the CONTRACTOR against the CITY and to CONTRACTOR's right to Progress or Final Payment. Without limitation to the foregoing or to any other provisions for withholding set forth in the Contract Documents, CITY shall have the right, in its sole discretion and in addition to any right of withholding of retention, to further withhold from any payment to CONTRACTOR a sum of up to ten percent (10%) of the total amount set forth in CONTRACTOR's current, unpaid Application(s) for Payment, until CONTRACTOR has complied with any outstanding and unsatisfied request by CITY for audits under this Article. Upon CONTRACTOR's compliance with this Article, any monies withheld pursuant to this Paragraph solely due to CONTRACTOR's failure to permit an audit requested by CITY shall be released to CONTRACTOR.
- I. CONTRACTOR hereby consents and agrees that any failure by CONTRACTOR to provide access to records as provided in A through G of this Article shall be specifically enforceable by issuance of a preliminary and/or permanent mandatory injunction by a court of competent jurisdiction based on affidavits submitted to such court, without the necessity of oral testimony, to compel CONTRACTOR to permit access and inspection of the records or to require delivery of the records to CITY for inspection.

MISCELLANEOUS

33. INTERFACE/COORDINATION REQUIREMENTS

- A. Vehicular and pedestrian traffic adjacent to the laydown area and/or within the jobsite must be maintained. If an existing street in the CONTRACTOR's work area is to be demolished or obstructed, the CONTRACTOR shall be responsible for providing access through or around the effected area, including signs, barricades, and lights, as approved by the PROJECT MANAGER and any local agencies having jurisdiction over any public access areas. The CONTRACTOR shall follow WATCH standards and City of Los Angeles Department of Transportation Worksite Traffic Control Plans for all traffic, including a minimum traffic lane dimensions for vehicles and pedestrians.
- B. The CONTRACTOR shall not park any vehicles, including concrete, hauling and delivery trucks, in any street at any time unless approved by the PROJECT MANAGER. Access must be maintained at all times for emergencies, sampling, equipment operations, maintenance and like items.
- C. Before altering any vehicular or pedestrian access, the CONTRACTOR shall notify the PROJECT MANAGER thirty (30) days in advance on forms provided by the PROJECT MANAGER. The CONTRACTOR shall then request the alteration on forms provided by the PROJECT MANAGER. Requests

shall include reasons for the alteration, times, boundary limits, special safety measures, proposed traffic rerouting with widths of such route, and a map detailing the above. Such requests shall be submitted to the PROJECT MANAGER not less than fifteen (15) days before the requested date of the access alteration. If any of the information changes, an additional fifteen (15) days may be required after the changes are brought to the attention of the PROJECT MANAGER. Approval when granted, will always be conditional. Final approval of the request, including date and time, will be given three (3) days in advance. The CITY retains the right to ticket and impound vehicles blocking traffic.

34. PROGRESS PHOTOGRAPHS

- A. As directed by the PROJECT MANAGER, take a minimum of 4 views of each Project worksite location, at 14 days intervals during the entire period of Contract Work. Take the first photographs before start of construction operations at the jobsite. Take the final photographs when all Contract Work has been completed and accepted by the CITY regardless of time intervals since previous photographs were taken. View locations shall be as directed by the PROJECT MANAGER.
- B. Provide 4, 8-inch by 10-inch color prints of each photograph on double weight glossy paper with each monthly progress report. Clearly label each print with the name of the job, view location, date of exposure and CONTRACTOR's name. Photographs and prints shall be of professional quality.
- C. Submittal of progress photographs shall be a condition precedent to the making of the monthly payments.

35. COMMUNITY RELATIONS

- A. The contractor shall cooperate with the City in conducting a public relations program for the project. The program will provide information to address concerns and complaints and to promote a positive project image. Contractor cooperation shall include the following:
 - 1. The Project Manager shall attend public meetings, when requested by the PROJECT MANAGER.
 - 2. Provide safe access for on-site community meetings and tours, on average twice per month per work site. Tours will be conducted by the PROJECT MANAGER and will be coordinated with the Contractor to limit interference with the work.
 - 3. Do not provide any information directly to the public or news media without approval of the PROJECT MANAGER.

36. PROJECT CLOSEOUT

A. CLOSEOUT TIMETABLE

The CONTRACTOR shall establish dates for equipment testing and acceptance periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the CITY, the PROJECT MANAGER, and their authorized representatives sufficient time to schedule attendance at such activities.

B. FINAL SUBMITTALS

- 1. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the PROJECT MANAGER.
 - a. Written guarantees, where required.
 - b. Technical manuals and instructions.
 - c. Maintenance stock items; spare parts; special tools.
 - d. Completed record drawings.
 - e. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 - f. Releases from all parties who are entitled to claims against the subject project, property, or

improvement pursuant to the provisions of law.

C. FINAL CLEANUP

The CONTRACTOR shall perform all tasks specified in REMOVAL, CLEANUP, AND DEMOBILIZATION of these General Requirements.

D. MAINTENANCE AND GUARANTEE

1. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the PROJECT MANAGER. If the CONTRACTOR fails to make such repairs or replacements promptly, the PROJECT MANAGER reserves the right to do the work and the CONTRACTOR and his surety shall be liable to the CITY for the cost thereof.
2. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work.

E. BOND

1. The CONTRACTOR shall provide a bond to guarantee performance of the provisions contained in Article 31 and Article 37 (Paragraph K) of the General Conditions, Article 24 of these General Requirements, Paragraph D of this Article.

ATTACHMENTS

ATTACHMENT TO GENERAL REQUIREMENTS ARTICLE 27
CHANGE ORDER COST QUOTATION FORM

DATE / /2021

Estimate Summary for Prime CONTRACTOR Total Costs

W.O. _____ C.O. _____ CONTRACT # _____

ESTIMATOR _____ P.E. _____

	LABOR PER General Requirements 27		
	Journeyman _____ MH	Supervision _____ MH	\$ _____
	2) MATERIALS (and Other Taxables)		
	Including Sales Tax		\$ _____
	3) EQUIPMENT (Rented, Leased, and/or OWNED)		
	Blue Book and/or CRG, including Sales Tax if applicable		\$ _____
SUBTOTAL	(A) _____ 1) + 2) + 3)		\$ _____
	4) G and A OH per General Requirements 27		
	Show calculations on separate sheet		\$ _____
SUBTOTAL	(B) _____ (A) + 4)		\$ _____
	5) PROFIT _____ % x Line (B)		
	Per General Requirements 27		\$ _____
SUBTOTAL	(C) _____ (B) + 5)		\$ _____
	6) SUBCONTRACTS (All Subcontractors)		\$ _____
	7) FIXED FEE FOR ALL SUBS 6%		
	Per General Requirements 27		\$ _____
SUBTOTAL	(D) _____ (C + 6) + 7)		\$ _____
	8) FIELD OFFICE OVERHEAD:		
	\$ _____ X _____ DAYS		
	Exclude if not required		\$ _____
	9) SCHEDULING COSTS (\$200 Max.)		
	Exclude if not required		\$ _____
SUBTOTAL	(E) _____ (D) + 8) + 9)		\$ _____
	10) IMPACT COST, per General Requirements 27		
	Show calculations on separate sheet		\$ _____
GRAND TOTAL	_____ (E) + 10)		\$ _____

CHANGE ORDER COST QUOTATION FORM

Estimate Summary for Prime CONTRACTOR Total Costs

DATE / /2021

W.O. C.O. CONTRACT #

ESTIMATOR P.E.

LABOR PER General Requirements 27

Journeyman Supervision
 MH MH

\$

2) **MATERIALS (and Other Taxables)**
 Including Sales Tax

\$

3) **EQUIPMENT (Rented, Leased, and/or OWNED)**
 Blue Book and/or CRG, including Sales Tax if applicable

\$

SUBTOTAL (A) 1) + 2) + 3)

\$

4) **G and A OH per General Requirements 27**
 Show calculations on separate sheet

\$

SUBTOTAL (B) (A) + 4)

\$

5) **PROFIT % x Line (B)**
 Per General Requirements 27

\$

SUBTOTAL (C) (B) + 5)

\$

6) **SUBCONTRACTS (ALL SUB-SUBS)**

\$

7) **FIXED FEE FOR ALL SUB-SUBS 6%**
 Per General Requirements 27

\$

SUBTOTAL (D) (C + 6) + 7)

\$

8) **FIELD OFFICE OVERHEAD:**
 \$ X DAYS
 Exclude if not required

\$

SUBTOTAL (E) (D) + 8)

\$

IMPACT COST, per General Requirements 27
 Show calculations on separate sheet

\$

GRAND TOTAL **FOR SUBCONTRACTOR (E) + 9)**
To Line 6) of Prime CONTRACTOR'S Summary

\$

SUPPLEMENTARY GENERAL REQUIREMENTS

FOR CONSTRUCTION OF

DEPARTMENT OF RECREATION AND PARKS SOUTH PARK RENOVATION PUBLIC RESTROOM RENOVATION

WORK ORDER NO: E1908366



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SUPPLEMENTARY GENERAL REQUIREMENTS

1.1 GENERAL SCOPE OF WORK:

- A. Work in this Contract: All labor, material, and equipment necessary for construction of the South Park Renovation - Public Restroom Renovation as noted on the Contract Drawings and in these Specifications (Technical Specification) and all other Contract Documents including but not limited to the GENERAL CONDITIONS, GENERAL REQUIREMENTS, City of Los Angeles Department of Building and Safety Soils Report Approval or Correction Letters, Geotechnical Engineering Reports and Asbestos and Lead Survey Reports.
- B. Work not in this Contract (but arranged and paid for by the Contractor): All work or equipment indicated on the Contract Drawings or in these Specifications as “Not in Contract” or “N.I.C.” or anything which implies exclusion from the Contract in any manner.

1.2 CONTRACT DRAWINGS: In addition to provisions noted in the GENERAL CONDITIONS and the GENERAL REQUIREMENTS.

1.3 The following are in addition to GENERAL CONDITIONS and GENERAL REQUIREMENTS:

- ◆ This Supplementary General Requirements
- ◆ Asbestos and Lead Survey Report for this project.
- ◆ Protection of Trees During Construction Guidelines (12-page Tree Care Manual)
- ◆ Project Specifications. See specifications set.
- ◆ Construction Document Sheets. See plans set.

1.4 PRIME CONTRACTOR'S MINIMUM QUALIFICATIONS and EXPERIENCE: The prime contractor that will actually construct the project must have adequate qualifications and experience in constructing public recreation facilities. In order for a bid to be considered eligible for this project, the prime contractor must have completed at least three (3) public recreation facilities of \$5 million or greater each for government agencies in the past six (6) years. The facilities must be new construction and are currently in operation. The bidder must complete and submit with the bid the “Prime Contractor’s Minimum Qualifications – Experience with Public Recreation Facilities Construction” forms (pages GR-S3 through GR-S4), attached herewith. **Failure to submit the completed said forms with the bid or failure to meet the minimum qualifications of the Prime Contractor will result in the bid being non-responsive.**

1.5 The following supplements modify the “GENERAL REQUIREMENTS” (ATTACHMENT ‘A’)

1. ADD Section **01116 “ELECTRONIC DOCUMENT CONTROL”**
2. ADD Section **01212 “FIXED CASH ALLOWANCE ITEMS”**
3. ADD Section **01253 “DIFFERING SITE CONDITIONS”**
4. ADD Section **01254 “CHANGE ORDERS”**
5. ADD Section **01292 “PAYMENTS FOR PERMITS”**
6. SUBSTITUTE **Article 18 “CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK”** for Section **01321 “CONTRACTOR’S CONSTRUCTION SCHEDULE AND REPORTS”**
7. SUBSTITUTE **Article 10 “SUBMITTALS”** for Section **01330 “SHOP DRAWINGS/SUBMITTALS”**

8. MODIFY the following items under “**MOBILIZATION**”

- a. ADD the following Note 15 under Item A. General: At least ten (10) days before the start of construction, the CONTRACTOR is required to notify, in writing, abutting property occupants of the proposed construction start date. A copy of said written notification shall be provided to the INSPECTOR.

9. ADD Section **01571 “STORMWATER POLLUTION CONTROL MEASURE FOR CONSTRUCTION ACTIVITIES”**

10. ADD Section **01572 “CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT”**

1.6 GENERAL CONDITIONS ARTICLE 12 - LENGTH OF WORKDAY AND WORK WEEK:

The second paragraph is hereby amended to read:

“A working day shall be Monday through **Saturday**, and work shall be between 7:00 a.m. and 4:00 p.m., unless otherwise approved by the PROJECT MANAGER or the RECREATION AND PARK COMMISSION or revised by CITY Ordinance.”

Supplementary General Requirements Continue on Next Page.

PRIME CONTRACTOR'S MINIMUM QUALIFICATIONS -- EXPERIENCE with PUBLIC RECREATION FACILITIES CONSTRUCTION

FAILURE TO SUBMIT THIS FORM WITH THE BID OR FAILURE TO MEET THE MINIMUM QUALIFICATIONS OF THE PRIME CONTRACTOR OR FAILURE TO SUBMIT THIS FORM WITH THE BID WILL RESULT IN THE BID BEING NON-RESPONSIVE

The intent of this form is to solicit information to confirm if the prime contractor meets the minimum qualifications for the South Park Renovation - Public Restroom Renovation. The prime contractor that will actually construct the project must have adequate qualifications and experience in constructing public recreation facilities. In order for a bid to be considered eligible for this project, the prime contractor must have completed at least three (3) public recreation facilities of \$5 million or greater each for government agencies in the past six (6) years. The facilities must be new construction and are currently in operation. The bidder must complete and submit with the bid the "Prime Contractor's Minimum Qualifications – Experience with Public Recreation Facilities Construction" forms (pages GR-S3 through GR-S4), attached herewith. The forms (pages GR-S3 through GR-S4) will help to determine if the GENERAL CONTRACTOR meets the minimum qualification for this project; however, submission of the forms (pages GR-S3 through GR-S4) does not in and of itself constitute qualification.

The Bidder must submit information below on projects that the PRIME CONTRACTOR has completed.

PROJECT NO. 1

A. Project Information

- 1. **Project Name and Address** _____

- 2. **Project Description** _____
(Meeting minimum qualifications above) _____

- 3. **Construction Cost** _____

- 4. **Year Completed** _____

B. Contact Information

- 1. **Owner / Reference Name** _____

- 2. **Telephone** _____

PROJECT NO. 2

A. Project Information

- 1. **Project Name and Address** _____

- 2. **Project Description** _____
(Meeting minimum qualifications above) _____

- 3. **Construction Cost** _____

- 4. **Year Completed** _____

B. Contact Information

- 1. **Owner / Reference Name** _____

- 2. **Telephone** _____

MUST BE SUBMITTED WITH THE BID

PROJECT NO. 3

A. Project Information

1. Project Name and Address

2. Project Description

(Meeting minimum
qualifications above)

3. Construction Cost

4. Year Completed

B. Contact Information

1. Owner / Reference Name

2. Telephone

PROJECT NO. 4 (if applicable)

A. Project Information

1. Project Name and Address

2. Project Description

(Meeting minimum
qualifications above)

3. Construction Cost

4. Year Completed

B. Contact Information

1. Owner / Reference Name

2. Telephone

PROJECT NO. 5 (if applicable)

A. Project Information

1. Project Name and Address

2. Project Description

(Meeting minimum
qualifications above)

3. Construction Cost

4. Year Completed

B. Contact Information

1. Owner / Reference Name

2. Telephone

END OF DOCUMENT

MUST BE SUBMITTED WITH THE BID

**SECTION 01116
ELECTRONIC DOCUMENT CONTROL**

1.1 USE OF ELECTRONIC DOCUMENT CONTROL SYSTEM

A. The CONTRACTOR shall use the City's cloud-based electronic document control system to submit and receive all construction related documentation on this project. The system used is "e2020" and all costs associated with the use of the software have been paid for by the City. The website address to be used will be provided by the ENGINEER after award of the contract. The CITY will provide training to the CONTRACTOR on the use of the system. As coordinated with other sections of these project specifications, the information to be generated, transmitted and tracked by the e2020 document control system shall include, but not be limited to the following:

1. Correspondence (including Engineer's Communication).
2. Plan Clarifications.
3. Requests for Information (RFI's).
4. Submittals & Shop Drawings.
5. Change Orders.
6. Allowance Orders.
7. Progress Photos.
8. Project Schedules.
9. Meeting Minutes.
10. Permits.
11. Partnering (Issue Resolution Ladder, Charter).
12. Claims Resolution.
13. Building Information Modeling Coordination.

B. When hard copies of drawings or product samples are required to be submitted that cannot be submitted through e2020, the CONTRACTOR shall:

1. Upload a transmittal sheet for the submittal in e2020,
2. Submit six (6) full-size hard copies,
3. Submit one half-sized hard copy (not exceeding 11x17 inches),
4. Transmit electronic files to the ENGINEER in Adobe Acrobat (.PDF) format.

- C. The CONTRACTOR shall be responsible for the installation of its own computer system and scanner. In addition, the CONTRACTOR shall be responsible for the procurement of an Internet Service Provider (ISP) with a high-speed broadband internet connection for its own use, as well as the ENGINEER's/INSPECTOR's use at the site offices to access the document control system.
- D. At the request of the ENGINEER, the CONTRACTOR must provide a hard copy of approved submittals to the INSPECTOR, at no additional cost to the CITY.

(END OF SECTION)

**SECTION 01212
FIXED CASH ALLOWANCE ITEMS**

1.1 THE REQUIREMENT

- A. A fixed cash allowance has been allocated to each of the following items of the Bid Breakdown (see Bid Proposal). Requirements for each Fixed Cash Allowance Item are specified in the GENERAL REQUIREMENTS (GR) section referenced below. Overhead and Profit, at the rates listed below, shall be added to the actual invoiced amount.

Bid Item No.	Description	Overhead and Profit
[7. Allowance for Differing Site Conditions (GR Section 01253)		Per Sec. 01254]
[8. Allowance for Payment for Permits (GR Section 01292)		0%]

- B. If these items are not executed, or are only partially executed, or the allowance for any item is not expended or partially expended, then a deductive Change Order shall be issued for the amount that is not expended. If, however, these items are over expended (with ENGINEER'S prior approval), then an appropriate Change Order shall be executed in accordance with the provisions of the GENERAL REQUIREMENTS Section 01254 — CHANGE ORDERS, except for Overhead and Profit wherein the above listed rates shall apply.

(END OF SECTION)

**SECTION 01253
DIFFERING SITE CONDITIONS**

1.1 THE REQUIREMENT

- A. During the course of construction, the CONTRACTOR may encounter existing utilities, structures, etc. that are not shown on the contract drawings or are not specified and which may interfere with or may impact construction activities. In the event of this occurrence, the ENGINEER may direct the CONTRACTOR to proceed with necessary exploratory or corrective work to alleviate the situation. The cost for such directed work shall be paid for under the bid item DIFFERING SITE CONDITIONS of the SCHEDULE OF WORK AND PRICES. Costs shall be calculated in accordance with Section 01254 CHANGE ORDERS, subsection TIME AND MATERIALSWORK, of the GENERAL REQUIREMENTS.
- B. If the total cost of the Work directed under the DIFFERING SITE CONDITIONS clause is different from the amount set forth in the SCHEDULE OF WORK AND PRICES, the Contract Price shall be adjusted by a Change Order. The adjustment shall be the difference between the total actual cost and the amount included in the Bid, as either an additional amount due the CONTRACTOR or as a credit to the CITY, as appropriate.

(END OF SECTION)

SECTION 01254 CHANGE ORDERS

1.1 The Requirement

Payment to the Contractor, or credit to the City, for any change, addition, deletion or extra to the Work, or settlement of any Claim, covered by any Change Order, shall be determined by the methods set forth herein. The Engineer may change the Plans and Specifications, character of the Work, or quantity of Work provided the total net dollar value of all such changes, taking into consideration both additive and deductive changes, does not exceed twenty-five percent (25%) of the original Contract Price. (The total net dollar value requires that additive and deductive changes offset each other, and only after the total net dollar value of the changes exceeds 25% of the original Contract Price, will a Supplemental Agreement be required). Should it become necessary to exceed this limitation, the change shall be by written Supplemental Agreement between the Contractor and the City, which shall be executed by a Change Order.

Unless otherwise stipulated, "Unit Prices" and "Stipulated Prices" include all costs necessary to furnish, install and complete the Work. The "Unit Prices" and "Stipulated Prices" include all direct costs for labor, equipment and materials, all insurance and bond costs, all field and office supervisors and assistants, all onsite project administration, security costs, the cost of small tools and consumables, incidental job burdens, and all general home office expenses and no separate allowance will be made therefor. Assistants to field and office supervisors include all clerical, stenographic, and general office help. Incidental job burdens include, but is not limited to, office equipment and supplies, temporary toilets, telephone, utilities, safety equipment, warning devices, personal protective equipment, and conformance to OSHA requirements. Project administration includes, but is not limited to, review and coordination, estimating, engineering, scheduling, and expediting relative to Change Orders, and updating and furnishing Record Drawings to incorporate changes, schedule update, supervision not applied solely to the Work of the Change Order, home office salaries and expenses, and City of Los Angeles Business Tax.

A. Unit Prices

Unit prices stipulated in the Schedule of Work and Prices (Bid) or itemized in the approved Schedule of Values shall be utilized, where they are applicable and determined reasonable by the Engineer. In the event that the Change Order results in a change in the Bid quantity of more than twenty-five percent (25%), either increase or decrease, then either the Engineer or the Contractor may request a review of the unit price to determine if a new unit price shall be mutually determined by negotiation. Any new unit price mutually determined under this Subsection shall only apply to the units in excess of one hundred twenty five percent (125%) of the Bid quantity for overruns. In case of underruns, the new mutually determined unit price shall only apply to the units up to seventy-five percent (75%) of the Bid quantity. When the final quantity is less than 75% of the Bid quantity, the total payment for that item shall not be more than 75% of the Bid quantity times the Bid unit price.

At the City's option, payment for Unit Price Work in excess of 125% of the Bid quantity, or less than 75% of the Bid quantity, will be made on a Time and Materials basis as provided in Subsection C if a new unit price cannot be agreed upon.

Renegotiated unit prices or unit prices for new items added to the Contract by Change Order shall be determined in accordance with Subsections B through G. Whether stipulated in the Bid, itemized in the approved Schedule of Values or renegotiated, the unit prices used for payment constitute the total adjustment with no further costs owed for overhead, impact, profit, delay or impact to unchanged portions of the Contract, or any

other reason. The unit price shall be full and final compensation as described in Subsection D.

The cost proposals for renegotiated unit prices shall be presented in accordance with the provisions of Subsections B through G. Should any Bid Item be deleted in its entirety, the amount bid for that Bid Item shall be subtracted from the total Contract amount. The Contractor shall be paid only for the actual cost incurred prior to the notification of such deletion for that Bid Item.

B. Lump Sum

The Engineer may initiate a change in the Work by issuing a Preliminary Change Order (PCO). A PCO will include a detailed description of the proposed additions, deletions, or revisions with supplementary sketches or revised Contract Drawings and/or Specifications, and will request from the Contractor a lump sum cost quotation and time impact analysis for the proposed Change Order Work. The Contractor shall submit its PCO cost quotation and time impact analysis, if applicable, to the City within 14 calendar days after receipt of a PCO. The Contractor shall summarize the total cost and furnish a breakdown of the proposed lump sum costs satisfactory to the Engineer in accordance with Subsections B through G. Such lump sum costs shall be full and final compensation as described in Subsection D. The Contractor's quotation shall conform to the requirements of Section 01251- Change Order Requests, and be submitted in the Change Order Cost Summary Form provided (see Attachment 01251-A1). The Change Order Cost Summary Form cannot be used to nullify or supersede any specification or contractual provision.

If the method or amount of payment cannot be agreed upon prior to performing the Change Order Work, the Engineer may issue a Unilateral Change Order in the amount determined reasonable by the Engineer for the Change Order Work and direct the Contractor to proceed immediately. The Engineer also has the option to issue a Time and Materials Change Order directing the Change Order Work be performed on a time and materials basis with the Contractor providing all labor, equipment, and materials necessary to complete the Change Order Work in a satisfactory manner and within a reasonable period of time. Estimates for lump sum quotations and accounting for Time and Materials Work shall be limited to direct expenditures necessitated specifically by the subject Change Order Work, and shall be segregated as follows:

1. Labor: The cost of labor shall include all employees of the Contractor or Subcontractor(s), up to and including working foremen, who are used in the actual and direct performance of the Change Order Work. Employees identified as superintendents or non-working foremen shall not be charged as labor on the Change Order Work. The labor rates used to price the Change Order Work shall be those listed on the Bureau of Engineering's website at <http://eng.lacity.org/contractors/>. The Change Order Labor Rates include State of California Prevailing Wages, Fringe Benefits (health & welfare, pension, vacation, training and other payments) as established by negotiated labor agreements, Payroll Taxes (FICA, Federal and State unemployment taxes) as established by law, and Insurance costs (Worker's Compensation and General Liability Insurance, but shall not include Automobile Liability Insurance, Umbrella or any other insurance costs). No other subcomponents of labor costs shall be considered, unless approved in writing by the Engineer.

The Change Order Labor Rates are calculated using the most current published prevailing wage and fringe benefits determination, applicable to the Los Angeles County and the particular labor classification, from the State of California Director

of Industrial Relations. To the Total Base Hourly Wage Rate (Column D), will be added Payroll Taxes at 8.65% (Column E), and Worker's Compensation & General Liability Insurance at 13% (Column F) of the base wages (Columns A+B), respectively.

Copies of the prevailing wage and fringe benefit determinations are available on the internet at <http://www.dir.ca.gov/OPRL/PWD/>. Payment to a craft of classification not shown on the prevailing wage rate determinations shall comply with the rate of the craft or classification most closely related to it.

The Engineer may approve a higher markup for insurance by review of current invoice(s) of insurance premium, as prepared by insurance companies for the Contractor or its Subcontractors at all tiers, to be submitted by the Contractor within ten (10) working days after issuance of the Notice to Proceed.

Except when provided otherwise by specific labor agreements, the overtime compensation will be at 1.5 times for more than 8 hours per day and Saturday work (Column H) and 2 times for Sunday and Holiday work (Column I).

The labor cost is not allowed to be increased by using labor classifications with paygrades higher than necessary to accomplish the Change Order Work. Owners, business partners, stock holders, corporate officers, next of kin, relatives and other stake holders of the contracting company (whose classifications are directly chargeable to the project) may be chargeable to the Change Order Work, provided that these personnel/workers perform direct labor in accordance with their classification and have the approval of the Inspector. The rates shall not exceed the prevailing wage rate for the classification they are performing. Foreman/General Foreman classification shall include a premium not exceeding the allowable premium in the Master Labor Agreement over the highest prevailing wage he is supervising. All labor classifications considered for the work shall be presented to the City, via a submittal, for review and approval before change order work is performed.

Reimbursement at the computed Change Order Labor Rates is subject to verification by certified payroll.

2. Materials: The cost of materials used in performing the Change Order Work will be the direct cost, including sales tax and freight, to the purchaser, whether Contractor, Subcontractor or other forces, from the supplier thereof, except as follows:
 - a. Cash or trade discounts available to the purchaser shall be credited to the City notwithstanding the fact that such discounts may not have been taken by the Contractor.
 - b. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the Engineer. Supplier markup, except for actual costs incurred in the handling of such materials, will not be allowed.
 - c. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on contract items or the current wholesale price for such materials delivered to the Jobsite, whichever price is lower.

- d. If, in the opinion of the Engineer, the cost of materials is excessive, or the Contractor does not furnish satisfactory evidence of the cost of such materials, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned, delivered to the Jobsite less cash or trade discount. The City reserves the right to furnish materials for the Work and no claim shall be made by the Contractor for costs and profit on such materials.
 - e. For the purposes of this Section, a "Supplier" is defined as any person or persons, firm or business, who supplies materials of construction and/or permanent equipment, but who does not perform any portion of the Work of the Contract on site, for the Contractor, except that labor or labor supervision which may be required by some manufacturers as part of their equipment installation for warranty or other purposes.
- 3. Equipment: The cost of equipment shall include ownership, lease or rental costs, as well as operating costs, for individual equipment units whose replacement value is in excess of \$1,000. Transportation and set up costs shall be included, but only if the equipment is imported to the worksite solely to perform work on the Changed/ Extra Work described in the Change Order and the Contractor can demonstrate that the changed work cannot or could not be performed economically with equipment already at the site. Equipment costs shall be determined in accordance with the requirements set forth in Subsection G.
 - 4. Small tools, equipment, consumables and incidental costs: No separate payment will be made for the use of small tools or equipment with a replacement value of \$1,000 or less. This applies to tools and equipment owned by the Contractor or its Subcontractors, at any tier. Also, no separate payment will be made for fuel, lubricants, tool or equipment repairs, tool or equipment maintenance, consumables, drinking water, sanitary facilities or other incidentals. These costs are already included as a part of Markup.
 - 5. Subcontractor Costs, including their overhead and profit, provided that such costs are direct costs to the Contractor for performing the Change Order Work as set forth in Subsections B through G.

C. Time and Materials Work

The costs of all Changed/Extra Work submitted under the Time and Materials (T&M) method shall be formulated in accordance with the provisions of Subsections B through I.

Unless otherwise stipulated on the Change Order, the "Not-to-Exceed" amount for all T&M Change Orders is \$25,000. The Contractor is responsible for tracking costs and for notifying the Engineer in writing when costs approach 50% and 75% of the "Not-to-Exceed" amount. In addition, if the Changed/Extra Work cannot be completed within the "Not-to-Exceed" limit, the Contractor shall notify the Engineer in writing, and in a timely manner, that the limit requires an increase. The City will only reimburse eligible costs up to the "Not-to-Exceed" amount.

The Contractor shall notify the Inspector at the beginning of each day when T&M Change Order Work is being performed. The Contractor shall notify the Inspector of the T&M Change Order Work being performed and describe the personnel involved, whether by Contractor forces or by its Subcontractors, at any tier. Failure to notify the Inspector prior

to the start of T&M Change Order Work serves as the Contractor's waiver to claim for compensation on that day.

For each day work is performed on the T&M Change Order, the Contractor shall submit a "Daily Report of Time and Material Work" to the Inspector. The "Daily Report" consists of Bureau of Contract Administration Form BCA-165 for labor supplied, and Form BCA-166 for equipment and materials supplied. The Inspector will only consider Forms that are properly completed as described below.

1. Separate forms must be used for labor and for equipment/materials.
2. Labor, equipment, material or expenditures that are not included on Bureau of Contract Administration Forms BCA-165 and/or BCA-166 are ineligible for payment. There will be no exceptions to this requirement. It is the responsibility of the Contractor to include any and all items of labor, equipment, or material for which it requests compensation for each day's work completed.
3. Information required on the Labor form shall include name of personnel, personnel classification, and only the number of hours worked on T&M Change Order Work for the day being reported. Since the overhead allowance already includes all necessary supervision, any hours for additional supervision or non-working foremen are ineligible for additional payment. The premium pay for a general foreman is eligible for payment only if the general foreman is a working foreman and a general foreman was required by a Union Labor Agreement or otherwise approved by the Inspector. The general foreman rate is eligible for payment only during the time that a general foreman was required for the T&M Change Order Work.
4. Information required on the Equipment/Material form shall include Contractor-owned equipment and/or tools, and rented equipment or tools for which compensation is requested. Information shall include the type of equipment, size of equipment, equipment identification number, appurtenances, and only the number of hours worked on the T&M Change Order Work.
5. The only allowable materials are materials delivered to the job site and/or incorporated only into the T&M Change Order Work. The allowable materials shall be listed on the Equipment/Material form for the day that they are delivered to the job site and/or incorporated into the T&M Change Order Work.
6. Delivery ticket(s) and/or bill(s) of lading for rental equipment and/or tools delivered to the site and/or material incorporated into the T&M Change Order Work for the day being reported must be attached with the T&M sheet for that day. No payment will be allowed for materials and/or rented equipment unless receipt(s) or bill(s) of lading is attached. If the request for payment is not substantiated by original vendor/supplier invoices, acceptable copies of original invoices, or other documentation acceptable to the Inspector, the City may establish the cost of the item(s) at the lowest possible wholesale price or rental rate applicable while the T&M Change Order Work was being performed.
7. Failure to submit the required "Daily Report of Time and Material Work" by the close of the next working day shall waive all rights for that day unless otherwise approved by the Inspector. Any T&M Change Order Work that cannot be substantiated by a "Daily Report", approved and signed by the Inspector, is ineligible for payment.

8. The Contractor is responsible for preparing the "Daily Report" for the T&M Change Order Work performed by its Subcontractors and submitting the forms to the Inspector on time.
9. The Contractor must have each "Daily Report" verified by the Inspector. After the "Daily Report" is approved by the Inspector, both the Contractor and Inspector sign the report. The original "Daily Report" is retained by the Inspector with a copy provided to the Contractor.
10. When the "Daily Report" is signed by the Inspector and the Contractor, it is binding on the Contractor and its Subcontractors.
11. When agreed to by the Inspector, the Contractor may submit a supplemental "Daily Report" for labor, materials, or equipment for which the Contractor requests compensation, but failed to list on the original daily report.
 - a. These supplemental forms shall be marked "SUPPLEMENTAL".
 - b. Unless otherwise approved by the Inspector, the supplemental forms may only be submitted for approval up to two (2) working days following the date when the work was performed.

No payment will be allowed for labor, materials, or equipment included on T&M sheets not signed by the Contractor and the Inspector. Payment will not be allowed for labor, materials, or equipment included on T&M sheets signed by anyone other than the Inspector or the Inspector's immediate supervisor.

D. General

It is the intent of the City to settle all Change Orders full and final at the time the Change Order is issued. Therefore, the following paragraph will be incorporated, in writing, on all Change Orders:

"The compensation (time and cost) set forth in a Change Order comprises the total compensation due the Contractor, all Subcontractors, and all Suppliers, for the Work or change defined in the Change Order, including impact on unchanged work. By signing the Change Order, the Contractor acknowledges and agrees on behalf of himself, all Subcontractors, and all Suppliers, that the stipulated compensation includes payment for all work contained in the Change Order, plus all payment for the interruption of schedules, extended field overhead costs, delay, and all impact, ripple effect or cumulative impact on all other work under this Contract. The signing of the Change Order indicates that the Change Order constitutes full mutual accord and satisfaction for the change, and that the time and/or cost under the Change Order constitutes the total equitable adjustment owed the Contractor, all Subcontractors, and all Suppliers as a result of the change. The Contractor, on behalf of himself, all subcontractors, and all Suppliers, agrees to waive all rights, without exception or reservation of any kind whatsoever, to file any further claim related to this Change Order. No further claim or request for equitable adjustment of any type for any reasonably foreseeable cause shall arise out of or as a result of this Change Order or the impact of this Change Order on the remainder of the Work under this Contract."

Costs which shall not be paid in Change Orders under this Contract include, but are not limited to, interest costs of any type; claim preparation or filing costs; legal expenses; the costs of preparing or reviewing proposed Change Orders or Change Order proposals;

lost revenue; lost profits; lost income or earnings; rescheduling costs; costs of idled equipment when such equipment is not at the site or has not yet been employed on the Work; lost earnings or interest on unpaid retainage; claims consulting costs; and the costs of corporate officer or staff visiting the site; any compensation due to the fluctuation of foreign currency conversion or exchange rates; loss of other business; changes in taxes or increased tax rates of any kind or any costs identified as unallowable under the provisions of the Federal Acquisition Regulations.

Extensions of time shall be based solely upon the effect of delays to the Work as a whole. Extensions of time shall not be granted for delays to the Work, unless the Contractor can clearly demonstrate, through analysis of the current updated schedule, that the delay to the Work as a whole arose or will arise from causes other than normal weather, beyond the control and without fault or negligence of the Contractor, or any Subcontractor, at any tier, and that such delays will, in fact, delay the progress of the Work as a whole. The Contractor shall not be entitled to a time extension unless it submits a Time Impact Analysis which is a calculation of the extent of the delay to the end date of the Work and which shows that the Work will be extended beyond the current Contract completion date. A Time Impact Analysis is a scheduling procedure which utilizes the networking techniques (fragnets) and a written analysis of the facts associated with the alleged delay to demonstrate the effect of the alleged delay on the critical path of the schedule. A "fragnet" is defined as a sequence of new activities and/or activity revisions that are proposed to be added to the existing current updated schedule to demonstrate (mathematically and graphically) the influence of the alleged delay on the end date of the Work and shall be the sole method for incorporating delays and impacts into the schedule. The objective of a Time Impact Analysis is to pinpoint, isolate, and quantify all time impact associated with a specific issue and determine its time relationship to current or future delays. Time extensions shall not be allowed for delays to parts of the Work that are not on the critical path of the currently approved monthly updated project schedule. Time extensions shall not be granted, nor delay damages of any kind whatsoever paid to the Contractor, until all available float, slack, or contingency time on the project is used and the end date of the Work is moved beyond the current, adjusted Contract completion date.

The cost summary, cost breakdowns and requests for cost reimbursement submitted by the Contractor (for delay, disruption, hindrance and interference associated with the changes, additions, deletions or extras) shall be itemized in a manner that, with mathematical certainty and without reliance upon probabilities or inferences, segregates the direct, actual reimbursable costs associated with each individual, change, addition, deletion, extra and (on an event-by-event basis) each individual delay or disruption event. Such cost summaries, breakdowns or requests shall not be based, in whole or in part, upon any methodology (such as "total cost" or "modified total cost" methodologies) that purports to calculate the Contractor's additional costs of performance of the extra, change, addition or deletion (including without limitation the additional costs of delay, disruption or other impact) based on the difference between Contractor's total actual Project or line item costs (with or without fee) and its original bid estimate for the Project or any original bid estimate line item. In connection with the foregoing, Contractor represents and warrants that it has the ability to generate and maintain complete and accurate cost accounting records that will reflect (i) the actual costs incurred or saved for each individual item of Extra Work, change, addition, deletion (including without limitation any costs of associated delay, disruption, interference, hindrance and the cumulative impact of each extra, change, addition, deletion on other parts of the Work); and, (ii) on an event-by-event basis, the effect of each delay or disruption that forms the basis of each request for extension of time, regardless of their scope, number, complexity, cumulative effect, or time of issuance or occurrence.

Except as provided in “Temporary Suspension or Delay of Work” of the General Conditions, Contractor shall have no right to recovery of any compensation, costs, expenses or damages resulting from delay, disruption, interference, or hindrance in the performance of the Work (including without limitation interruption of schedules, excess or extraordinary extended field and indirect overhead costs, loss of productivity and the impact, ripple or cumulative effect on other Work).

Contractor waives any claim or rights and remedies based on abandonment, quantum merit, rescission or other similar legal theory by reason of any of the following circumstances, which the Contractor acknowledges and agrees are within the reasonable contemplation of the parties: (i) changes, additions, deletions and extras to the Work after execution of the Contract and issued from time to time throughout the period of construction, regardless of their scope, number, cumulative value, or complexity, to correct errors, omissions, conflicts, and ambiguities in the Contract Documents, or to implement discretionary changes to the scope of Work requested by the City; (ii) the issuance and performance of changes, additions, deletions and extras in a manner that is not in sequence with the as-built or as-planned progress of the Work; (iii) changes due to Differing Site Conditions; (iv) suspensions of the Work or parts thereof, or limitations on access to portions or all of the Work, for the convenience of City or in the interests of the Project; (v) delay or disruption to the Work due to failure of the City, Engineer or Inspector to timely perform any contractual obligation.

E. Markups – Overhead and Profit

1. In addition to the direct expenditures specified for labor, materials and equipment in Subsection B, a fixed markup percentage will be paid for all overhead and profit, including: All insurance costs other than specifically mentioned in this Section, all field and office supervisors and assistants, all onsite project administration, security costs, the cost of small tools and consumables, incidental job burdens, and all general home office expenses and no separate allowance will be made therefor. Assistants to field and office supervisors include all clerical, stenographic, and general office help. Incidental job burdens include, but is not limited to, office equipment and supplies, temporary toilets, telephone, utilities, safety equipment, warning devices, personal protective equipment, and conformance to OSHA requirements. Project administration includes, but is not limited to, review and coordination, estimating, engineering, scheduling, and expediting relative to Change Orders, and updating and furnishing Record Drawings to incorporate changes, schedule update, supervision not applied solely to the Work of the Change Order, home office salaries and expenses, and City of Los Angeles Business Tax. The following maximum markup percentages shall be applied to the total amount of direct expenditures of the Contractor and Subcontractors, as noted in the Change Order Cost Summary Form.

Changed/Extra Work – Direct Costs	Markup Percentage
Contractor Direct Labor	20%
Contractor Direct Materials, Equipment, Other Items	15%
Subcontractor (of any tier) Direct Labor	20%
Subcontractor (of any tier) Direct Materials, Equipment, Other Items	15%
Contractor Administrative Fee for Subcontractor’s (of any tier) Direct Labor, Materials, Equipment, Other Items	5%

2. Bonds and Insurance

An additional allowance of one percent (1%) of all direct costs (less markup) is allowed.

3. Add/ Deduct Changes

The overhead rates determined above shall be applied to all additive Change Orders, except those utilizing as-bid Unit Prices or Stipulated prices listed in the Bid Proposal.

Any change in the Work involving both extras and credits shall show a net total cost, including subcontracts. Allowances for overhead and profit to the net total cost, as specified herein above, shall be applied if the net total cost is an extra; overhead and profit allowances shall not be applied if the net total cost is a credit. When the credit is due to a reduction in unit price quantity, the Contractor shall not be entitled to retain the markups in E.1 above for the reduced quantity. The estimated cost of deductions shall be based on labor and material prices on the date the Contract was signed.

F. City Furnished Materials, Equipment and Services

The Engineer reserves the right to furnish materials, equipment and services deemed expedient for use on the Change Order Work. The Contractor shall have no claim for profit or overhead on the cost of such materials, equipment and services.

G. Equipment Costs

The rates for rental or leased equipment shall not exceed the rates listed in the Rental Rate Blue Book (the Blue Book) published by Primedia Information, Inc., San Jose, California, as adjusted to the regional area of the Work under this Contract. For T&M Change Orders, the rates are established by the actual paid invoice(s) that comply with the requirements of Subsections G.1 and G.3. Owned equipment costs shall not exceed the rates established by Subsection G.2. The most recent published edition in effect at the commencement of actual equipment use on Change Order Work shall be used.

The rates paid for any rented or leased equipment or tools shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidental costs associated with the operation of the equipment or tools.

It is the responsibility of the Contractor to include any appurtenances added to equipment which would increase the basic rate for said equipment (i.e., hoe-ram, oversize bucket, etc.) as established in the acceptable rental rate guide. All equipment and/ or tools shall be acceptable to the Inspector, in good working condition, suitable for the purpose for which it is to be used, and necessary to complete the Change Order Work. Payment will be based on the manner in which the equipment was actually powered, operated and modified per the equipment manufacturer's recommendations.

1. Rented or Leased Equipment

For equipment rented or leased (including lease with purchase option) in arm's length transactions from outside vendors, the Contractor shall be paid the actual invoiced, rented or leased rates provided that the invoiced lease or rental rates do not exceed the rates set forth in the Blue Book. Arm's length rental or lease

transactions are those in which the firm involved in rental or lease of such equipment is not associated with, owned by, have common management, directorship, facilities, or stockholders with the firm renting the equipment. Submittal by a Contractor of a rental or leased invoice from the lessor will be prima facie proof of compliance with the above. However, such invoices are not conclusive proof; if questioned, the burden of proof remains with the Contractor. In no event shall the leased equipment rate billed to the City be at rates exceeding those prescribed in the following table:

Actual Usage (Change Order & Contract Work Combined)	Payment Category
Less than 8 hours	Hourly Rate
8 or more hours but less than 7 days	Daily Rate
7 or more days but less than 30 days	Weekly Rate
30 calendar days or more	Monthly Rate

a. When in Use:

Actual equipment use time documented by the Inspector shall be the basis that the equipment was utilized on the changed work and paid for under the T&M Change Order. In addition to the lease or rental rate, equipment-operating costs shall not exceed the estimated hourly operating rate as set forth in the Blue Book. The hours of operation shall be based upon actual equipment usage on the T&M Change Order Work as recorded by the Inspector. For multiple shift work sequences, the allowable equipment rate shall not exceed fifty percent (50%) of the base rate, for second or third shifts.

b. When Idle:

Idle equipment is equipment on site and necessary to perform the T&M Change Order Work, but periodically not in actual use due solely to the impact of the changed work. Equipment operating costs due to idle time, documented by the Inspector, shall be paid at the rate determined in "G" (1) above. The "ESTIMATED OPERATING COST \$/HR" will not be paid when the equipment is idle. Idle time shall include a reasonable time allowance to and from the project site. Payment for equipment necessary to be on the site to complete the Work, but not in actual use due solely to the impact of the T&M Change Order Work, shall be paid per Caltrans Standard Specifications Section 8-1.07C, provided that its presence and necessity on the site has been documented by the Inspector, and further provided that the equipment was idled solely by actions of the City.

Payment for equipment or tools shall be limited to hours actually used on the T&M Change Order Work if the equipment or tool is already on site for Work under the original Contract. No "standby" time will be paid for equipment already on site for Work under the original Contract.

If equipment or tools are used intermittently and, when not in use, could be returned to the rental source at less expense than holding it at the work site, it shall be returned, unless the Contractor elects to keep it at the work site at no expense to the City.

2. Owned and Other Equipment

Equipment rates for owned equipment or equipment provided in other than arm's length transactions shall not exceed the total hourly costs as set forth in the Caltrans "Labor Surcharge and Equipment Rental Rates" effective at the time the T&M Change Order Work is performed. (The Caltrans equipment rental rates are available on the internet at <http://www.dot.ca.gov/hq/construc/equipmnt.html>.) If the equipment is not listed in Caltrans, then the Rental Rate Blue Book shall be used. When using the Blue Book, the hourly rate for any period less than 7 days shall be the weekly rate divided by 40, plus the Operating Cost. Except as noted herein below, this equipment hourly rate plus the estimated operating cost per hour from the Blue Book will be paid for each hour the equipment actually performs the T&M Change Order Work. Daily records listing the equipment units and their respective operators, identification code, and actual usage on the T&M Change Order Work, as certified at the end of each work day (or work shift if the Work is being performed in multiple work shift sequence) by the Inspector shall be the record upon which actual equipment use shall be based. For multiple shift work sequences, the Caltrans overtime factor shall be applied. When using the Blue Book, one-half the Non-Operating Cost will be deducted for second and third shifts. The Non-Operating Costs are the Blue Book monthly or weekly/40 rates, as applicable. It is agreed that this rate shall represent payment in full for all the Contractor's and Subcontractor's direct costs.

a. When Idle:

Payment for equipment necessary to be on the site to complete the Work, but not in actual use due solely to the impact of the changed work, shall be paid per Caltrans Standard Specifications Section 8-1.07C, provided that its presence and necessity on the site has been documented by the Inspector, and further provided that the equipment was idled solely by actions of the City. (When using the Blue Book the payment for idle time shall not exceed fifty percent (50%) of the Non-Operating Cost.) Idle equipment time will only be paid as a function of delays specifically directed or caused by the City's actions. In no event shall the idle time claimed in a day for a particular piece of equipment exceed the normal work schedule established for the project - usually eight (8) hours per day or forty (40) hours per week, and excluding Saturdays, Sundays, and holidays. For multiple shift work sequence, the allowable idle equipment rate shall not be allowed, for second or third shifts. It is agreed that this rate shall represent payment in full for all the Contractor's and Subcontractor's direct costs.

3. Equipment Haulage and Set-up Costs

Documented and actual equipment haulage and set-up costs shall be paid for, if applicable as set forth in Subsection B.3.

4. Other Equipment Cost Guides

In the event that a piece of equipment used on a Change Order is not listed in Caltrans or the Blue Book, costs may be derived from the Associated General Contractor's of America Equipment Ownership Guide, the Associated Equipment Dealers Guide, or the Equipment Rate Guide published by the U.S. Army Corps of Engineers as adjusted appropriately for the type of work and use and the regional area of the Work under this Contract.

H. Records

At any time should the Contractor deviate substantially from the schedule, method and sequence of operation, equipment, cost or pricing data furnished by the Contractor and agreed to by the City in connection with the Change Order or should the City determine that any price negotiated in connection with the Change Order is defective due to such deviation or the fault of the Contractor, the City reserves the right to reduce the Change Order cost and reissue the Change Order at the amount in which the City determines to be the actual costs to complete the Change Order Work.

Whenever any material or process is indicated or specified by patent or a proprietary name, or by name of a manufacturer in the Change Order, such direction shall not relieve the Contractor's responsibility or obligation to perform Work in accordance with the Contract requirements. The Contractor shall be solely responsible for, and have control over construction means, methods, techniques, sequences and procedures, coordination of all portions of the Contract and Change Order Work.

The Contractor shall on a weekly basis submit an approximate accounting of the amount expended on the T&M Change Order Work to date and an estimate of the Impact to the time of performance of the Contract Work.

I. Partial Payments for Time and Materials Change Order Work.

Progress payments for T&M Change Order Work shall only be made if the anticipated cost of the changed work is in excess of \$100,000 and/or the time to perform the changed work will exceed two (2) months duration. To receive payments for T&M Change Order Work, the Contractor shall submit to the Engineer an invoice of the daily reports which were verified by the Inspector, with details and documents, verifying the Contractor's and Subcontractor's actual costs incurred for the T&M Change Order Work as set forth in Subsections B through H. Costs shall be submitted within thirty (30) calendar days after the T&M Change Order Work has been satisfactorily completed unless an extension of time for submittal is authorized in writing by the Inspector.

J. Field Office Overhead - Rate Per Day:

Subject to the provisions of this Subsection and "Temporary Suspension or Delay of Work" of General Conditions, for each day of approved time extension due solely to extras, changes, and additions to the Work, Contractor shall be entitled to compensation for additional Daily Field Office Overhead as set forth herein. As a further condition to the Contractor's right to such additional compensation, the Contractor shall submit a detailed listing of the Daily Field Office Overhead cost components which are time related. The individual cost components shall represent costs which have been or will be incurred or increased as a sole or direct result of the time extension. This listing may include, but is not limited to, onsite project management, supervision, engineering, and clerical salaries; onsite office utilities and rent; onsite company vehicles and their operating expenses; site maintenance and security expenses. Daily Field Office Overhead costs which are unaffected by the increased time or time extension in the Change Order shall not be allowable costs of the Daily Field Office Overhead rates. These cost components include, but are not limited to, acquisition and installation of plant, stationary equipment, temporary construction facilities, utilities and office furnishings (unless such items are rented or leased); the preparation of the site including clearing, grubbing, grading, and fencing; and mobilization and demobilization expenses. The listing of the Daily Field Office Overhead cost components described above must be based on the Contractor's actual Field Office Overhead costs. This listing must be submitted with the first Change

Order proposal that includes a time extension request per Subsection D. If the Contractor's time related Daily Field Office Overhead cost changes for subsequent compensable delays, then the Contractor shall submit a new Daily Field Office Overhead rate based on the Contractor's time related Daily Field Office Overhead costs at the time of the subsequent delay. If change order work is performed during a compensable delay, any Daily Field Office Overhead costs paid by that change order shall be deducted from the compensation owed for additional Daily Field Office Overhead during the same time period.

The Daily Field Office Overhead rate shall be multiplied by the number of days the Contract is to be extended in the Change Order, and shall then be added to the agreed upon costs of the Change Order. No markup for overhead costs and no profit allowance shall be allowed on the Extended Daily Field Office Overhead cost component of the Change Order. The derivation of an extended home office overhead rate and its application to Contract time extensions shall not be allowed.

The information submitted above shall be submitted in sufficient detail to allow review, and shall be prepared in accordance with generally accepted accounting principles and applicable portions of the Federal Acquisition Regulations. The Engineer shall have the right to have an audit of the Contractor's costs performed, at the Contractor's sole expense, if the costs submitted are considered by the Engineer to be excessive, questionable, or unsupported. The overhead rates determined above shall be applied to all additive Change Orders, except those utilizing original as-bid unit prices under Subsection A.

(END OF SECTION)

**SECTION 01292
PAYMENT FOR PERMITS**

1.1 PAYMENT FOR PERMITS

- A. The Contractor shall obtain and pay for all permits necessary for performance of the Work in accordance with the provisions of PERMITS AND CONSTRUCTION EASEMENTS of the GENERAL CONDITIONS. If the Bid Proposal provides an allowance for Permits, the CONTRACTOR shall include in the Bid the amount stipulated under PERMITS in the SCHEDULE OF WORK AND PRICES in the Bid Proposal as an allowance for the costs of all required permits. Costs shall be limited to the actual fees paid to the agencies and will be reimbursed based on original receipts only and no overhead or profit shall be added to the cost of the permits. The CONTRACTOR shall deliver to the ENGINEER with each permit the original receipt. After all permits have been obtained and delivered, the actual costs of all permits shall be reviewed by the CONTRACTOR and the ENGINEER. If the total costs differ from the amount set forth in the SCHEDULE OF WORK AND PRICES, the Contract Price shall be adjusted by a Change Order for the difference between the total actual costs and the amount included in the Bid, as an additional amount due the CONTRACTOR or a credit to the CITY, as appropriate.

(END OF SECTION)

SECTION 01321
CONTRACTOR'S CONSTRUCTION SCHEDULE AND REPORTS

1. THE REQUIREMENT

- A. It is expressly understood and agreed that the time of beginning, the rate of progress, and the time of completion of the Work are of the essence of this Contract. The Work shall be executed with such progress as required to prevent any delay to other CONTRACTORS working on other contracts at the site, the Contract milestones, and the general completion of the Contract.
- B. The CONTRACTOR shall employ or retain the services of a Construction Scheduler who shall have at least two (2) years verifiable experience as the person primarily responsible for preparing and maintaining detailed project schedules on projects of the same or similar size and nature as this project. The CONTRACTOR shall submit a resume of the Construction Scheduler for ENGINEER'S approval prior to the start of Work. The Construction Scheduler is required to attend all meetings pertaining to scheduling and progress of the Work. The ENGINEER and the INSPECTOR reserve the right to disapprove of any scheduling candidate proposed for the project that, in the ENGINEER'S or INSPECTOR'S opinion, is incompetent in scheduling.
- C. Within seven (7) calendar days after Notice of Award, the ENGINEER will schedule and conduct a Preconstruction Scheduling Conference to commence development of the required project Schedule. At this meeting, the requirements of this Section, as they apply to the Contract, will be reviewed with the CONTRACTOR. The CONTRACTOR shall be prepared to review and discuss its methodology for the Schedule, its proposed sequence of operations, and cost loading methodology. The Schedule shall be a CPM schedule using Primavera P6 (latest edition).

The Contractor shall include the effects of adverse weather in the Schedule in terms of working days (wds). The number of wds, Monday through Friday, excluding any day designated as a holiday by the City or in a Master Labor Agreement binding the Contractor, of normal adverse weather per month is as follows: January-3 wds, February-2 wds, March-3 wds, April-1 wd, October-1 wd, November-2 wds, December-2 wd. Unusually severe weather (see GC 00401 – Unavoidable Delay) is defined as the number of working days over what is normal adverse weather, as defined in the previous sentence. For partial months, the aforementioned numbers shall be prorated and rounded to the nearest whole number. There shall be no extension of time for adverse weather unless the Contractor is prevented from working during the first five (5) hours of a workday with at least sixty percent (60%) of the normal work force on more days per month than listed above. Even if there is unusually severe weather, a non-compensable extension of time will not be granted unless the other conditions required by GC 00401 are met, including negative impact to the critical path and delay beyond the current Contract Completion Date.

- D. The CONTRACTOR shall prepare and submit to the ENGINEER on e2020 the CONTRACTOR'S Construction Baseline Schedule (the Schedule) within fourteen (14) calendar days after issuance of the Notice to Proceed. The Schedule shall be comprised of a detailed Network Diagram as described in J of this Section. The Schedule shall show the dates on which each part or division of the Work is expected to be started and completed, and shall show all submittals which

constrain any work activity, allowing a minimum of **[thirty (30) (for WW)] [twenty-one (21) (for MF)]** calendar days for the ENGINEER'S review of each submittal unless a longer period of time is specified elsewhere in these Contract Documents. The CONTRACTOR shall also submit a separate listing of all submittals required under the Contract, showing when each submittal will be submitted. The Work activities making up the Schedule shall be of sufficient detail to assure that adequate planning has been done for proper execution of the Work and such that, in the sole judgement of the ENGINEER, it provides an appropriate basis for monitoring and evaluating the progress of the Work. All on-site construction activities shall be cost loaded. The cost value of all on-site construction activities shall equal the Contract value. Submittal and approval of the Schedule in accordance with the requirements of this Section is a condition precedent to the receipt of any payments from the CITY under this Contract.

- E. The Schedule shall show the sequence, duration, and interdependence of activities required for the complete performance of all Work. The Schedule shall begin with the date of issuance of the Notice to Proceed and conclude with the Contract Completion Date based on the completion time (calendar days) allowed in the Contract.
- F. Float, slack time, or contingency within the Schedule (i.e., the difference in time between the project's early completion date and the required Contract Completion date), and total float within the overall Schedule, is not for the exclusive use of either the CITY or the CONTRACTOR, but is jointly owned by both and is an expiring resource available to and shared by both parties as needed to meet Contract milestones and the Contract Completion Date. Pursuant to the float sharing requirement of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times or imposed dates shall be cause for rejection of the Schedule and any revisions or updates. For activities started but not finished, the Schedule shall be calculated using remaining duration and the retained logic option.
- G. Time extensions shall not be granted nor delay damages paid until a delay occurs which is beyond the control and without the fault or negligence of the CONTRACTOR and its Subcontractors or Suppliers, at any tier, which extends actual performance of the Work beyond the current Contract Completion Date and the completion date projected by the current, approved, updated Schedule. If the delay occurs along a path, which the current approved Schedule update projects late completion prior to addition of any CITY caused delay, then the time extension allowed will be only for the additional delay demonstrated by the approved Time Impact Analysis. Time extensions shall be granted only if they are clearly demonstrated by the CONTRACTOR through the submittal, within fifteen (15) calendar days after the delay occurs, of a Time Impact Analysis which demonstrates the estimated impact on the end date of the Work; is based upon the updated Schedule current as of the month the delay occurred; and demonstrates that the delay cannot be mitigated, offset, or eliminated through such actions as revising the intended sequence of Work or other means. Since float time within the Schedule is jointly owned, it is acknowledged that CITY caused delays on the project may be offset by CITY caused time savings (e.g. critical path submittals returned in less time than allowed by the Contract or approval of substitution requests which result in a savings of time to the CONTRACTOR). In such an event, the CONTRACTOR shall not be entitled to

receive a time extension or delay damages until all CITY caused time savings are exceeded and the Contract Completion Date is also exceeded.

- H. If the CONTRACTOR submits a Baseline Schedule showing completion of the Work more than thirty (30) calendar days in advance of the Contract Completion Date, the CONTRACTOR agrees that the ENGINEER may, at no cost to the CITY, decrease the Contract duration by issuance of a Change Order which will change the appropriate Milestone Date(s) and the Contract Completion Date to the completion date reflected on the Schedule. Any approved Schedule, revision, or update having an early completion date shall show the time between the early completion date and the current Contract Completion Date as "project float".
- I. Comments made by the ENGINEER on the Schedule during review will not relieve the CONTRACTOR from compliance with the requirements of the Contract Documents. The review is only for general conformance with the scheduling requirements of the Contract Documents. Upon the ENGINEER'S request, the CONTRACTOR and all major Subcontractors (defined herein as being any Subcontractor, Sub-Subcontractor, or Supplier with five (5) percent or more of the value of the Contract) shall participate in the review of the Schedule submissions (including the original material, all update submittals, and any resubmittals). All revisions shall be submitted within fifteen (15) calendar days after the ENGINEER'S review.
- J. The Detailed Network Diagram shall provide a workable plan for performing the Work, establish and clearly display the critical elements of the Work, forecast completion of the construction, and match the Contract duration in time. It shall be a time scaled logic diagram plotted on 2'x3' size paper. Exclusive of those activities for submittal review and material fabrication and delivery, activity durations shall not be less than one (1) nor more than fifteen (15) working days, unless otherwise approved by the ENGINEER. In addition to the detailed network diagram, the CONTRACTOR shall submit on e2020 the following reports with the original submittal:
 - 1. Predecessor/Successor Report or a list showing the predecessor activities and successor activities for each activity in the schedule sorted by Activity Number. The report shall include late dates, early dates, original duration, and total float.
 - 2. The electronic file of the Schedule submittal.
- K. An updated Schedule shall be submitted to the ENGINEER with the submittal of the CONTRACTOR'S monthly payment request. For those activities started but not yet completed at the time of submittal, the updated Schedule shall reflect the percentage complete, as agreed between the CONTRACTOR and the INSPECTOR, and an estimate of the remaining duration. The Schedule update shall be calculated using remaining durations and the retained logic option. The monthly update of the Schedule shall include the following:
 - 1. A time scaled logic diagram showing early schedule or actual dates for each activity remaining to be completed, total float, and original and remaining durations.

2. As in J-1, above, the Predecessor/Successor Report sorted by activity number.
 3. A complete hard copy listing of all changes from the previous approved Schedule (Claim Digger report.) Activities shall not be added nor logic changed without prior acceptance of the ENGINEER.
 4. The data necessary to produce the network diagram and reports.
- L. The submittal of the updated Schedule which satisfies the requirements of this Section, accurately reflects the status of the Work (for all previously accepted activities), and incorporates all approved changes into the schedule, shall be a condition precedent to the processing of the monthly payment application. (Actual and/or forecast dates for status of additional submittal cycles shall be added without the prior approval of the ENGINEER.) Updated Schedules shall also be submitted at such other times as the ENGINEER may direct. Upon approval of a Change Order or issuance of a notice to proceed with a change, the approved change shall be reflected in the next Schedule update submittal by the CONTRACTOR.
- M. If completion of any part of the Work, the delivery of equipment or materials, or submittal of CONTRACTOR submittals is behind according to the updated Schedule, and will impact the end date of the Work past the contract completion date, the CONTRACTOR shall submit in writing, a recovery plan acceptable to the ENGINEER for completing the Work by the current Contract Completion Date, if requested by the ENGINEER.
- N. **[Failure of the CONTRACTOR to submit the Baseline Schedule or any required resubmittals, Schedule revisions, or Schedule updates in a timely, accurate manner and in accordance with the requirements of this Section, will result in costs to the CITY which are difficult if not impossible to determine. Therefore, the CONTRACTOR shall pay the CITY liquidated damages in the amount of [\$1,800] per calendar day, for every day the Schedule submittal, revision, resubmittal, or update is late or incomplete. This amount shall be subtracted from any monies due and shall be forfeited by the CONTRACTOR.]**
- O. As a condition precedent to the release of any retained funds, the CONTRACTOR shall, after substantial completion of the Work has been achieved, submit a final "As-Built" Schedule which accurately reflects the manner in which the project was constructed and includes actual start and completion dates for all Work activities on the Schedule.
- P. Each week the CONTRACTOR shall submit to the ENGINEER and the INSPECTOR a bar graph schedule showing a one (1) week history and a two (2) week forecast. The corresponding CPM activity number shall be on each bar.

SECTION 01330
SHOP DRAWINGS / SUBMITTALS

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall prepare, approve, sign and submit to the ENGINEER any and all Shop Drawings, Manufacturers' Project Data, Job References, Certificates, Wiring Diagrams, Operation and Maintenance Manuals and Samples required by the Contract Documents on "e2020" (the City's web-based construction management application.)

NOTE: All references in the Technical Sections under "Shop Drawings" or "Submittal" to the words "approval of" shall mean "reviewed by".

- B. The CONTRACTOR, by preparing, reviewing, approving and submitting the Shop Drawings, Manufacturers' Product Data, Job References, Certifications, Wiring Diagrams, Operation and Maintenance Manuals and Samples, represents that the CONTRACTOR has determined and verified all materials, field measurements and filed construction criteria related thereto, and has checked and coordinated the information contained within such submittals with the requirements of the Work, the Project and the Contract Documents.
- C. The CONTRACTOR shall inform the ENGINEER, in writing, of any and all deviations and/or questions regarding the Contract Documents, and shall properly identify these areas of concern in the transmittal of the Shop Drawings, Manufacturers' Product Data, Job References, Certification, Wiring Diagram and Samples for proper written disposition respectively by the ENGINEER. The CONTRACTOR shall provide Shop Drawings in accordance with Specification Section 01116 of the General Requirements.
- D. Transmittal sheets for all Shop Drawings, Manufacturers' Product Data, Wiring Diagrams, Job References, Certifications, Operation and Maintenance Manuals and Samples shall be uploaded in e2020 in accordance with Specification Section 01116 of the General Requirements.
- E. The CONTRACTOR is not relieved of the responsibility for any deviation from the requirements of the Contract Documents, by virtue of CONTRACTOR'S approval and submittal of the Shop Drawings, Manufacturers' Product Data, Wiring Diagrams, Operation and Maintenance Manuals and Samples to the ENGINEER. All deviations and/or interpretations of the Contract Documents must be approved in writing by the ENGINEER.
- F. The review of the Shop Drawings, Manufacturers' Product Data, Job References, Certifications, Wiring Diagrams, Operation and Maintenance Manuals; and Samples by the ENGINEER does not relieve the CONTRACTOR of its responsibility from any requirements of the Contract Document, or any errors or omissions in such submittals, or for any failure to perform the requirements and intent of Contract Documents.

- G. The Shop Drawings shall include such fabrication, erection, and setting drawings; manufacturer's standard drawings or catalog cuts, performance and test data; Job References, Certifications, wiring and control diagrams; schedules; samples; and descriptive data pertaining to material, machinery and methods of construction as may be necessary to carry out the intent of contract Drawings and Project Manual and shall not relieve the CONTRACTOR from the responsibility for proper fitting and construction of the Work, nor from furnishing materials and Work required by the Contract, which may or may not be indicated on the Shop Drawings.

The CONTRACTOR shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Job References, Certifications, samples, etc. until such submittals have been reviewed by the ENGINEER.

- H. Shop Drawings shall show in detail the size, sections and dimensions of all the members, the arrangement and construction of all connections and joints and other pertinent details; also, all holes, straps and other fittings required by other CONTRACTORS for attaching their work. When required, by the ENGINEER or by Standard Practice of the CONTRACTOR, engineering computations shall be submitted for the record. The CONTRACTOR shall be responsible to coordinate with other trades, collect all necessary data or information for preparation of shop Drawings and deliver approved copies of Shop Drawings to all others whose work is dependent thereon.
- I. At all times, the CONTRACTOR shall maintain at the site of the project, a complete file of Shop Drawings and Manufacturers' Data of its own and all Subcontractors. All Shop Drawings and Manufacturers' Data shall be reviewed and by the CONTRACTOR.
- J. Submittals shall be made within the times specified in the various Divisions, of the Project Manual. If time is not specified, they shall be made within a period which will cause no delay in the work. The CONTRACTOR shall allow twenty-one (21) calendar days on the project construction schedule for each item submitted for the review by the ENGINEER.
- K. In the event the ENGINEER finds the submittal to be incomplete, it will be returned to the CONTRACTOR for required revised drawings. The CONTRACTOR will revise the drawings and resubmit as directed on original submittals. Any delay resulting from the need for resubmittals shall be the CONTRACTOR'S responsibility.
- L. In the event, the Contract Documents are prepared by a Consultant Architect or ENGINEER, the pertinent requirements of this Section will be effective, except as follows or as otherwise modified in the Divisions that follow:
1. All references in the Contract Documents to the Consultant shall mean the Consultant Architect or Consultant Engineer
 2. Submittals shall be uploaded in e2020 in accordance with Specification Section 01116 of the General Requirements.

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION
WO# E1908366
02/29/2024

Shop Drawings /
Submittals
Division 01–GR
01330-2

3. If submittal is found to be incomplete and revised drawings are required, CONTRACTOR will be notified by the ENGINEER.
 4. When Shop Drawings are required in accordance with the Contract, due to "substitutions" or for "or equal" determination or review as indicated hereinbefore, after final check, said drawings, reviewed and signed by Consultant shall be forwarded to the ENGINEER, Bureau of Engineering for final review and distribution electronically, through e2020.
 5. Unless otherwise specified for Operation and Maintenance Manuals, four (4) copies are required and all copies should be delivered to the Consultant Architect for review. After reviewed and signed by the Consultant, scan and electronically upload in e2020 for final review. Once approved by the ENGINEER on e2020, four (4) copies shall be forwarded to the ENGINEER for distribution to the CITY maintenance staff. The CONTRACTOR will receive a transmittal of acceptance of Operation and Maintenance Manual Submittal.
- M. In the event the Contract Documents are prepared by CITY personnel, four (4) copies of each Operation and Maintenance Manuals, shall be sent to the ENGINEER by the CONTRACTOR for review and final distribution. Distribution requirements described in Items L(4) and L(5) hereinbefore remain effective.
- N. CONTRACTOR'S Coordination:
1. The ENGINEER will return and will not review unrelated submittals.
 2. The CONTRACTOR may be required to provide drawings, setting diagrams and similar information necessary for proper coordination of Contracted Work. Such data shall remain between the CONTRACTOR and CONTRACTOR'S Subcontractor and will not be reviewed by the Consultant or ENGINEER unless specifically called for in the Contract Documents.
 3. Consultant or ENGINEER will not review any required Structural Shop Drawings, Structural Calculations, etc., not prepared or signed by a State of California licensed ENGINEER.
 4. The ENGINEER will return and will not review any submittal requiring coordination with other submittals until such other submittals or required information are received by the ENGINEER.
- O. CONTRACTOR'S Submittals: CONTRACTOR'S submittals required for performance of Contracted Work shall be electronically submitted in e2020 construction subsections 8.1 through 8.22, and shall include, but are not limited to, the following:
1. Contract Price (Cost Breakdown)

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION
WO# E1908366
02/29/2024

Shop Drawings /
Submittals
Division 01–GR
01330-3

2. Construction Schedule and Notification to ENGINEER of completion of each milestone or percentage increment of the Work as required.
 3. Submittal Schedule
 4. Daily Construction Reports
 5. Shop Drawings and Structural Calculations.
 6. Manufacturer's Data and Specifications.
 7. Samples
 8. Templates
 9. Certificate of Compliance
 10. Construction Photographs
 11. Substitutions
 12. Record Drawings and Record Project Manual
 13. Operation & Maintenance Manuals
 14. Stock Materials, Spare parts, tools
 15. Material Testing Results
 16. Daily Statements of cost-plus percentage Change Order
 17. **[Survey grade sheets]**
 18. Copies of Notice-To-Correction or Notice of Non-Compliance from governing authorities.
 19. Maintenance Logs and Maintenance Schedule.
- P. Administrative Submittals include, but are not limited to the following:
1. Permits
 2. Request for Payments
 3. Performance and Payment Bonds
 4. Insurance Certificates
 5. List of Subcontractors and proof of qualifications

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION
WO# E1908366
02/29/2024

Shop Drawings /
Submittals
Division 01–GR
01330-4

6. Hazardous Communication Program.
 7. Certified weekly payroll records.
 8. Ethnic Composition of Work Force Report.
 9. Third Party Testing Agency
- Q. CONTRACTOR shall conform to the provisions of the Contract Document and may be specifically directed by the Consultant or ENGINEER.
1. Preparation and processing of submittals shall be coordinated with Contracted Work operations, which includes fabrication, purchasing and delivery of work items so as not to delay Contracted Work operations.
 2. In each Submittal, mark every applicable material, product, equipment, manufacturer's data, product information, color samples, rating or values, part and model numbers, etc. by red color circle. Each of the submittal items must be clearly distinguishable from other unrelated or similar items listed in the Manufacturer's Catalog or Technical Specifications, Manuals, etc.
- R. Coordination and Submittals:
1. Carefully review and coordinate all aspects of each item being submitted.
 2. Carefully review contract drawings and technical sections, verify all work as laid out or indicated meeting the applicable codes and standards.
 3. Ensure ample time for reviewing and processing of the submittals by the CITY or other authorized agencies, delays resulting from improper and untimely submittals shall be the responsibility of the CONTRACTOR.
 4. Verify that all such submittal items conform to the Project Manual requirements noted in the Technical Sections.
 5. Verify all site conditions and provide all required dimensions and measurements in Shop Drawings.
 6. Where necessary, review the CITY'S comments, make changes and resubmit to local governing agencies for approval. Upload the approved plans or drawings for review on e2020 and furnish copies of said drawings at the ENGINEER'S request.
- S. CONTRACTOR shall affix to each submittal, the CONTRACTOR'S electronic signature certifying that required coordination has been performed and include on an attached label for processing and recording action taken, noting the following:

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION
WO# E1908366
02/29/2024

Shop Drawings /
Submittals
Division 01–GR
01330-5

1. Name and address of the Subcontractor(s)
 2. Name and address of the Supplier
 3. Name and address of the Manufacturer
 4. Reference to Specification Section Number and Title
 5. Reference to Drawing Sheet Number and detail(s)
 6. Priority Number and expected return date.
- T. CONTRACTOR shall, verify on e2020 that the CONTRACTOR has met the following CITY requirements:
1. Conformance in all respect to the Contract Document requirements.
 2. Has reviewed and coordinated all aspects of each submitted item relative to manufacturer's product data, Specifications, etc.
 3. Has verified with site conditions and all dimensions.
 4. That all questions and/or comments prepared by the Consultant or ENGINEER have been reviewed and answered.
 5. CONTRACTOR is not relieved from responsibilities for errors, omissions and any deviation in the required submittals as revealed resulting from the CITY'S or Consultant's review of such submittals.
 6. In each Section of the Project Manual, all required lists of material, product or equipment; manufacturer's data; and etc., shall be appropriately grouped and submitted to the CITY for review as one submittal. Piece meal submittals will not be accepted.
- Any submittal with outstanding product data, manufacturer's specification or any required information shall deem to be incomplete and subject for rejection without any review. Subsequent submittal shall be considered as second submission.
7. **[Exception:
For Division 16 - ELECTRICAL, CONTRACTOR may submit all required list of material, product or equipment, manufacturer's data, wiring diagram, product information and etc., from various Sections in one submittal.]**
 8. **[Exception:**

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION
WO# E1908366
02/29/2024

Shop Drawings /
Submittals
Division 01–GR
01330-6

For [Section 05120 - STRUCTURAL STEEL], [Section 15400 – PLUMBING] and [Section 15600 - HEATING, VENTILATING & AIR CONDITIONING], CONTRACTOR may submit the required lists of material, products, equipments, manufacturer’s data, product information, color or material samples, structural calculations, and etc., of each section in two separate submittals. Each submittal shall be allowed for two (2) submissions or reviews without additional charge. In the first submittal, CONTRACTOR shall provide a complete list of submittal items and a list of the outstanding product data, manufacturer’s specification and etc., to be submitted in the second submittal. Failure to submit said listings shall deem the submittal to be incomplete and causing the submittal to be rejected without review.]

9. All Shop Drawings shall be provided with dimensions and measurements verified at the site as stated hereinbefore. If the CONTRACTOR decides to submit the dimensions and measurements at a later time, the CONTRACTOR must state the reason, for the ENGINEER’S approval, why the dimensions and measurements cannot be taken. If approval is granted, the CONTRACTOR shall re-submit the approved submittal with the final dimensions and measurements after the Works are completed. The CONTRACTOR is not relieved from the responsibilities of error and omission, or any problem that may arise during the fabrication or installation.

10. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the ENGINEER or Consultant by the second submission of a submittal item. The CITY reserves the right to withhold moneys due to the CONTRACTOR to cover additional costs of the ENGINEER or Consultant's review beyond the second submittal. On the third submittal by CONTRACTOR, the CONTRACTOR will be charged \$150 per hour of CITY’S or Consultant's review time and no additional Contract time shall be allowed.

U. Comply with pertinent provisions of the GENERAL CONDITIONS and GENERAL REQUIREMENTS as applicable, but not limited, to the following:

1. Record Drawings, Record Project Manual, Record Product Data, Record Sample and Record Submittals.
2. Operation and Maintenance Manuals.
3. Manufacturer's Reference Data.
4. Qualification of CONTRACTOR.
5. Certification of Warranty and Guarantee.
6. Manufacturer's Recommended Installation Procedures.

7. Materials List of items proposed to be provided as specified in the Technical Sections of the Project Manual.
 8. Samples, illustrating assembly details, workmanship, fabrication techniques, connections, color selection to be submitted as specified in the Technical Sections of the Project Manual.
 9. Regarding Concrete Work, submit Portland Cement Mill Certificates, Concrete Mix and Curing Designs, Load Tickets and Product Data.
 10. Regarding shop-Inspected fabricated items, submit Shop INSPECTOR Tag, copy of the billing of lading, delivery receipt for materials or equipment.
 11. Mock-ups shall be delivered to or constructed at the project site. The Contractor shall submit a Transmittal sheet including a picture of the mockup uploaded to e2020.
- V. The CONTRACTOR shall comply with all submittal requirements in the Contract Documents.
- W. CONTRACTOR shall submit requests for changes in products, materials, equipment and methods of construction required by the Contract Documents, and all submittals shall conform to the provisions of Section 01630 – SUBSTITUTIONS AND “OR EQUAL” SUBMITTAL of the GENERAL REQUIREMENTS of the Project Manual immediately after the issuance of Notice-To-Proceed.
1. All substitution requests shall be made by the CONTRACTOR and shall imply the CONTRACTOR’S approval of such substitutions.
- X. The Following Are Not Considered As Substitutions:
1. Substitutions requested by Bidders during the bidding period or prior to award of contract will not be considered or accepted.
 2. Revisions to Contract Documents requested by the ENGINEER or the Consultant.
 3. Specified options of products and construction methods included in Contract Documents.
 4. The CONTRACTOR’S determination of and compliance with governing regulations and orders issued by governing authorities.
- Y. CONTRACTOR shall perform no portion of the Contracted Work requiring submittal and review of Shop Drawings, Product Data, Samples, etc. until such submittals have been reviewed by the Consultant or ENGINEER. All work not

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION
WO# E1908366
02/29/2024

Shop Drawings /
Submittals
Division 01–GR
01330-8

shown on Shop Drawings or not conforming to Contract shall be removed without additional cost to the CITY.

- Z. CONTRACTOR shall be responsible for procurement and installation of equipment or material without deviation upon receipt of the reviewed submittal from the ENGINEER or Consultant bearing the designation of **["A" No Exception Taken]**. Be responsible for the coordination with other trade, proper fitting and construction of the work, furnishing other material and work required which may not be indicated on the Contract Drawings or Submittals. All submittals shall be reviewed by the CITY for general design or compliance. CONTRACTOR will be responsible for deviation from the drawings or Project Manual, and for errors or omissions of any sort in the Submittals.
- AA. CONTRACTOR shall review and attend to all **["Note Markings"]** and/or **["Comments Attached"]** as noted by the ENGINEER or the Consultant on the Submittal. Make corrections or modifications to equipment or material as required.
- AB. CONTRACTOR shall omit any article disapproved or noted **["Reject"]** by the ENGINEER, or any article not conforming to the contract, or not of proper quality or grade and provide suitable articles, in lieu thereof in conforming with the Contract.
- AC. CONTRACTOR shall resubmit all submittals with corrections as noted by the ENGINEER or the Consultant or as required in timely manner without delay or impact to the contract.

(END OF SECTION)

SECTION 01571
STORMWATER POLLUTION CONTROL
MEASURES FOR CONSTRUCTION ACTIVITIES

1.1 THE REQUIREMENT

A. General

1. The Contractor shall exercise every reasonable precaution to protect channels, storm drains, and bodies of water from pollution.
2. Conduct and schedule operations to minimize or avoid muddying and silting channels, drains, and waters.
3. As required, obtain permits for erosion and water pollution control from the appropriate jurisdictional agency before starting Work. All costs for work required for compliance with this Section shall be included within the Bid Prices.
4. Provide any necessary water pollution control devices to prevent, control, and abate water pollution, and implement good housekeeping pollution control measures to reduce the discharge of pollutants from work sites to the maximum extent practicable. These water pollution control devices include drains, gutters, slope protection blankets and retention basins and shall be constructed concurrently with other Work at the earliest practicable time.
5. Exercise care in preserving vegetation and protecting property, to avoid disturbing areas beyond the limits of the Work. Promptly repair any damage caused by Contractor operations.
6. Comply with the specific requirements based on acreage of disturbed soil.
7. Penalties: Failure to comply with this Section may result in significant fines and possible imprisonment. The RWQCB or other prosecuting authority may assess fines of up to \$32,500 per day for each violation. Should the City be fined or penalized as a result of the Contractor failing to comply with this Section, the Contractor shall reimburse the City for any and all fines, penalties and related costs.
8. Notification and Report: If pollution occurs in the work area for any reason or when the Contractor becomes aware of any violation of this Section, correct the problem and immediately notify the Inspector. In addition, submit a written report to the Engineer within seven (7) calendar days describing the incident and the corrective actions taken. If either the Inspector or Engineer is first to observe pollution or a violation, the Contractor shall also explain in the written report why the Work was inadequately monitored.
9. The provisions of this Section describe minimum compliance and do not preclude other more stringent stormwater pollution control measures that may be required in the Contract.

B. Definition

1. Construction Activity: Includes clearing, grading, excavation, stockpiling, and reconstruction of existing facilities involving removal and replacement. Construction activity does not include routine maintenance such as, maintenance of original line and grade, hydraulic capacity, or original purpose of the facility. If construction activity is part of a larger common plan of development, the amount of disturbed soil is the total land area of disturbed soil that results under the common plan.

C. Projects Having Less Than One Acre of Disturbed Soil

Projects with construction activity that will result in less than one acre of disturbed soil, the Contractor shall comply with the following minimum water quality protection requirements:

1. Retain eroded sediments and other pollutants on-site and do not allow transportation from the site by sheet flow, swales, area drains, natural drainage, or wind. Control slope and channel erosion by implementing an effective combination of best management practices (BMPs). Such BMPs include scheduling grading during non-rainy seasons, planting and maintaining vegetation on slopes and covering erosion-susceptible slopes.
2. Protect stockpiles of earth and other construction-related materials from being transported from the site by wind or water.
3. Properly store and handle fuels, oils, solvents, and other toxic materials to not contaminate the soil or surface waters, enter the groundwater, or be placed where they may enter a live stream, channel, drain, or other water conveyance facility. Protect all approved toxic storage containers from weather. Clean spills immediately and properly dispose of cleanup materials. Spills shall not be washed into live streams, channels, drains, or other water conveyance facilities.
4. Do not wash excess or waste concrete into the public way or any drainage system. Retain concrete wastes on-site until they can be appropriately disposed of or recycled.
5. Deposit trash and construction-related solid wastes in covered receptacles to prevent contamination of rainwater and dispersal by wind.
6. Do not allow sediments and other materials to be tracked from the site by vehicle traffic. Stabilize construction entrance roadways to inhibit sediments from being deposited onto public ways. Immediately sweep up accidental depositions. Do not allow depositions to be washed away by rain or by any other means.
7. Contain non-stormwater runoff from equipment or vehicle washing and any other activity at the work site.
8. At completion of the Work, clear the worksite of debris and restore to a condition at least equal to or better than prior to construction.
9. When construction activity with grading is likely to occur during the rainy season (October 1 through April 15), prepare a Wet Weather Erosion Control Plan

(WWECP) per LAMC Section 61.02. The WWECP must be submitted to the Engineer for approval within thirty (30) calendar days after Notice to Proceed.

Guidance on preparing the WWECP can be found in "Development Best Management Practices Handbook - Part A, Construction Activities", adopted by the Board and as authorized by LAMC Section 64.72. The handbook can be viewed at or obtained at cost at Bureau of Engineering public counters.

10. When working in live streams, these are additional water pollution control requirements.
11. Erect barriers sufficient to prevent muddying or polluting streams.
12. Prior to removing materials from a flowing stream, use a stream bypass or other equivalent means to keep the flow in the stream free of the mud or silt from the removal operations.
13. Avoid transporting materials across live streams. If not possible, the transportation operation must be designed to prevent materials from falling into the stream and cannot muddy the stream.
14. Equipment may not be operated in a live stream or channel unless the Contractor can demonstrate to the Engineer's satisfaction that no other practical alternatives exist. The equipment must be designed to prevent materials from falling into the stream and cannot muddy the stream.
15. Do not allow fresh portland cement or fresh portland cement concrete to enter the water flowing in streams, channels or drains.
16. Do not allow material derived from the Work to be deposited in a live stream, channel or drain.

(END OF SECTION)

**SECTION 01572
CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT**

1.1 The Requirement

- A. The Construction and Demolition (C&D) Waste Management Specification includes procedures for ensuring optimal diversion of construction and demolition waste generated by the project, and documentation procedures for tracking waste generation and diversion.
- B. Each construction or demolition project shall reuse or recycle a minimum of 80% of the inert debris and 65% of the remaining construction and demolition waste generated by the project.
- C. Each construction or demolition project shall dispose of construction and demolition waste generated from the project in accordance with the City's C&D Waste Recycling Ordinance (Ordinance No. 181519). Los Angeles Municipal Code requires that all mixed C&D waste generated within the City of Los Angeles be taken to a City Certified C&D Waste Processing Facility and all source separated C&D waste be taken to a recycling facility or City Certified C&D Waste Processing Facility. Further, C&D waste can only be legally collected, removed, or transported by City of Los Angeles Permitted Solid Waste Haulers. If the Contractor plans on collecting, removing, or transporting its own waste, it must first apply for and obtain a Solid Waste Hauler Permit from the Solid Resources Citywide Recycling Division (SRCRD) of the Bureau of Sanitation.
- D. Failure to meet the C&D waste recycling requirements as detailed above will result in the assessment of penalties up to \$5,000 per each load of mixed C&D waste not taken to City Certified C&D Waste Processing Facility. Further, collecting, removing or transporting C&D waste within the City without a valid Solid Waste Hauler Permit is a criminal misdemeanor subject to fines and/or imprisonment.
- E. The project shall promote the City's sustainable building efforts by creating a resource-efficient and environmentally sensitive project and maintaining optimum control of the C&D waste generated during the project.
- F. The project shall use products with post-consumer recycled content to the greatest extent feasible. Refer to the California Department of Resources Recycling and Recovery's website for information about recycled content construction products.

1.2 Abbreviations

- A. C&D: Construction and Demolition
- B. CalMAX: California Materials Exchange
- C. CalRecycle: California Department of Resources Recycling and Recovery
- D. CCR: California Code of Regulations
- E. CDRG: Construction and Demolition Recycling Guide
- F. LEA: Local Enforcement Agency
- G. SWDD Report: Solid Waste Diversion and Disposal Report
- H. WMP: Waste Management Plan

1.3 Definitions

- A. “Certified C&D Waste Processing Facility” or “Certified C&D Waste Processor”: A solid waste processing facility that accepts loads of C&D waste for the purpose of recovering re-usable and recyclable materials and disposing of the non-recyclable residual material. A Certified C&D Waste Processing Facility has been certified by the City of Los Angeles Bureau of Sanitation to have a facility specific recycling rate for C&D waste. For information on becoming a certified C&D waste processor, type in and search “waste hauler permit program” and then select the “waste hauler permit program” link at www.lacitysan.org. See the CDRG for information on the current list of certified processors and recycling facilities.
- B. “Class III Landfill”: A landfill that accepts non-hazardous solid waste such as household, commercial, and industrial solid waste. A Class III landfill is regulated by the LEA and must have a CalRecycle solid waste facilities permit.
- C. “Construction and Demolition Recycling Guide”: A publication by the Bureau of Sanitation’s Solid Resources Citywide Recycling Division. The CDRG can be found by searching “waste hauler permit program” at www.lacitysan.org.
- D. “C&D Waste” or “Mixed C&D Waste” or “C&D Debris or Mixed C&D Debris”: Solid waste and recyclable materials, and building materials from construction, deconstruction, remodeling, repair, or demolition of buildings and other structures, do not contain hazardous waste (as defined in CCR Title 22, Section 66261.3, *et seq.*), and contain no more than one percent (1%) putrescible wastes by volume, calculated on a monthly basis. C&D waste includes, but is not limited to: asphalt, concrete, Portland cement, brick, lumber, drywall, roofing material, ceramic tile, pipe, glass, carpet and associated packaging.
- E. “Deconstruction”: The process of taking apart a structure with the primary goal of preserving the value of all useful building materials, so that they may be reused or recycled.
- F. “Disposal”: Acceptance of solid waste at a legally operating facility for the purpose of landfilling.
- G. “Diversion”: Activities that result in reducing the amount of solid waste disposed at a landfill. This can include source reduction activities, composting, recycling, and reuse.
- H. “Inert Backfill Site”: A location, other than inert fill or other disposal facility, to which inert debris is taken for the purpose of filling an excavation, shoring, or another soils engineering operation.
- I. Inert Debris: Solid waste and recyclable materials that are source separated or separated for reuse and do not contain hazardous waste (as defined in CCR, Title 22, section 66261.3 *et seq.*) or soluble pollutants at concentrations in excess of applicable water quality. Inert debris may not contain any putrescible wastes. Inert debris includes but is not limited to concrete, asphalt, crushed glass, fiberglass, asphalt or fiberglass roofing shingles, brick, slag, ceramics, plaster, clay, and clay products.
- J. Inert Debris Engineered Fill Operation (IDEFO): An activity exceeding one year in duration in which only the following inert debris may be used: fully cured asphalt, uncontaminated concrete (including steel reinforcing rods embedded in the concrete), crushed glass, brick, ceramics, clay and clay products, which may be mixed with rock and soil. Those materials are spread on land in lifts and compacted under controlled conditions to achieve a uniform and dense mass which is capable of supporting structural loading, as necessary, or supporting other uses such as recreation, agriculture and open space in order to provide land that is appropriate for an end use consistent with approved local general and specific plans (e.g., roads, building sites, or other improvements) where an engineered fill is required to facilitate productive use(s) of the land.
- K. “Non-Permitted Solid Waste Hauler”: A company that does not possess a valid and current solid waste hauler permit from the City of Los Angeles to collect and transport solid waste from individuals or businesses in the City of Los Angeles.

- L. "Permitted Solid Waste Hauler": A company that possesses a valid and current solid waste hauler permit from the City of Los Angeles to collect and transport solid waste from individuals or businesses in the City of Los Angeles.
- M. "Recycling": The process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new, reused, or reconstituted products that meet the quality standards necessary to be used in the marketplace.
 - 1. On-site Recycling: Materials that are sorted and processed for use in an altered form in the project, (e.g. concrete is crushed for use as base for a parking lot on the site)
 - 2. Off-site Recycling: Source-separated materials hauled to another location and used in an altered form in the manufacture of a new product.
- N. "Recycling Facility": An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a Solid Waste Facilities permit from CalRecycle or be regulated by the LEA.
- O. "Reuse": Materials that are recovered for use in the same form. This includes materials that are reused on-site or off-site.
- P. "Salvage": Materials recovered for reuse or sale or donation to a third party.
- Q. "Source Reduction": Any action causing a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of nonrecyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, and reducing the amount of yard waste generated.
- R. "Source-Separated Materials (Construction and Demolition Waste)": Material that is sorted at the site of generation by individual material type for the purpose of reuse or recycling, i.e., loads of concrete that are source-separated for delivery to an inert debris recycling facility to be crushed into road base material. Note: The Contractor may be able to save money on collection fees for source-separated material. Source-separated material is not subject to the City's 10% AB939 fee.
- S. "Solid Waste": shall mean waste that CalRecycle has deemed acceptable for disposal at a Class III Landfill and shall not include source-separated material.
- T. "Transfer Station": A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal or recovering some materials for reuse or recycling. Transfer stations must be permitted by CalRecycle and regulated by the LEA.
- U. "Solid Waste Hauler" or "Waste Hauler": shall mean any Person engaged in the business of providing or responsible for the collection, removal or transportation of Solid Waste, Construction and Demolition Waste, Source-Separated Materials,
- V. "Solid Waste Hauler Permit", "Waste Hauler Permit", or "AB 939 Compliance Permit": Persons who collect, remove or transport Solid Waste, including Construction and Demolition Waste, Source-Separated Materials or Co-Mingled Recyclables, generated within the City, must obtain, in addition to all other required permits, an AB 393 Compliance Permit from the Bureau of Sanitation.

1.4 DIVERSION REQUIREMENTS

- A. The construction and demolition project shall reuse or recycle a minimum of 80% of the inert debris and 65% of the remaining construction and demolition waste generated by the project.

1.5 SUBMITTALS

- A. Waste Management Plan (WMP): The Contractor shall conduct a site assessment and estimate the types and quantities of materials, generated during the project, that are anticipated for on-site or off-site processing, recycling, or reuse.
1. After the contract is awarded and prior to the commencement of the project, the City project manager will schedule and attend a meeting with the Contractor to discuss the Contractor's proposed WMP. This plan shall be submitted to allow the City and the Contractor an opportunity to develop a mutual understanding regarding the recycling and reuse requirements and programs.
 2. Not more than 20 working days after the meeting, and before the commencement of the project, the Contractor shall prepare and submit to the City project manager a written WMP, Attachment A of this specification, and a copy of the contracted hauler's solid waste hauler permit. The plan shall show a minimum 80% recycling for inert debris expected from the project and 65% recycling for the remaining C&D waste expected from the project. The Contractor shall submit the plan in the format provided herein as Attachment A. Instructions for filling out the form are in Attachment A, -- INSTRUCTION SHEET. Work shall not begin until the project engineer approves the WMP for the project.
 3. If the Contractor expects a circumstance that the Contractor believes make it infeasible to comply with the Diversion Requirement, the Contractor may submit a written request for an exemption at the time the WMP is submitted. If the exemption request is not approved by the Engineer, the Contractor shall revise and resubmit a WMP.
 4. If the City determines that it is infeasible for the Contractor to meet the Diversion Requirement due to unique circumstances, the City shall determine the maximum feasible diversion rate for each material and shall indicate this rate on the WMP submitted by the Contractor. The City shall return a copy of the WMP to the Contractor marked "Approved for Infeasible Exemption". The Contractor will be required to meet the maximum feasible diversion rates as approved by the City. If the Contractor fails to meet the revised rates the Contractor will be subject to the stipulated penalties. Exempt projects are required to keep and submit all documentation for the project. This includes receipts, the WMP, SWDD Reports, and all supporting documentation as required herein.
 5. The City's approval of the Contractor's WMP will not otherwise relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.
- B. Solid Waste Diversion and Disposal Report (SWDD Report): With each submittal of the Contractor's application for progress payment, the Contractor shall prepare and submit to the project inspector a written SWDD Report quantifying all material generated, diverted, and disposed in the project during the time period covered by the SWDD Report and progress payment. Part 3 of each SWDD Report is a cumulative history of the diversion and disposal for the project. The Contractor shall submit the report in the format provided herein as shown in Attachment B. Failure to submit the report and the supporting documentation shall render the application for progress payment incomplete and delay payment until the proper documentation is submitted. The supporting documentation includes manifests, weight tickets, receipts, reports, invoices, and other supporting documents specifically identifying the projects, the recyclables and solid waste generated by the project, and where the material was sent. Instructions for filling out the forms are in Attachment B – INSTRUCTION SHEET. Together, all of the SWDD Reports should cover the complete time

period of the project. The final SWDD Report and supporting documentation must be submitted within 30 days of the end of the project.

- C. Substitutions: Should the Contractor desire to use materials, equipment, or products that meet the requirements of these specifications but are more environmentally responsive, the Contractor shall submit these substitutions in accordance with "Substitutions and "Or Equal" Submittals" of the General Requirements.

1.6 PENALTY

- A. If the diversion requirement has not been met, a per ton penalty will be applied to the disposed material over that allowed in the approved WMP.
- B. The penalty will be calculated as follows: Tons over that allowed in the approved WMP times the per-ton penalty in effect at the time the contract was awarded. The penalty may not exceed the total payment retention for the project.
- C. Tons of mixed C&D waste either not hauled to City Certified C&D Waste Processing Facilities or hauled by non-permitted waste hauler(s) will be assessed a per-ton penalty. The penalty may not exceed the total payment retention for the project.
- D. The penalty is \$100 per ton.
- E. The recommended penalty will be determined by the Bureau of Contract Administration and Bureau of Sanitation and shall be considered by the Board of Public Works at the time of the project closeout.

1.7 REUSE, SALVAGE, AND RECYCLING OPTIONS

- A. Construction projects shall make use of as many reuse and salvage options as is feasible. One option is the California Materials Exchange (CalMAX), a free program sponsored by CalRecycle. The most recent issue of CDRG, contains contact information for non-profit organizations, salvage facilities, and other reuse organizations.
- B. Recycling shall include both on-site and off-site recycling of source-separated materials, as well as mixed C&D waste recycling efforts.
- C. On-site recycling programs shall produce a quality product to meet the specifications identified in the contract documents, subject to approval. The Contractor shall estimate the amount of material to be used in the project and include a program for off-site recycling of any excess material that cannot be used in the project.
- D. The Contractor shall develop and implement a program to include source separation of solid waste, to the greatest extent feasible, of the following types:
 - 1. Asphalt
 - 2. Concrete, concrete block, slump stone (decorative concrete block)
 - 3. Rock
 - 4. Wood (lumber)
 - 5. Green material (i.e. tree trimmings)
 - 6. Other materials, as appropriate, such as red clay brick, building fixtures, architectural details, dry wall, carpet, carpet padding, and corrugated cardboard
- E. Mixed C&D Waste Recycling: The Contractor must develop and implement a program to transport all commingled construction and demolition materials that cannot be feasibly source-separated to a Certified C&D Waste Processing Facility.
- F. Certified C&D Waste Processing Facility: These facilities have facility recycling rates, established by the City of Los Angeles for mixed C&D waste. Mixed C&D waste taken to these facilities are considered to have been recycled at the rate of the certified processing facility. For example, 100 tons of material taken to a

facility with an 80% recycling rate results in 80 tons of recycling and 20 tons of disposal for the project. A list of these facilities and their recycling rates is in the most recent issue of CDRG.

- G. Recycling, Reuse, Mixed C&D Waste Processing, and Salvage Facilities: The CDRG is incorporated herein by reference and contains information about processing, recycling, reuse, and salvage facilities.
- H. Revenue: Revenue or savings obtained from recycled, reused, or salvaged materials shall accrue to the Contractor unless otherwise noted in the Contract Documents. Note: The Contractor may be able to save money on collection fees for source-separated material. Source-separated material is not subject to the City's 10% AB939 fee.
- I. AB 939 Fee: The AB 939 fee is assessed on all solid waste hauled within the City of Los Angeles in accordance with Section 66.32 of the Los Angeles Municipal Code.
 - 1. All solid waste haulers hauling material from City of Los Angeles locations must be permitted in accordance with Section 66.32 of the Los Angeles Municipal Code.
 - 2. Source-separated material is not assessed this fee.

1.8 HAULING AND DISPOSAL OPERATIONS

- A. Hauling: The Contractor is responsible for arranging the collection and hauling of C&D waste by a solid waste hauler that is permitted by the City of Los Angeles in accordance with Section 66.32 of the Los Angeles Municipal Code.
- B. Recycling and Processing Facilities: The Contractor shall be responsible for transporting C&D waste to recycling or processing facilities. The Contractor shall be familiar with the requirements for acceptance of C&D waste at the recycling and processing facilities before the material is delivered. The most recent issue of CDRG includes a partial list of these facilities. Always call facilities in advance.
- C. Disposal Facilities: The Contractor shall be responsible for transporting C&D waste that cannot be accepted at a recycling or processing facility, to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal. A load of C&D waste may be taken to a disposal facility only after it has been rejected by 2 different certified processing facilities and the driver is in possession of both rejection slips. The rejection slips and the weight ticket from the final destination must be kept together and submitted to the contractor.
- D. Site Disposal: The Contractor may not burn, bury, or otherwise dispose of solid waste on the project job-site.

END OF SECTION

ATTACHMENT A - INSTRUCTION SHEET FOR WASTE MANAGEMENT PLAN

1. For assistance, contact the Solid Resources Citywide Recycling Division of LA Sanitation & Environment at (213) 485-3460 or sansrcrd_cdrecycling@lacity.org.
2. Please print very clearly or type.
3. Waste Management Plan (WMP) is to be completed and approved prior to start of construction. Along with the WMP, the Contractor is to include a copy of the waste hauler's waste hauler permit.
4. Attachment A includes: **Part 1**-Inert Debris and **Part 2**-Metal, Wood, C&D waste, and all other materials.
5. Must meet $\geq 80\%$ recycling rate in **Part 1** – Inert Debris such as concrete, asphalt, dirt, rock, and brick.
6. Must meet $\geq 65\%$ recycling rate in **Part 2** – Metal, wood, green waste, C&D waste, and all other materials.
7. The information required includes but is not limited to, the following:
 - a. Contractor and project work order number.
 - b. Permitted solid waste hauler(s) and permit number(s).
 - c. Facility names and addresses that are to process the C&D materials.
 - d. Estimated quantities of **all** C&D materials listed in **tons**.
 - e. Verify whether the Waste Management Plan meets the minimum recycling requirement of 80% for inert debris in Part 1. Verify whether the Waste Management Plan meets the minimum recycling requirement of and 65% for other C&D waste.
8. ****Calculating recycling and disposal for mixed C&D waste taken to a certified processing facility: the total tons taken to certified processing facility times the recycling rate = amount to be recycled. Total tons taken to facility minus amount to be recycled = amount for disposal. E.g. 100 tons x 0.80 (80% recycling rate) = 80 tons diverted and 20 tons disposed.**

**ATTACHMENT A
WASTE MANAGEMENT PLAN (PART 1-INERT DEBRIS)**

Project Title:		W. O. Number:	Date Submitted:
Name & Title of Responsible Person:		Signature:	
Permitted Waste Hauler Name(s) and Permit No(s):			
Material	Facility Name and Address	Tons Diverted	Tons Disposed
RECYCLING/REUSE			
Asphalt			X
Concrete			X
Brick			X
Dirt			X
Mixed Inerts			X
Other (Describe)			X
Other (Describe)			X
DISPOSAL			
Other (Describe)		X	
Other (Describe)		X	
Other (Describe)		X	
DIVERSION AND DISPOSAL TOTALS		=	
Percent Recycling = $\frac{\text{Total diversion}}{\text{Total diversion} + \text{Total disposed}} \times 100 =$			
Percent Recycling = $\frac{\quad}{\quad + \quad} \times 100 = \quad \%$			
Does Part 1 (Inert Debris) of this Waste Management Plan meet the minimum recycling requirement of 80% for Inert Debris? YES <input type="checkbox"/> NO <input type="checkbox"/>			

**ATTACHMENT A
WASTE MANAGEMENT PLAN (PART 2-ALL OTHER C&D WASTE)**

W. O. No.:		Date Submitted:	
Contractors Name:			
Street address:			
City, State, Zip:			
Phone:	Fax:	Email:	
Permitted Waste Hauler Name(s) and Permit No(s):			
Material	Facility Name and Address	Tons Diverted	Tons Disposed
RECYCLING/REUSE			
Glass			X
Wood/Greenwaste			X
Metal			X
Cardboard			X
Other (Describe)			X
DISPOSAL			
Other (Describe)		X	
Other (Describe)		X	
CERTIFIED PROCESSING**			
Mixed C&D Waste			
Mixed C&D Waste			
DIVERSION AND DISPOSAL TOTALS		=	
Percent Recycling =	$\frac{\text{Total Diversion}}{\text{Total Diversion} + \text{Total Disposed}} \times 100 =$		
Percent Recycling =	$\frac{\quad}{\quad + \quad} \times 100 = \quad \%$		
Does Part 2 (All Other C&D Waste) of this Waste Management Plan meet the minimum recycling requirement of 65% for all other C&D Waste? YES <input type="checkbox"/> NO <input type="checkbox"/>			

****Recycling tonnages for mixed C&D waste taken to a certified processing facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.**

EXAMPLE WASTE MANAGEMENT PLAN
ATTACHMENT A
WASTE MANAGEMENT PLAN (PART 1-INERT DEBRIS)

Project Title: <i>Big Street Overcrossing</i>	W. O. Number: <i>XYZ12345</i>	Date Submitted: <i>01/01/2020</i>	
Name & Title of Responsible Person: <i>Bobby Lee, Project Manager</i>		Signature: <i>Bobby Lee</i>	
Permitted Waste Hauler Name(s) and Permit No(s): <i>Grava Gravel Haulers, PER-22-333</i>			
Material	Facility Name and Address	Tons Diverted	Tons Disposed
RECYCLING/REUSE			
Asphalt	<i>Inert Recycling Facility A, 888 Valle Valley, CA 12345</i>	600	X
Concrete	<i>Inert Recycling Facility A, 888 Valle Valley, CA 12345</i>	55	X
Brick	<i>Inert Recycling Facility B, 777 Valle Valley, CA 12345</i>	6	X
Dirt	<i>The Landscaping Co., 222 Valle Valley, CA 12345</i>	200	X
Mixed Inerts			X
Other (Describe)			X
Other (Describe)			X
DISPOSAL			
Other (Describe)		X	
Other (Describe)		X	
Other (Describe)		X	
DIVERSION AND DISPOSAL TOTALS		=	861
Percent Recycling = $\frac{\text{Total diversion}}{\text{Total diversion} + \text{Total disposed}} \times 100 =$			
Percent Recycling = $\frac{861}{861 + 0} \times 100 = 100.00\%$			
Does Part 1 (Inert Debris) of this Waste Management Plan meet the minimum recycling requirement of 80% for Inert Debris?			
YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>			

ATTACHMENT A
WASTE MANAGEMENT PLAN (PART 2-ALL OTHER C&D WASTE)

W. O. No.: XYZ12345		Date Submitted: 01/01/2020	
Contractors Name: Awesome Engineering Contractors			
Street address: Circular Drive			
City, State, Zip: Ciudad City, CA 12345			
Phone: (123) 456-7891		Fax: (321) 123-4567	Email: AEC@zmail.com
Permitted Waste Hauler Name(s) and Permit No(s):			
Material	Facility Name and Address	Tons Diverted	Tons Disposed
RECYCLING/REUSE			
Glass			X
Wood/Greenwaste	<i>The Landscaping Co., 222 Valle Valley, CA 12345</i>	50	X
Metal	<i>Kim Loai Metal Recycling, 333 Camino St, CA 12345</i>	6	X
Cardboard			X
Other (Describe)			X
DISPOSAL			
Other (Describe)	<i>Municipal Landfill, 456 Montana Mountains, CA 12345</i>	X	15
Other (Describe)		X	
CERTIFIED PROCESSING**			
Mixed C&D Waste	<i>Certified Processor A (Recycling Rate = 75% = 0.75)</i>	18.75	6.25
Mixed C&D Waste	<i>25 tons x 0.75 = 18.75 tons recycled and 6.25 tons disposed</i>		
DIVERSION AND DISPOSAL TOTALS =		74.75	21.25
Percent Recycling = $\frac{\text{Total Diversion}}{\text{Total Diversion} + \text{Total Disposed}} \times 100 =$			
Percent Recycling = $\frac{74.75}{74.75 + 21.25} \times 100 = 77.86 \%$			
Does Part 2 (All Other C&D Waste) of this Waste Management Plan meet the minimum recycling requirement of 65% for all other C&D Waste? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>			

****Recycling tonnages for mixed C&D waste taken to a certified processing facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.**

ATTACHMENT B - INSTRUCTION SHEET FOR SOLID WASTE DIVERSION & DISPOSAL REPORT

1. For assistance, contact the Solid Resources Citywide Recycling Division of LA Sanitation & Environment at (213) 485-3460 or sansrcrd_cdrecycling@lacity.org.
2. Please print very clearly or type.
3. All **three (3) pages** of Attachment B and **all** manifests, weight tickets, receipts, reports, invoices, and other supporting documents specifically identifying the projects, the recyclables and solid waste generated by the project, and where the material was sent must be submitted to the inspector with each application for progress payment.
4. Attachment B includes: **Part 1** - Inert Debris, **Part 2** - All Other C&D Waste, **Part 3** - Project Cumulative Total.
5. Must meet $\geq 80\%$ recycling rate for Inert Debris by end of construction.
6. Must meet $\geq 65\%$ recycling rate in Metal, wood, green waste, C&D waste, and all other materials by end of construction.
7. In **Part 1 and Part 2**, record:
 - a. Material type generated.
 - b. Permitted solid waste hauler(s) and permit number(s).
 - c. Facility names and addresses where materials were delivered.
 - d. Tons diverted/disposed for a particular pay period.
 - e. Verify whether Part 1 meets the minimum recycling requirement of 80% for Inert Debris. Verify whether Part 2 meets the minimum recycling requirement of 65% for other C&D Waste. Contractor is to meet the minimum recycling requirements by the end of construction.
8. In **Part 3**, record:
 - a. Pay period beginning and period ending
 - b. Diversion and disposal for the pay period and cumulative diversion and disposal for the project
 - c. Cumulative waste generated (diversion + disposal) for the project
 - d. Cumulative recycling rate for the project (diverted/generated)*100
9. The information required includes but is not limited to, the following:
 - a. Contractor and project identification information
 - b. Actual quantities of **all** materials listed in tons
10. Source-separated material taken to a recycling facility or certified processing facility is 100% recycled.
11. **Calculating recycling and disposal for mixed material taken to a certified processing facility: the total tons taken to certified processing facility times the recycling rate = amount to be recycled. Total taken to facility minus amount to be recycled = amount for disposal. E.g. 100 tons x 0.80 (80% recycling rate) = 80 tons diverted and 20 tons disposed.

**ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 1 OF 3 - INERT DEBRIS**

Project Title:	W. O. Number:	Date Submitted:	Progress Payment #
Company Name:		Daytime Phone Number:	
Period Covered In This Report:			
From:		To:	
Permitted Waste Hauler Name(s) and Permit No(s):			
Material	Facility Name and Address	Tons diverted	Tons Disposed
RECYCLING/REUSE			
Asphalt			X
Concrete			X
Brick			X
Dirt			X
Mixed Inerts			X
Other (Describe)			X
Other (Describe)			X
DISPOSAL			
Other (Describe)		X	
Other (Describe)		X	
Other (Describe)		X	
DIVERSION AND DISPOSAL TOTALS * =			

***Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.**

**ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 2 OF 3 - ALL OTHER C&D WASTE**

W. O. Number:		Date Submitted:	
Permitted Waste Hauler Name(s) and Permit No(s):			
Material	Facility Name and Address	Tons Recycled	Tons Disposed
RECYCLING/REUSE			
Metal			X
Wood / Lumber			X
Greenwaste / Landscaping			X
Glass			X
Cardboard			X
Other (Describe)			X
Other (Describe)			X
DISPOSAL			
Mixed Solid Waste		X	
Other (Describe)		X	
Other (Describe)		X	
CERTIFIED PROCESSING**			
Mixed C&D Waste			
Mixed C&D Waste			
Mixed C&D Waste			
DIVERSION AND DISPOSAL TOTALS*		=	

*Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.

**Recycling tonnages for mixed C&D waste taken to a certified facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.

**ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 3 OF 3 - PROJECT CUMULATIVE TOTAL**

W. O. Number:				Date Submitted:			
Period Beginning	Period Ending	*Period Diversion	Cumulative Project Diversion, <u>R</u>	*Period Disposal	Cumulative Project Disposal, <u>D</u>	Cumulative Waste Generated <u>R + D</u>	Cumulative Recycling % <u>(R/G)100</u>
<u>INERT DEBRIS CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 1 OF 3</u>							
<u>ALL OTHER C&D WASTE CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 2 OF 3</u>							
Does this Report meet the minimum recycling requirement of 80% for Inert Debris and 65% for All Other C&D Waste? Contractor is to meet the minimum recycling requirements of 80% for Inert Debris and 65% for All Other C&D Waste by the end of construction.							
YES <input type="checkbox"/> NO <input type="checkbox"/>							
Name & title of person responsible for the information in this form:					Signature:		

***From appropriate Part 1 or 2 during each period.
Each Attachment B Part III Report needs to have the Tons Diverted and Tons Disposed from every previous Diversion and Disposal Report documented in it, as well as the totals from this Report.
Attach another Part III form and continue information if more rows are needed.**

**EXAMPLE SOLID WASTE DIVERSION AND DISPOSAL REPORT FOR
PROGRESS PAYMENT #1**

**ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 1 OF 3 - INERT DEBRIS**

Project Title: <i>Big Street Overcrossing</i>		W. O. Number: <i>XYZ12345</i>	Date Submitted: <i>03/15/2020</i>	Progress Payment # <i>1</i>
Company Name: <i>Awesome Engineering Contractors</i>		Daytime Phone Number: <i>(123)456-7891</i>		
Period Covered In This Report: From: <i>2/1/2020</i> To: <i>2/28/2020</i>				
Permitted Waste Hauler Name(s) and Permit No(s): <i>Grava Gravel Haulers, PER-22-333</i>				
Material	Facility Name and Address	Tons diverted	Tons Disposed	
RECYCLING/REUSE				
Asphalt	<i>Inert Recycling Facility A, 888 Valle Valley, CA 12345</i>	<i>45</i>	X	
Concrete	<i>Inert Recycling Facility A, 888 Valle Valley, CA 12345</i>	<i>10</i>	X	
Brick	<i>Inert Recycling Facility B, 777 Valle Valley, CA 12345</i>	<i>6</i>	X	
Dirt	<i>The Landscaping Co., 222 Valle Valley, CA 12345</i>	<i>150</i>	X	
Mixed Inerts			X	
Other (Describe)			X	
Other (Describe)			X	
DISPOSAL				
Other (Describe)			X	
Other (Describe)			X	
Other (Describe)			X	
DIVERSION AND DISPOSAL TOTALS * =		<i>211</i>		

*Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.

ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 2 OF 3 - ALL OTHER C&D WASTE

W. O. Number: <i>XYZ12345</i>		Date Submitted: <i>03/15/2020</i>	
Permitted Waste Hauler Name(s) and Permit No(s): <i>Grava Gravel Haulers, PER-22-333</i>			
Material	Facility Name and Address	Tons Recycled	Tons Disposed
RECYCLING/REUSE			
Metal	<i>Kim Loai Metal Recycling, 333 Camino St, CA 12345</i>	2	X
Wood / Lumber	<i>The Landscaping Co., 222 Valle Valley, CA 12345</i>	15	X
Greenwaste / Landscaping			X
Glass			X
Cardboard			X
Other (Describe)			X
Other (Describe)			X
DISPOSAL			
Mixed Solid Waste	<i>Municipal Landfill, 456 Montana Mountains, CA 12345</i>	X	1
Other (Describe)		X	
Other (Describe)		X	
CERTIFIED PROCESSING**			
Mixed C&D Waste	<i>Certified Facility A (Recycling Rate = 75% = 0.75)</i>	9	3
Mixed C&D Waste	<i>12 tons x 0.75 = 9.00 tons recycled and 3.00 tons disposed</i>		
Mixed C&D Waste			
Mixed C&D Waste			
DIVERSION AND DISPOSAL TOTALS* =		26	4

*Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.

**Recycling tonnages for mixed C&D waste taken to a certified facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.

ATTACHMENT B
INERT SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 3 OF 3 - PROJECT CUMULATIVE TOTAL

W. O. Number: <i>XYZ12345</i>				Date Submitted: <i>03/15/2020</i>			
Period Beginning	Period Ending	*Period Diversion	Cumulative Project Diversion, <u>R</u>	*Period Disposal	Cumulative Project Disposal, <u>D</u>	Cumulative Waste Generated <u>R + D</u>	Cumulative Recycling % (<u>R/G</u>)100
INERT DEBRIS CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 1 OF 3							
<i>2/1/2020</i>	<i>2/28/2020</i>	<i>211</i>	<i>211</i>	<i>0</i>	<i>0</i>	<i>211</i>	<i>100(211/211)= 100.00</i>
ALL C&D OTHER WASTE CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 2 OF 3							
<i>2/1/2020</i>	<i>2/28/2020</i>	<i>26</i>	<i>26</i>	<i>4</i>	<i>4</i>	<i>26+4=30</i>	<i>100(26/30)= 86.67</i>
Does this Report meet the minimum recycling requirement of 80% for Inert Debris and 65% for All Other C&D Waste? Contractor is to meet the minimum recycling requirements of 80% for Inert Debris and 65% for All Other C&D Waste by the end of construction. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>							
Name & title of person responsible for the information in this form: <i>Bobby Lee, Project Manager</i>					Signature: <i>Bobby Lee</i>		

*From appropriate Part 1 or 2 during each period.
 Each Attachment B Part III Report needs to have the Tons Diverted and Tons Disposed from every previous Diversion and Disposal Report documented in it, as well as the totals from this Report.
 Attach another Part III form and continue information if more rows are needed.

**EXAMPLE SOLID WASTE DIVERSION AND DISPOSAL REPORT FOR
PROGRESS PAYMENT #2**

**ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 1 OF 3 - INERT DEBRIS**

Project Title: <i>Big Street Overcrossing</i>		W. O. Number: <i>XYZ12345</i>	Date Submitted: <i>04/15/2020</i>	Progress Payment # <i>2</i>
Company Name: <i>Awesome Engineering Contractors</i>		Daytime Phone Number: <i>(123)456-7891</i>		
Period Covered In This Report: From: <i>3/1/2020</i> To: <i>3/31/2020</i>				
Permitted Waste Hauler Name(s) and Permit No(s): <i>Grava Gravel Haulers, PER-22-333</i>				
Material	Facility and Location	Tons diverted	Tons Disposed	
RECYCLING/REUSE				
Asphalt	<i>Inert Recycling Facility A, 888 Valle Valley, CA 12345</i>		X	
Concrete	<i>Inert Recycling Facility A, 888 Valle Valley, CA 12345</i>	<i>300</i>	X	
Brick	<i>Inert Recycling Facility B, 777 Valle Valley, CA 12345</i>		X	
Dirt	<i>The Landscaping Co., 222 Valle Valley, CA 12345</i>	<i>100</i>	X	
Other (Describe)			X	
Other (Describe)			X	
DISPOSAL				
Other (Describe)			X	
Other (Describe)			X	
Other (Describe)			X	
DIVERSION AND DISPOSAL TOTALS * =		<i>400</i>		

*Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.

ATTACHMENT B
SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 2 OF 3 - ALL OTHER C&D WASTE

W. O. Number: <i>XYZ12345</i>		Date Submitted: <i>04/15/2020</i>	
Permitted Waste Hauler Name(s) and Permit No(s): <i>Grava Gravel Haulers, PER-22-333</i>			
Material	Facility and Location	Tons Recycled	Tons Disposed
RECYCLING/REUSE			
Metal	<i>Kim Loai Metal Recycling, 333 Camino St, CA 12345</i>	<i>1</i>	<i>X</i>
Wood / Lumber	<i>The Landscaping Co., 222 Valle Valley, CA 12345</i>	<i>16</i>	<i>X</i>
Greenwaste / Landscaping			<i>X</i>
Glass			<i>X</i>
Cardboard			<i>X</i>
Other (Describe)			<i>X</i>
Other (Describe)			<i>X</i>
DISPOSAL			
Mixed Solid Waste	<i>Municipal Landfill, 456 Montana Mountains, CA 12345</i>	<i>X</i>	<i>1</i>
Other (Describe)		<i>X</i>	
Other (Describe)		<i>X</i>	
Other (Describe)		<i>X</i>	
CERTIFIED PROCESSING**			
Mixed C&D Waste	<i>Certified Processor A (Recycling Rate = 75% = 0.75)</i>	<i>7.5</i>	<i>3.5</i>
Mixed C&D Waste	<i>10 tons x 0.75 = 7.5 tons recycled and 2.5 tons disposed</i>		
Mixed C&D Waste			
Mixed C&D Waste			
DIVERSION AND DISPOSAL TOTALS* =		24.5	4.5

*Copy the Tons Diverted and Tons Disposed totals to Part 3 Project Cumulative Total. Each Report needs to have the totals from every previous Diversion and Disposal Report documented on it, as well as the totals from this Report.

**Recycling tonnages for mixed C&D waste taken to a certified facility = total tonnage x recycling rate. Remaining tonnage counts as disposal. Example: 200 tons x 0.80 = 160 tons diverted and 40 tons disposed.

ATTACHMENT B
INERT SOLID WASTE DIVERSION AND DISPOSAL REPORT
PART 3 OF 3 - PROJECT CUMULATIVE TOTAL

W. O. Number: <i>XYZ12345</i>				Date Submitted: <i>04/15/2020</i>			
Period Beginning	Period Ending	*Period Diversion	Cumulative Project Diversion, <u>R</u>	*Period Disposal	Cumulative Project Disposal, <u>D</u>	Cumulative Waste Generated <u>R + D</u>	Cumulative Recycling % (<u>R/G</u>)100
INERT DEBRIS CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 1 OF 3							
<i>2/1/2020</i>	<i>2/28/2020</i>	<i>211</i>	<i>211</i>	<i>0</i>	<i>0</i>	<i>211</i>	<i>100(211/211)= 100.00</i>
<i>3/1/2020</i>	<i>3/31/2020</i>	<i>400</i>	<i>211+400=611</i>	<i>0</i>	<i>0</i>	<i>211+400=611</i>	<i>100(611/611)= 100.00</i>
ALL OTHER C&D WASTE CUMULATIVE PROJECT HISTORY, REFER TO ATTACHMENT B PART 2 OF 3							
<i>2/1/2020</i>	<i>2/28/2020</i>	<i>26</i>	<i>26</i>	<i>4</i>	<i>4</i>	<i>26+4=30</i>	<i>100(26/30)= 86.67</i>
<i>3/1/2020</i>	<i>3/31/2020</i>	<i>24.5</i>	<i>26+24.5=50.5</i>	<i>4.5</i>	<i>4+4.5=8.5</i>	<i>50.5+8.5=59</i>	<i>100(50.5/59)= 85.59</i>
<p>Does this Report meet the minimum recycling requirement of 80% for Inert Debris and 65% for All Other C&D Waste? Contractor is to meet the minimum recycling requirements of 80% for Inert Debris and 65% for All Other C&D Waste by the end of construction.</p> <p align="center">YES <input checked="" type="checkbox"/> NO <input type="checkbox"/></p>							
Name & title of person responsible for the information in this form: <i>Bobby Lee, Project Manager</i>					Signature: <i>Bobby Lee</i>		

*From appropriate Part I or II during each period.
Each Attachment B Part III Report needs to have the Tons Diverted and Tons Disposed from every previous Diversion and Disposal Report documented in it, as well as the totals from this Report.
Attach another Part III form and continue information if more rows are needed.

TECHNICAL SPECIFICATION

FOR CONSTRUCTION OF

DEPARTMENT OF RECREATION AND PARKS SOUTH PARK RENOVATION PUBLIC RESTROOM RENOVATION

WORK ORDER NO: E1908366



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**SECTION 024119
SELECTIVE DEMOLITION**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Selective Site Demolition:
 - 1. Demolition of designated site improvements including paving, curbing, site walls, and utility structures.
 - 2. Demolition of below-grade foundations and site improvements to depth to avoid conflict with new construction or site work.
 - 3. Removal of hollow items or items which could collapse.
 - 4. Salvage of designated items.
 - 5. Protection of site work and adjacent structures.
 - 6. Disconnection, capping, and removal of utilities.
 - 7. Pollution control during building demolition, including noise control.
 - 8. Removal and legal disposal of materials.
 - 9. Designated site improvements and adjacent construction.
 - 10. Interruption, capping or removal of utilities as applicable.

- B. Selective Building Demolition:
 - 1. Selective demolition of interior partitions, systems, and building components designated to be removed.
 - 2. Selective demolition of exterior facade, structures, and components designated to be removed.
 - 3. Protection of portions of building adjacent to or affected by selective demolition.
 - 4. Removal of abandoned utilities and wiring systems.
 - 5. Notification to Owner of schedule of shut-off of utilities which serve occupied spaces.
 - 6. Pollution control during selective demolition, including noise control.
 - 7. Removal and legal disposal of materials.
 - 8. Protection of designated site improvements and adjacent construction.
 - 9. Salvage of designated items.
 - 10. Interruption, capping or removal of utilities as applicable.

- C. Hazardous Materials:
 - 1. Not present.
 - 2. Removed under separate prior contract.
 - 3. Removed as a part of this contract.

1.2 SUBMITTALS

- A. Submit under provisions of Section 01330 – Shop Drawings / Submittals

- B. Schedule: Submit for approval selective demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility

service.

1.3 QUALITY ASSURANCE

- A. Codes and Regulations: Comply with governing codes and regulations. Use experienced workers.

1.4 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.5 SEQUENCING

- A. Immediate areas of work will not be occupied during selective demolition. The public, including children, may occupy adjacent areas.
- B. No responsibility for buildings and structures to be demolished will be assumed by the Owner.
- C. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 - PRODUCTS - Not applicable to this Section.

PART 3 - EXECUTION

3.1 SELECTIVE DEMOLITION

- A. Demolition Operations: Do not damage building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner, shall be removed from structure. Storage or sale of items at project site is prohibited.
- B. Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished.
- C. Shoring and Bracing: Provide and maintain interior and exterior shoring and bracing.
- D. Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having

jurisdiction. If necessary, provide temporary utilities.

- E. Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.
- F. Security: Provide adequate protection against accidental trespassing. Secure project after work hours.
- G. Restoration: Restore finishes of patched areas.

3.2 SCHEDULE

- A. Items for Protection During Demolition and Construction: (The following are samples only)
 - 1. Oak Tree, Palm Tree, and etc.
 - 2. Adjacent Soccer Field and Fence
 - 3. Park Service Driveway
 - 4. LADWP Underground Powerline and Vault
- B. Utilities Requiring Interruption, Capping, or Removal:
 - 1. [Electric.]
 - 2. [Water.]
 - 3. [Gas.]
 - 4. [Sewerage.]

END OF SECTION

SECTION 031000 CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Forms for cast-in-place concrete.
2. Shoring, bracing, accessories and form coating.

B. Work installed but furnished in other Sections:

1. Inserts, bolts, anchors and other items furnished by other trades for installation in formed concrete.

C. Related work:

1. Division 3 for concrete.
2. Division 3 for forms for precast structural or architectural concrete.
3. Division 4 for false work and shoring of masonry.

D. References

1. ACI 117, specifications for tolerances for construction and concrete materials.
2. ACI 347, Guide to Formwork for Concrete.
3. APA Design/Construction Guide, Concrete Forming.

1.2 SYSTEM DESCRIPTION

A. Design requirements:

1. Engineer, fabricate, assemble and install concrete formwork to meet or exceed the criteria indicated and specified, to conform to the profiles indicated and to other requirements of the Contract Documents, to satisfy the requirements of the authorities having jurisdiction, and to provide a watertight, structurally sound, self-draining assembly.
2. If required by the authorities having jurisdiction, prepare and submit reviewed shop drawings, specifications, calculations and any other supporting data required for review and approval, and pay fees incurred, prior to beginning installation.
3. Engineering calculations for these assemblies shall bear the signature and seal of a California-licensed professional engineer.

1.3 SUBMITTALS

- A. Submit manufacturer's product data, specifications, typical installation details and other data as necessary to demonstrate compliance with the specified requirements for form facing materials, including coatings, release agents, ties, joint sealant or tape, and accessories.
- B. Shop drawings: For concrete permanently exposed to view, submit large scale, dimensioned drawings showing materials, profiles, joints, finishes, methods of fabrication and anchorage details.
 - 1. Provide elevation drawings of each concrete plane to be remain exposed.
 - a. Show tie placement, panel layout, construction joint and other pertinent details.
 - b. Show locations of openings and control joints.
 - 2. Coordinate shop drawings with the work of other trades that are part of, or will be incorporated into, the work of this section. Indicate work to be performed by other trades, including adjacent and abutting materials to which this work is to be secured.
 - 3. Drawings shall be complete for each specific area of Project when submitted.
 - 4. Shoring and re-shoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and re-shoring installation and removal.
- C. Records: Keep an accurate record of the dates of all form removal and furnish copies to the architect.

1.4 QUALITY ASSURANCE

- A. Grading: Provide lumber and plywood grade-marked by a grading agency acceptable to the authorities having jurisdiction.
- B. Qualifications:
 - 1. Professional Engineer qualifications: California licensed professional engineer and experienced in providing engineering services of the kind required.
 - 2. Installer's qualifications: Firm and individuals with a minimum of 3 consecutive years experience in the fabrication and erection of concrete formwork on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.
- C. Mockup: As specified in Section 033000.

1.5 HANDLING

- A. Store materials outdoors, off the ground on pallets, protected with breathing type covers.
- B. Handling: Handle form facing materials to prevent damages that could be transferred to finished concrete work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Forms for exposed concrete surfaces – general: Plywood, metal, metal-framed/plywood-faced, or FRP which will provide continuous, flat or curved as applicable, smooth exposed concrete surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings, where indicated.
 - 1. Type:
 - a. For smooth concrete to remain exposed without further treatment: Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1) Plywood, metal, or other approved panel materials.
 - 2) Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - 3) High-density overlay, Class 1 or better.
 - 4) Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - 5) Structural 1, B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
 - b. For concrete surfaces to be sacked and rubbed: DOC PS-1 “B-B (Concrete Form) Plyform,” Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
 - c. Elsewhere where concrete will remain exposed, with or without a mechanical finish: Overlaid plywood complying with DOC PS-1 “A-C or B-B High Density Overlaid Concrete Form,” Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
 - B. Forms for concealed concrete surfaces: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
 - C. Forms for cylindrical columns and supports:
 - 1. Metal, fiberglass-reinforced plastic, or paper or fiber tubes.

2. Provide paper or fiber tubes of laminated piles with water-resistant adhesive and wax-impregnated exterior for weather and moisture protection.
 3. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.
 4. Unless otherwise indicated, provide forms or form liners that will leave type leaving no marks in concrete after de-forming, Sonotube "Finish Free" by Sonoco, "Commercial" by Sonoco, Spiral Paper Tube and Core or equal, one piece length for full height. Provide one piece plastic liner for exposed tube formed columns.]
- D. Foam filler: ASTM C 578, Type IV, 1.8-lb/cu. feet density.
- E. Chamfer strips: Extruded PVC, with a 3/4-inch diagonal faces unless otherwise indicated, by Greensteak Group, Inc., Barker Steel LLC, or equal, or oiled softwood shapes with the same profile.
- F. Form coatings: Commercial formulation form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces; one of the following, or equal; do not use form oil.
1. Formshield WB by the Euclid Chemical Co.
 2. Clean Strip J-1-A by Dayton Superior Construction Chemicals.
 3. J-3 Light by Dayton Superior Construction Chemicals.
 4. Magic Kote VOC by Dayton Superior Construction Chemicals.
 5. Durogard Plus by WR Meadows.
 6. Debond by L & M Construction Chemicals Inc.
- G. Prefabricated construction joint keyways: Key-Loc by Form-A-Key Products Div. of Cardinal Manufacturing Co., BoMetals Inc., or equal, complete with all accessories.
- H. Form voids: One of the following types.
1. Corrugated fiberboard by SureVoid Products, Inc., or Deslauriers, Inc. or equal.
 2. Expanded polystyrene foam blocks complying with ASTM D 6817, with a minimum compressive strength of 15 psi, Thermal Star X-Grade by Atlas EPS, Geofoam by AMF Corp. or equal.
 - a. Provide in accordance with the manufacturer's standard specifications with related and required manufacturer's hardware and adhesives

2.2 FORMWORK REQUIREMENTS

- A. General:

1. The design and construction of forms and shoring are the contractor's responsibility, but shall comply with specified requirements.
2. Form contact surfaces shall be clean, free from dents, holes and other imperfections.
3. Establish and maintain benchmarks, lines and controls necessary to achieve specified tolerances.
4. Take an accurate survey of the form location just prior to concrete pour.

B. Earth bank:

1. Except for exterior face of wall footings and grade beams that must be formed, earth banks may be used to form footings and grade beams if the soil is firm, neatly trimmed, and will retain concrete in the required size and shape.
2. Increase the concrete coverage as required by the authorities having jurisdiction when concrete is cast against earth.

C. Wood forms:

1. Construct with plywood panels as large as practicable where, because of their height, walls and columns have a horizontal form joint, the horizontal joint shall align throughout the floor, or area unless accepted otherwise by Architect.
2. For concrete permanently exposed to view, fill voids and imperfections in form contact surfaces with body putty sanded flush and smooth and seal joints between panels with compound paste specifically designed to seal forms, or other approved material, to prevent concrete leakage.
3. Provide sharp, clean corners at form intersecting planes, without visible edges and offsets. Back joints with additional studs or girts.
4. Form recesses and projections with smooth finish materials, and install in forms with sealed joints to prevent displacement.
5. Drill holes accurately in forms to fit ties used. Prevent leakage of concrete around tie holes. Do not drive ties through undersized or improperly prepared holes.
6. Kerf backside of wood inserts used for forming keyways, reglets, recesses and similar treatments, to allow wood to swell without spalling concrete, and to assure easy removal.

D. Metal forms:

1. Provide sections of metal forms that fasten tightly and interlock securely.
2. Cut or drill forms for attaching sleeves or other items to be embedded in concrete.
3. Provide precisely cut openings required by trades.

E. Re-use of forms:

1. Form materials may be re-used if they produce finished surfaces equal to finished surfaces where new form materials are used.

2. Before reuse, thoroughly clean, recondition in every respect, suitable for their re-use purpose.
- F. Tolerances: To obtain cast-in-place concrete not exceeding the tolerances specified in Section 033000, except support form facing material to limit deflection to L/360 between supports for concrete exposed to view, and L/270 for all other concrete.
- G. High density insulation filler:
1. Use boards of maximum thickness to achieve insulation depth.
 2. Where required, apply adhesive to layers of insulation to prevent movement during concrete placement.
 3. After boards are installed, protect until concrete topping is prepared and placed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions and measurements affecting the work of this Section at site.
- B. Correct detrimental conditions to the proper and timely completion of this work before proceeding with installation.

3.2 FORMWORK INSTALLATION

- A. Construction:
 1. Comply with the applicable provisions of ACI 347, Guide to Formwork for Concrete, and APA Design/Construction Guide "Concrete Forming."
 2. Rigidly support and construct forms to the lines, surfaces and profiles necessary to produce concrete to the design indicated.
 3. Construct forms to be removable without prying against concrete.
 4. Make forms tight, without cracks or holes, to prevent leakage of mortar or loss of fine particles from concrete.
 5. Cover or fill holes that are not used, and cracks that have opened up, flush with adjacent surfaces.
- B. Wales and studs: Provide wales and studs of adequate size and spacing to prevent form failure and to obtain concrete within the tolerances specified.
- C. Form contact surfaces: As specified above, except that the plywood form facing material specified must be used for concrete permanently exposed to view. Forms for all other concrete may be constructed of plywood, fiberglass, plastic, or steel.

1. To eliminate joint offsets, block plywood edges that do not occur at bearing points.
 2. Do not expose plywood edges to concrete.
- D. Special features:
1. Corners: Form exposed corners between beams and columns to produce a square, smooth, solid joint without paste leakage.
 - a. Except where chamfers are indicated, miter or cope corners accurately and attach securely to the form facing material with adhesive or nails driven flush with the item being fastened. Avoid hammer marks. Provide sharp, clean corners, without visible edges or offsets at intersecting planes. Back joints with extra studs or girts to maintain square intersections.
 - b. Install chamfer strips in corners of all other forms, unless otherwise indicated. Miter chamfer strip at changes in direction.
 - c. Corners that will be concealed in the Work may be formed either square or chamfered.
 2. Concrete details: Form offsets, keys, reglets, seats, pockets, anchorages, moldings, chamfers, blocking, screeds, drips, bulkheads and other required features as indicated or as necessary to receive or engage the work of other trades.
 3. Openings, chases and recesses: Form as indicated or necessary to receive, pass and clear other work.
 - a. Verify sizes and locations with other trades before forming. Closely coordinate the location of boxes, cans and sleeves furnished by other trades.
 - b. Seal edges of cutouts and holes in plywood.
- E. Form release agent: Thoroughly clean forms and coat with release agent prior to initial use (except when mill-oiled) and before each reuse.
1. Apply form coating before reinforcement and embeds are placed.
 2. Apply form coating in accordance with its manufacturer's instructions and coverage rates. Do not over-apply.
 3. Provide a coating of uniform thickness. Do not allow excess form coating material to accumulate in forms or to come into contact with in-place concrete against which fresh concrete will be placed.
 4. Coat steel forms with a non-staining rust preventive material. Rust-stained steel formwork is not acceptable.
- F. Tolerances: Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows.
1. Class A, 1/8-inch
 2. Class B, 1/4-inch

3. Class C, 1/2-inch
4. Class D, 1-inch

3.3 FORMWORK REMOVAL

- A. Remove forms after concrete has developed sufficient strength to not be damaged by form removal operation and to safely sustain its own weight and superimposed loads, as determined by testing field-cured concrete cylinders, but not sooner than specified in ACI 347, Paragraph 3.6.2.3 and no less than 12 hours per CBC 1906A.2.
- B. Take care when removing forms that concrete surfaces are not marred or gouged, that corners are true, sharp and unbroken. Do not pry against concrete when removing forms.
- C. Cut off nails flush on concealed surfaces. Cutback tie wires and nails in exposed concrete surfaces at least 1-1/2-inches. Remove rod and cone ties and separators or similar devices and pull inward away from finished surfaces.
- D. Where used, remove rod and cone ties and separators or similar devices and pull.

3.4 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- B. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 SHORES AND RESHORES

- A. Contractor shall engineer shoring to comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

Do not remove shoring or reshoring until measurement of slab tolerances is complete.

In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

Plan sequence of removal of shores and reshore to avoid damage to concrete.

Locate and provide adequate reshoring to support construction without excessive stress or deflection.

END OF SECTION

SECTION 032000 CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Reinforcing steel for cast-in-place concrete.
2. Supplementary parts and components, such as clips, fasteners, chairs, tie wires, and other miscellaneous accessories required for a complete installation.

B. Related work:

1. Division 4 for reinforcing steel for masonry.

C. Codes:

1. Los Angeles City Building Code 2017, Section 1906
2. Standard Specifications for Public Works Construction, 2018 Edition

D. Standards

1. ACI-301 - Specifications for Structural Concrete for Buildings.
2. ACI-315 - Details and Detailing of Concrete Reinforcement.
3. ACI-318 - Building Code Requirements for Reinforced Concrete.
4. ASTM A82 - 16-gage Cold Drawn Steel Wire for Concrete Reinforcement.
5. ASTM A1 85 - Welded Steel Wire Fabric for Concrete Reinforcement, sizes as noted on the Contract Drawings.
6. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
7. ASTM A615 - Deformed and plain Billet-Steel Bars for Concrete Reinforcement grades as called for on the Contract Drawings.
8. ASTM A706 - Low-Alloy Steel deformed bars for Concrete Reinforcement.
9. AWS.D1 .4 - Structural Welding Code Reinforcing Steel.
10. CRSI - Manual of Practice.
11. CRSI-93 - Recommended Practice for Placing Reinforcing Bars.
12. CRSI-92 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

1.2 SUBMITTALS

A. Shop drawings:

1. Submit shop drawings prepared by a California-registered licensed professional Structural or Civil engineer showing fabrication, bending, and placement of concrete reinforcing.
2. Submit bar drawings and schedules with the corresponding placing diagrams.
 - a. Comply with ACI SP-66.

- b. Indicate bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcing.
 - c. Include special reinforcing required for openings through concrete structures.
 - 3. Drawings shall be complete for any specific area of Project when submitted.
 - B. Certificates: Submit copies of mill reports and test data for reinforcing steel sampled prior to starting this work.
 - 1. Mill reports shall contain the steel source, description, heat number, yield point, ultimate tensile strength, elongation percentage, bend test and chemical analysis.
 - a. If the reports show material is satisfactory no tests will be required.
 - b. For foreign steel, perform testing as specified below by a testing laboratory acceptable to the authorities having jurisdiction.
 - c. Certification from any other sources is not acceptable.
 - 2. Ensure material delivered for use is that represented by mill reports.
 - 3. Obtain copies of mill reports, examine them, certify whether the material represented complies with Specifications requirements, and make distribution of reports as required. Report chemical composition of each heat, as determined by ladle analysis.
 - C. Test reports: Submit test data for reinforcing steel sampled and tested prior to starting this work.
 - 1. Where materials proposed for use cannot be identified, pay for an approved testing laboratory to make one series of tests (tensile and bend) from each 2.5 tons, or fraction thereof, of each size and kind of reinforcing steel.
 - 2. Include minimum 2 samples of sufficient length to allow tests to be made on the as-rolled bar.
 - D. Welding qualifications: Qualify procedures and personnel according to AWS D1.4, Structural Welding Code – Reinforcing Steel.

1.3 HANDLING

- A. Delivery:
 - 1. Deliver reinforcing to the site bundled, tagged and marked; handle to prevent damage to material.
 - 2. Use metal tags indicating size, length and other markings shown on placement drawings. Maintain tags after bundles are broken.
- B. Storage:
 - 1. Electrode storage: Comply with the combined recommendations of AWS and the electrode manufacturer for storage of electrodes. Do not use electrodes that have been wetted.
 - 2. Store epoxy-coated bars on protective cribbing. Maintain tags after bundles are broken.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing steel: ASTM A 615, Grade indicated on Drawings and for reinforcing to be welded use bars complying with ASTM A 706, Grade 60.
 - 1. Where galvanized bars are indicated, bars shall also comply with ASTM A 767, Class II (2 oz./sq. ft.) and shall be galvanized after fabrication.
 - 2. Where epoxy-coated bars are indicated, bars shall also comply with ASTM A 775.
- B. Welded wire mesh: ASTM A 185. Provide in flat sheets, not rolls.
- C. Column spirals: Plain, cold-drawn wire, ASTM A 82 or hot-rolled rods for spirals, ASTM A 615, including supplementary requirements S-1.
- D. Synthetic fiber: Basis of design is for "Fibrasol F" fibrillated polypropylene fibers, complying with ASTM C 1116, Type III, 1/2 to 1-inch lengths, by Axim Concrete Technologies. Other acceptable materials/manufacturers include the following:
 - 1. "Fibermesh InForce e3" by SI Concrete Systems.
 - 2. "Fiberstrand 100" by The Euclid Chemical Co.
 - 3. "Grace MicroFiber" by W. R. Grace & Co.
- E. Welding electrodes: AWS A5.1 E70XX Series, low hydrogen, having a minimum yield point of 60,000 psi.
- F. Tie wire:
 - 1. ASTM A 82, 16-gage (minimum) annealed steel wire.
 - 2. Use tie wires complying with ASTM A 884 for tying epoxy-coated bars.
- G. Supports for reinforcing: Provide bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire mesh in place. Use wire-bar-type supports complying with Concrete Reinforcing Steel Institute (CRSI) specifications.
 - 1. Slabs-on-grade: Provide supports with sand plates or horizontal runners where base material will not support chair legs, or precast concrete block chairs with embedded wire ties.
 - 2. Exposed concrete surfaces: Where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
 - 3. Over waterproof membranes and vapor retarder: Provide precast concrete chairs to prevent puncturing of membrane.
- H. Recycled content of steel products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- I. Splice sleeves: Conforming to ICC Report ES ER-3967.
 - 1. Acceptable manufacturers:
 - a. Erico, Inc.: Lenton Coupler.

- b. Splice Sleeve North America; NMB Splice Sleeve.
- c. Richmond Screw Anchor Co.; Rebar Splicing System.
- d. Dywidag Systems International; Extruded Coupler Splice.

- 2. Description: Steel sleeves conforming to requirements of National Research Board Report No. NRB-217, published by the Council of American Building Officials of Homewood, IL. Identify each splice sleeve by the size and type imprinted on the sleeve.

2.2 FABRICATION

- A. General: Except as modified by the Contract Documents, comply with Chapter 7 of CRSI Manual of Standard Practice for fabrication of reinforcing steel except that supports of epoxy-coated bars shall rest on coated wire bar supports, or on bar supports made of dielectric material.
- B. Bending and forming:
 - 1. Fabricate steel bars, wire and welded wire mesh to sizes, lengths and gages indicated.
 - 2. Accurately form to shapes by methods that will not damage the materials or the coating on epoxy-coated bars
 - 3. Heating of reinforcing for bending is not permitted.
- C. Tolerances: Comply with ACI 117.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions and measurements affecting the work of this Section at site.
- B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

- A. Clean reinforcing of loose mill scale, excessive rust, oil, and other coating that might destroy or reduce its bond before placing it.

3.3 PLACING

- A. Place reinforcing under the continuous inspection of the onsite Deputy Inspector.
- B. Placing: Comply with the listed reference standards as applicable. Do not install bars with unscheduled kinks or bends.
- C. Spacing of reinforcing: Space reinforcing to maintain proper distance and clearance between parallel bars and between bars and forms.

- D. Floor system reinforcing: Do not place until concrete in walls and columns has been placed and forms and projecting steel have been thoroughly cleaned.
- E. Splices:
1. Do not splice reinforcing bars except where indicated.
 2. At lapped splices, bars shall be in contact, unless noted otherwise on the Drawings, and shall be firmly wired together before placing concrete.
 3. Extend stubs and dowels required to receive and engage subsequent work a sufficient length to develop the strength of the bar.
 4. Place dowel and stub bars in the forms and secure against displacement during placing of concrete.
- F. Welded wire mesh reinforcing:
1. Straighten and cut to required size where required and lay flat in place.
 - a. Lap welded wire mesh one full mesh plus 2 inches.
 - b. Securely wire together and to other reinforcing at approximately 24 inches o.c.
 2. In concrete slabs-on-grade, extend welded wire mesh to within one inch of expansion, construction and contraction joints. As concrete is placed, chair welded wire mesh to ensure proper embedment at position indicated.
 3. In concrete slabs on steel deck, extend welded wire mesh through construction joints 12 inches minimum. Lift welded wire mesh as concrete is placed to ensure proper embedment at position indicated.
- G. Clearance: Maintain clear distances between reinforced steel and face of concrete indicated on the Drawings.
- H. Sleeved splices: install spliced sleeves only where indicated in accordance with manufacturer's instructions.

3.4 WELDING

- A. Welding:
1. Use only ASTM 706 steel where welding is proposed. Perform welding, where shown or approved, by the direct electric arc process in accordance with AWS D1.4 using specified low-hydrogen electrodes.
 2. Preheat 6 in. each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is prohibited.
 3. Do not tack weld bars.
 4. Clean metal surfaces to be welded of all scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal.
 5. Cut out welds or parts of welds found defective with chisel and replace with proper welding.
 6. Prequalification of welds shall be in accordance with Code.
- B. Welded splices: Use full penetration butt welds made by the electric-arc method unless indicated otherwise.

1. Use only welders who have passed the AWS standard qualification tests within the previous year and have an active Los Angeles City Department of Building and Safety Certification.
 2. Weld splices shall develop 125 percent of the specified yield strength of the reinforcing bars, or of the smaller bar in transition splices.
 3. Clean bars of oil, grease, dirt and other foreign substances, and flame-dry before welding.
 4. Prepare ends of bars in compliance with AWS D1.4.
 5. Preheat bars before welding.
- C. Welding Inspection. All welding must be continuously inspected by a Los Angeles City Department of Building and Safety Certified Inspector. Where welding is done in excess of the maximum permitted by ASTM A 775, clean the damaged area and touchup with repair material complying with ASTM A 775.

END OF SECTION

SECTION 033000 CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
 - 2. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
 - 3. Section 321313 "Concrete Paving" for concrete pavement and walks.
 - 4. Section 031000 Concrete Formwork
 - 5. Section 032000 Concrete Reinforcement
 - 6. Section 042200 Concrete Unit Masonry
 - 7. Section 033500 Concrete Finishes
- C. Codes and Standards
 - 1. Los Angeles City Building Code 2017, Section 1906
 - 2. Standard Specifications for Public Works Construction, 2018 Edition
 - 3. ACI 301 - Specifications for Structural Concrete for Buildings.
 - 4. ACI 318 – Building code for reinforced concrete.
 - 5. Concrete reinforcing steel institute "Manual of Standard Practice."
 - 6. Concrete curing should conform to quality as specified in Specifications for Public Works Construction 2018 and latest Amendments thereto.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.
- C. Exposed Concrete: All concrete that is visible in the finished work, including concrete to be painted
- D. Unexposed Concrete: All concrete that is concealed in the finished work, including plastered surfaces and attic/utility spaces.

1.3 ACTION SUBMITTALS

- A. Product Data: Within 30 calendar days after the Contractor has received the City's "Notice to Proceed", submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements

- B. Mix Design: Submit to the City Engineer for review and approval. Distribute approved mix designs to testing laboratory, batch plant; job-site and Governmental Agency having jurisdiction. Mix design shall be signed by a licensed California Structural or Civil Engineer or Inspector and shall include curing method contractor intends to use. Indicate amounts of mixing water to be withheld for later addition at Project site. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.
- D. Samples: For waterstops and vapor retarder.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, and testing agency.
- B. Welding certificates.
- C. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Fiber reinforcement.
 - 6. Waterstops.
 - 7. Curing compounds.
 - 8. Floor and slab treatments.
 - 9. Bonding agents.
 - 10. Adhesives.
 - 11. Vapor retarders.
 - 12. Semi-rigid joint filler.
 - 13. Joint-filler strips.
 - 14. Repair materials.
- D. Load Tickets: In addition to the Contractor's copy, deliver a legible copy of each load ticket from the producer to the inspector. Load ticket shall state quantities of all material in each load and shall be signed by weigh master. The inspector shall record on each copy, the slump and location where placed on the job. Maintain tickets at job-site.
- E. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- F. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- G. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- H. Field quality-control reports.
- I. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- D. Quality Control:
 1. Do not commence placement of concrete until mix designs have been reviewed and approved by the Project Manager or Inspector and all governmental agencies having jurisdiction, and until copies are at the job-site, the batch plant, and the Department of Building and Safety
 2. Testing stated in Part 3 of this Section shall apply.
 3. Mix Design: Submit to the Project Manager or Inspector for review and approval. Distribute approved mix design(s) to Testing Laboratory, Batch Plant; job-site and Governmental Agency having jurisdiction. Mix design shall be signed by a licensed Engineer or Inspector and shall include curing method contractor intends to use.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.
- F. Batch Plant Inspections: Required for all structural concrete. Inspection shall be by a City's Construction Administration's material control inspector. The inspector shall be present at the beginning of each day of batching and shall perform the following: The contractor shall notify the inspector at least 24 hours in advance of mixing time.
 1. Check plant and equipment quality.

2. Check identity of materials.
 3. Check aggregate grading, characteristics and water content.
 4. Verify mix designs being used.
 5. Check proportioning and loading of concrete materials
 6. Issue certifications of quality and quantity of materials as batched
 7. After verification of above, return to the job-site for placement inspection.
- G. Continuous Placement Inspection: Required for all structural concrete and to be performed by an LADBS certified deputy inspector approved by the Project Manager. The inspector shall perform the following procedures:
1. Verify condition and adequacy of forms and reinforcement placement.
 2. Insure that concrete is of required quality and consistency.
 3. Insure that all requirements and conditions of concrete placement are met.
 4. Make slump tests and secure cylinders
 5. Provide written reports at regular intervals reporting concrete practices.
- H. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.
1. Build panel approximately 200 sq. ft. for slab-on-grade and 100 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Architect.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.
2. ACI 117.

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

3. Overlaid Finnish birch plywood.

- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

- H. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Galvanized Reinforcing Bars: ASTM A 615 Grade 60
- D. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.
- E. Deformed-Steel Wire: ASTM A 1064/A 1064M.
- F. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - 3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.5 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I for lightweight filled deck and drag beams, Type V for all foundations: slab, grade beams, footings.
 - 2. Fly Ash: ASTM C 618, Class F
 - 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
 - 4. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Lightweight Aggregate: ASTM C 330/C 330M, 3/4-inch nominal maximum aggregate size.
- E. Air-Entraining Admixture: ASTM C 260/C 260M.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- G. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
 - 1. Color: As selected by Architect from manufacturer's full range.
- H. Water: ASTM C 94/C 94M and potable.

2.6 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Follow the requirements set forth in the Standard Specifications for Public Works Construction 2012 Edition
- C. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.7 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Slab on grade, Grade beams, and Footings: Normal-weight concrete.
1. Mix design per Standard Specifications for Public Works Construction 2018 Edition for concrete with moderate sulfate exposure, Use 658-CME-4500P
 2. Minimum Compressive Strength: 4500 psi at 28 days
 3. Slump Limit: 4 inches, plus or minus 1 inch.
- B. Concrete Toppings: Light-weight concrete.
1. Mix design per Standard Specifications for Public Works Construction 2018 Edition, Use 565-C-3250P (LWT)
 2. Minimum Compressive Strength: 3250 psi at 28 days
 3. Maximum W/C Ratio: 0.45
- C. Drag Beam on top of CMU: Normal-Weight Concrete
1. Mix design per Standard Specifications for Public Works Construction 2018 Edition, Use 560-C-3250
 2. Minimum Compressive Strength: 3250 psi at 28 days
 3. Slump Limit: 4 inches, plus or minus 1 inch.

2.8 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
- D. Retain surface classes, usually two or more, in two subparagraphs below. See discussion in "Formwork" Article in the Evaluations. Coordinate with rough- and smooth-formed finishes in "Finishing Formed Surfaces" Article.
- E. Class A, 1/8 inch for smooth-formed finished surfaces.
- F. Class B, 1/4 inch for rough-formed finished surfaces.
- G. Construct forms tight enough to prevent loss of concrete mortar.
- H. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.
- I. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- J. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- K. Chamfer exterior corners and edges of permanently exposed concrete.
- L. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- M. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

- N. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- O. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

- F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
- G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780/A 780M. Use galvanized-steel wire ties to fasten zinc-coated steel reinforcement.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least **one-fourth** of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view .
- C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 - 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 - 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
 - 1. Apply scratch finish to surfaces indicated
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces indicated
 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
 - b. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
 - c. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
 - d. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 24.
 3. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
 1. Coordinate sizes and locations of concrete bases with actual equipment provided.

2. Construct concrete bases specified per plan, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
 3. Minimum Compressive Strength: 4500 psi at 28 days.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

- a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
- a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 LIQUID FLOOR TREATMENT APPLICATION

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a Los Angeles City Deputy special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Steel reinforcement welding.
 - 3. Headed bolts and studs.
 - 4. Verification of use of required design mixture.
 - 5. Concrete placement, including conveying and depositing.
 - 6. Curing procedures and maintenance of curing temperature.
 - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 - 6. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 7. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
 12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

3.15 PROTECTION OF LIQUID FLOOR TREATMENTS

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

SECTION 033500 CONCRETE FINISHES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Furnish and apply abrasion and chemical-resistant sealer over interior concrete floors. All concrete finish interior floors, shall be natural (standard grey color) finish, or as denoted on the Finish Schedules, with a clear seal, exposed concrete (no other finish). Use all means necessary to protect the floors so as not to mar the finish appearance once installed. The storage of metal components, paint cans, tools and similar items directly on the concrete floors is strictly prohibited. Damage to the concrete may result in the complete removal and replacement of the concrete, subject to the Architect's and City Engineer's analysis. All concrete surfacing and special finishes or treatment including, but not necessarily limited to:

- B. Furnish and apply grinding and stain over interior and exterior exposed concrete floors and provide integrally-colored concrete components such as planter benches where so denoted. Locations are as referenced in the Drawings and the Schedules.

1.02 RELATED SECTIONS

- A. Section 033000: Cast-In-Place Concrete

- B. Section 079200: Joint Sealants

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Do not mix nor apply materials when temperature is less than that recommended by manufacturer.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01330: Submittals.

- B. Furnish certification that materials meet Specification requirements.

- C. Furnish 5 copies of manufacturer's recommended instructions for application of chemical-resistant sealer for interior concrete floors.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Minimum of 3 years of experience on installations using the applications as defined in this Section.

- B. Contractor shall sample and perform preliminary testing of the existing concrete floor in a designated area to understand the characteristics of the conditions. Contractor shall also provide sample treatments of the intended finish flooring system to establish the quality for the installation of the project. Contractor shall provide repeat samples (up to six (6) as deemed required until a finish sample is accepted by all parties.

- C. Manufacturer's recommended maintenance instructions.
- D. Rejections: Finishes
 - 1. Installation does not match approved samples.
 - 2. Excessive air pits evident in the seal coat.
 - 3. Foreign material embedded in the seal coat.
- E. Warranty: Manufacturer's standard twenty (20) years Limited Material Warranty.

1.06 PRODUCT HANDLING

- A. Deliver products in manufacturer's original containers with seals and labels intact.
- B. Store materials in enclosed space protected from weather and out of direct rays of sun.
- C. Store materials above ground.
- D. Maintain storage temperature as recommended by manufacturer.

PART 2 - PRODUCTS

Note: All finished concrete horizontal surfaces shall meet the following minimum static and dynamic coefficient of friction:

- A. Level surfaces: 0.6 minimum.
- B. Step treads: 0.6 minimum.
- C. Ramp surfaces: 0.8 minimum.

2.01 FINISH SEALER

- A. Acceptable Installers:
 - 1. Mike Payne + Associates, Inc. Lake Elsinore, CA. Telephone: 951.674.8377. Telefax: 951.674.7828. E.mail: mikepayne@earthlink.net or approved equal.
- B. Acceptable Manufacturers:
 - 1. Vexcon Chemicals Inc. 7240 State Road Philadelphia, PA 19135 or approved equal. Telephone: (888) 839-2261. Telefax: (215) 332-9997. Website: www.vexcon.com.
 - a. Crack and spall Sealer: S.B.A. Bonding Agent incorporating 66% 90-Grit Silica Sand and 34% Portland Cement or approved equal, as recommended by the manufacturer.
 - b. Stain and Blemish Remover: As recommended by the manufacturer
 - c. Star Seal PS Clear Liquid Floor Hardener, base coat
 - d. Star Seal Fixative, second coat

- e. Star Seal PS Finish Coat, finish coat.
 - f. Coverage: 250 square feet per gallon per coat. Allow drying time between coats as recommended by the manufacturer.
3. Grinding and Surface Preparation Stones and Plugs, horizontal surfaces only:
- a. 120 and 220-Grit Carborundum Grinding Stones.
 - b. 50 and 80-Grit Diamond Plugs.
4. Locations: All interior exposed concrete floors as indicated on the Drawings and Finish Schedules.

PART 3 - EXECUTION

3.01 INTERIOR INSTALLATION

- A. Inspect slab for foreign matter that must be removed prior to the initial grind.
- B. Grind slab with 24-grit stones to remove laitance and expose aggregate. Edge grind with hand machine to complete initial grind.
- C. Prepare all flooring to receive seal coats. Fill all cracks with manufacturer's recommended material. Remove all removable stains and blemishes. Perform all other necessary preparation per strict manufacturer's standards. Fill large cracks and spalls with approved material. Grout entire floor and let cure.
- D. Grind entire floor with 80 to 220-grit stones to provide a smooth floor finish.
- E. Wash floor with clean potable water and let dry completely.
- F. Apply Vexcon Star Seal PS at recommended coverage rates.
- G. Apply Vexcon Star Seal Fixative at recommended coverage rates.
- H. Apply Vexcon Star Seal Finish Coat at recommended coverage rates.
- I. Wash floor with clean potable water and let dry completely.
- J. Polish floor to specified finish level in appropriate sequence with diamond pads. Buff with dry polishing pad.

END OF SECTION

SECTION 036200 NON-SHRINK GROUTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Grout under column base plates, and elsewhere as shown on the Drawings and required by job conditions.

1.2 SUBMITTALS

- A. Data: Submit manufacturer's product data, specifications, and other data as necessary to demonstrate compliance with the specified requirements for each type of grout proposed for use.

1.3 HANDLING

- A. Delivery:
 - 1. Deliver materials to project site in original unopened packages, clearly labeled with manufacturer's identification labels intact and legible, indicating manufacturer's name, brand, type, source of product, date of manufacture, UL classification, expiration date and grade.
 - 2. Protect materials from excessive moisture in shipment, storage, and handling.
- B. Storage: Store materials indoors, off the ground on pallets, protected with breathing type covers.

1.4 PROJECT CONDITIONS

- A. Do not install grout under adverse weather conditions, or when temperature, humidity or other environmental requirements are beyond manufacturer's recommended limits.

1.5 SEQUENCING

- A. Obtain setting templates from affected trades where the spacing and alignment of anchors, bolts, and similar items is critical.
- B. Embed anchors, bolts, inserts and other items in grout as the Work progresses.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of design is for “Crystex” high flow, non-shrink grout by L & M Construction Chemicals, Inc. Other acceptable materials/manufacturers include the following:
 - 1. “Masterflow 713” by Master Builders.
 - 2. “Five Star Grout” by US Grout Corp.
 - 3. Or equal.

2.2 MATERIALS

- A. Grout: Pre-packaged, non-metallic, non-gaseous, non-shrinking when tested in accordance with ASTM C 1107 Grade B or C at a fluid consistency (flow cone) of 20 to 30 seconds.
 - 1. 30-minute old grout shall flow through flow cone after slight agitation, in temperatures of 40 to 0 deg. F.
 - 2. Grout shall be bleed-free.
- B. Grout strength:
 - 1. Under base plates for steel columns: Minimum 7,500 psi 28-day strength.
 - 2. At non-structural locations: Minimum 4,000 psi 28-day strength.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and surfaces to receive materials, and conditions under which materials will be applied.
- B. Verify surfaces to receive grout are free from dust, construction debris, oil, grease, waxy films, curing compounds, release agents and other deleterious materials that would negatively affect the quality of installation, durability and material performance.
- C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

- A. Concrete and masonry surfaces:
 - 1. Clean concrete and masonry surfaces that will be in contact with grout of dust, construction debris, form oil, curing compound and other contaminants.
 - 2. Roughen concrete surfaces by chipping or sandblasting to expose coarse aggregate.
 - 3. Presoak concrete and masonry surfaces thoroughly for not less than 24 hours prior to grouting to reduce their suction.
- B. Steel: Remove loose rust and scale, oil, dirt, and other contaminants.

- C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.3 COORDINATION

- A. Obtain setting templates from affected trades where the spacing and alignment of anchors, bolts, and similar items is critical.
- B. Embed anchors, bolts, inserts and other items in grout as the work progresses.

3.4 GROUTING

- A. Mix grout with recommended amount of water in a mixer, all in compliance with its manufacturer's instructions. Do not place grout when ambient temperature is not within the range recommended by its manufacturer.
- B. Construct watertight forms around base plates to provide an approximately one-inch clearance on 3 sides, and additional clearance on the fourth side as necessary to accommodate the flow box into which the grout will be placed and funneled under the base plates.
- C. Grouting under base plates:
 - 1. Place grout under base plates to the thickness indicated on the Drawings, but in no case less than one inch.
 - 2. Wherever possible place grout from one side only to minimize cold joints and air entrapment. Use rods and straps to move grout to its final location. To prevent bleeding and segregation, avoid the use of vibrators.
 - 3. Place grout at least 1/4-inch above the bottom of the base plate to insure complete filling of the grout space.
 - 4. Cut grout shoulders back at a 45 degrees angle from the base of the plate to the concrete foundation just before the grout hardens.
- D. Railing posts, anchor bolts, frames, sills, and similar items:
 - 1. Roughen inside surfaces of grout pocket before proceeding.
 - 2. Brace items plumb and level and leave bracing in place until grout reaches its full strength. Finish grout flush with adjacent surfaces.
- E. Curing: Cure grout in compliance with its manufacturer's printed instructions to prevent rapid evaporation of water and shrinkage cracks.

END OF SECTION

SECTION 042200 CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Pre-faced concrete masonry units.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry-joint reinforcement.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Masonry-cell fill.

B. Products Installed but not Furnished under This Section:

1. Cast-stone trim in concrete unit masonry.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.
2. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
3. Section 071900 "Water Repellents" for water repellents applied to unit masonry assemblies.
4. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

D. Codes and Regulations

1. Perform work in accordance with requirements of chapter 21 of Los Angeles City Building Code and hereinafter referenced Code Section Numbers.
2. ACI 530-11 Building Code Requirements and Specification for Masonry Structures

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection: 2 Full size pieces of each size of block and texture proposed for use
1. Decorative CMUs, in the form of small-scale units.
 2. Pre-faced CMUs.
 3. Colored mortar.
 4. Weep holes/vents.
- D. Samples for Verification: For each type and color of the following:
1. Exposed CMUs.
 2. Pre-faced CMUs.
 3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
1. Masonry units.
 - a. Include data on material properties, material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Integral water repellant used in CMUs.
 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 4. Mortar admixtures.
 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 6. Grout mixes. Include description of type and proportions of ingredients.
 7. Reinforcing bars.
 8. Joint reinforcement.
 9. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

- D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
 - 1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 36 inches long by 36 inches high by full thickness.
 - 2. Build sample panels facing south.
 - 3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
 - 4. Protect approved sample panels from the elements with weather-resistant membrane.
 - 5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Build mockups for each type of exposed unit masonry construction typical exterior and interior walls in sizes approximately 72 inches long by 72 inches high by full thickness, including face and backup wythes and accessories.
 - a. Include a sealant-filled joint at least 16 inches long in each exterior wall mockup.
 - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
 - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 - 3. Protect accepted mockups from the elements with weather-resistant membrane.
 - 4. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

- a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1.8 Warranty

- A. Upon completion of the work of this section and as a condition of its acceptance, deliver to the project manager or inspector two (2) copies of a written warranty signed by the contractor, the water repellent coating application subcontractor and the water repellent coating manufacturer, under which"
 - 1. The three parties mutually agree to maintain the water repellent coated surface free from the penetration of water for a period of two years following date of substantial completion; and
 - 2. The water repellent coating manufacturer agrees to provide water repellent coating materials as required for that purpose for a period of five (5) years following date of substantial completion; and
 - 3. These warranty services will be provided at no additional cost to the city.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
 - 1. ANGELUS BLOCK, CO., INC., (909) 350-0244
 - 2. BASALITE, (209) 833-3670
 - 3. ORCO BLOCK CO., INC., (909) 685-1521
 - 4. RCP BLOCK AND BRICK, INC., (619) 460-7250
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
 1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
- C. CMUs: ASTM C 90.
 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi
 2. Density Classification: Normal weight
 3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.5 MASONRY LINTELS

- A. General: Provide one of the following:

- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type II. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: LOS ANGELES CITY BUILDING CODE SECTION 2103A, ITEM 3
- C. Portland Cement-Lime Mortar: Type "S" proportioned as set forth in 2103A.10 of section 2103A of Los Angeles City Building Code or as noted on the contract drawing complying with section 201-5.1 of the "standard specification" with amount of water for a plastic workable mix. Mortar shall be integrally colored as approved by the project manager or inspector.
 - 1. Mixing time: Machine mixed for at least 3 minutes.
 - 2. Time of use: Within 30 minutes after leaving the mixer. Any mixture not so used to be discarded. Retempering not permitted.
- D. Masonry Grout: Los Angeles City Building Code, Section 2103A.12 proportioned as set forth in Sec. 2103A.12.2 using fine aggregates in grout space where least cell dimension is 4 inches or more. Grout strength as noted on the contract drawings.
 - 1. Fluid consistency as required for pouring in place without segregation of ingredients.
 - 2. Mix by machine for at least 3 minutes and use within 30 minutes after leaving the mixer. Discard grout not used.
- E. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- F. Aggregate for Grout: ASTM C 404.
- G. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for glazed or pre-faced masonry units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.
- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
- I. Water: Potable.

2.7 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime mortar.
 4. For reinforced masonry, use portland cement-lime mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated. Before retaining mortar types in subparagraphs below, see Appendix X1 in ASTM C 270 and BIA Technical Notes 8A and 8B for recommendations; coordinate with requirements for masonry compressive strengths.
1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced masonry, use Type S
 3. For mortar parge coats, use Type S
 4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 5. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product[or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products].
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
 3. Mix to match Architect's sample.
 4. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
 - c. Cast-stone trim units.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match Architect's sample.
 2. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
 - c. Cast-stone trim units.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 but not less than 2000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
- G. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.
1. Application: Use epoxy pointing mortar for exposed mortar joints with pre-faced CMUs.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean,

sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- H. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
 - 3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Wet joint surfaces thoroughly before applying mortar.
 - 3. Rake out mortar joints for pointing with sealant.

- D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows
 - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
 - 4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.7 LINTELS

- A. Provide **masonry** lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.8 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At lintels, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
 4. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
 5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
 6. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
 7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.9 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 64 inches

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- I. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.11 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.12 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 055000 METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
2. Metal ladders.
3. Miscellaneous steel trim including steel angle corner guards.
4. Metal bollards.
5. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 051200 "Structural Steel Framing."

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Paint products.
3. Grout.

- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 2. Metal ladders.
 3. Miscellaneous steel trim including steel angle corner guards.
 4. Metal bollards.
 5. Loose bearing and leveling plates for applications where they are not specified in other Sections.
- C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design ladders.
- B. Structural Performance of Aluminum Ladders: Aluminum ladders shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints,

overstressing of components, failure of connections, and other detrimental effects. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- E. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- F. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches.
 - 2. Material: Galvanized steel, ASTM A 653/A 653M, commercial steel, Type B, with G90 coating; 0.108-inch nominal thickness.
- H. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
 - 2. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1 (A1).
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in

concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

- G. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
- I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting," Section 099123 Interior Painting," and Section 099600 "High-Performance Coatings."
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.

2.7 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3.
 - 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Steel Ladders:

1. Space siderails as indicated.
2. Siderails: Continuous, 3/8-by-2 inch steel flat bars, with eased edges.
3. Rungs: 1-inch- (25-mm-) diameter steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
6. Provide hinged and lockable security door as indicated.
7. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets.

2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.

2.9 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.

2.11 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

2.12 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.13 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.14 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for ceiling hung toilet partitions securely to, and rigidly brace from, building structure.

3.3 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing. Do not fill removable bollards with concrete.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 061000 ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking and nailers.
4. Wood furring.
5. Wood sleepers.
6. Utility shelving.
7. Plywood backing panels.

B. Related Requirements:

1. Section 061600 "Sheathing" for sheathing.
2. Section 033000 "Concrete Formwork" for concrete formwork.

1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product, indicate component materials, dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.
5. Metal framing anchors.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
- B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Delivery: Deliver the rough carpentry materials to the job-site and store in a safe area, out of way of traffic and shored up off the ground surface, where directed by the City Engineer.
 1. Identify framing lumber as to grades and store each grade separately from other grades.
 2. Protect metal items with adequate waterproof outer wrapping and properly identify or label such items.
 3. Use extreme care in off-loading of lumber to prevent damage, splitting and breaking of materials.
- B. Protection: Stack lumber to prevent warping and keep dry.
- C. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Dress lumber, S4S, unless otherwise indicated.
- D. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood blocking, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
 - 1. Concealed blocking.
 - 2. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
 - 3. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Cants.
 5. Furring.
 6. Grounds.
 7. Utility shelving.
- B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any of the following species:
1. Hem-fir (north); NLGA.
 2. Mixed southern pine or southern pine; SPIB.
 3. Spruce-pine-fir; NLGA.
 4. Hem-fir; WCLIB or WWPA.
 5. Western woods; WCLIB or WWPA.
- C. Utility Shelving: Lumber with 15 percent maximum moisture content of any of the following species and grades:
1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 2. Mixed southern pine or southern pine No. 2 grade; SPIB.
 3. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
 4. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:
1. Mixed southern pine or southern pine, No. 3 grade; SPIB.
 2. Hem-fir or hem-fir (north), Standard or No. 3 Common grade; NLGA, WCLIB, or WWPA.
 3. Spruce-pine-fir (south) or spruce-pine-fir, Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 4. Western woods, Standard or No. 3 Common grade; WCLIB or WWPA.
- E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC193 as appropriate for the substrate.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.7 METAL FRAMING ANCHORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Cleveland Steel Specialty Co.
 - 2. KC Metals Products, Inc.
 - 3. Phoenix Metal Products, Inc.
 - 4. Simpson Strong-Tie Co., Inc.
 - 5. USP Structural Connectors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick. Use for wood-preservative-treated lumber and where indicated.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304. Use for exterior locations and where indicated.

2.8 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to substrate; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- J. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials.

Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring horizontally at 24 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 061600 SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Building Products.
 - c. National Gypsum Company.
 - d. Temple-Inland Building Products by Georgia-Pacific.
 - e. United States Gypsum Company.
 - 2. Type and Thickness: Regular, 1/2 inch thick.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
 - 1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
 - 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.4 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."

- B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION

SECTION 071113 BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cold-applied, emulsified-asphalt dampproofing.
- B. Related Requirements: Section 071326 "Self-Adhering Sheet Waterproofing" for waterproofing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For coatings, indicating VOC content.
 - 2. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.

1.3 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.
- B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course and auxiliary materials recommended in writing by manufacturer of primary materials.
- B. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.
- C. VOC Content: 100 g/L or less.
- D. Low-Emitting Materials: Interior coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. BASF Corporation; Construction Systems.
 - 2. ChemMasters, Inc.
 - 3. Henry Company.
 - 4. Karnak Corporation.
 - 5. W. R. Meadows, Inc.
- B. Trowel Coats: ASTM D 1227, Type II, Class 1.
- C. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
- D. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Cut-Back-Asphalt Primer: ASTM D 41.
- C. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
- D. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- E. Patching Compound: Epoxy or latex-modified repair mortar of type recommended in writing by dampproofing manufacturer.
- F. Protection Course: ASTM D 6506, 1/8-inch-thick, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work. Test for surface moisture according to ASTM D 4263.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to the dampproofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.
- C. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
 - 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Concrete Foundations and Parged Masonry Foundation Walls: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat.
- B. Unparged Masonry Foundation Walls: Apply primer and two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat.

3.5 INSTALLATION OF PROTECTION COURSE

- A. Where indicated, install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.
 - 1. Support protection course over cured coating with spot application of adhesive type recommended in writing by protection-board manufacturer.
 - 2. Install protection course on same day of installation of dampproofing (while coating is tacky) to ensure adhesion.

3.6 CLEANING

- A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

SECTION 071900 WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes penetrating water-repellent treatments for the following vertical and horizontal surfaces:
 - 1. Cast-in-place concrete.
 - 2. Concrete unit masonry.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's printed statement of VOC content.
 - 2. Include manufacturer's standard colors.
 - 3. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.
- B. Samples: For each type and color of water repellent and substrate indicated, 12 by 12 inches in size, with specified water-repellent treatment applied to half of each Sample.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Applicator.
- B. Product Certificates: For each type of water repellent.
- C. Preconstruction Test Reports: For water-repellent-treated substrates.
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.
- B. Mockups: Prepare mockups of each required water repellent on each type of substrate required to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Locate mockups on existing surfaces where directed by Architect. Size: 25 sq. ft. each.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 FIELD CONDITIONS

- A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:
1. Concrete surfaces and mortar have cured for not less than 28 days.
 2. Building has been closed in for not less than 30 days before treating wall assemblies.
 3. Ambient temperature is above 40 deg F and below 100 deg F and will remain so for 24 hours.
 4. Substrate is not frozen and substrate-surface temperature is above 40 deg F and below 100 deg F.
 5. Rain or snow is not predicted within 24 hours.
 6. Not less than 24 hours have passed since surfaces were last wet.
 7. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in "Performance Requirements" Article within specified warranty period. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Performance: Water repellents shall meet the following performance requirements as determined bytesting on manufacturer's standard substrates representing those indicated for this Project.
- B. Water Absorption: Minimum 90 percent reduction of water absorption after 24 hours for treated compared to untreated specimens when tested according to the following:
1. Cast-in-Place Concrete: ASTM C 642.
 2. Concrete Masonry Units: ASTM C 140.
- C. Water-Vapor Transmission: Comply with one or both of the following:
1. Maximum 10 percent reduction water-vapor transmission of treated compared to untreated specimens, according to ASTM E 96/E 96M.
 2. Minimum 80 percent water-vapor transmission of treated compared to untreated specimens, according to ASTM D 1653.

- D. Water Penetration and Leakage through Masonry: Minimum 90 percent reduction in leakage rate of treated compared to untreated specimens, according to ASTM E 514/E 514M.
- E. Durability: Maximum 5 percent loss of water-repellent performance after 2500 hours of weathering according to ASTM G 154 compared to water-repellent-treated specimens before weathering.
- F. Chloride-Ion Intrusion in Concrete: NCHRP Report 244, Series II tests.
 - 1. Reduction of Water Absorption: 80 percent.
 - 2. Reduction in Chloride Content: 80 percent.

2.2 PENETRATING WATER REPELLENTS

- A. General: Subject to compliance with requirements, provide one of the following water repellent materials.
- B. Siloxane, Penetrating Water Repellent: Clear, containing 10 percent or more solids of oligomeric alkylalkoxysiloxanes; with alcohol, ethanol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L or less of VOCs. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Dayton Superior.
 - 2. Evonik Degussa Corporation.
 - 3. H&C Concrete Care Products, Sherwin-Williams Company (The).
- C. Silane/Siloxane-Blend, Penetrating Water Repellent: Clear, silane and siloxane blend with 400 g/L or less of VOCs. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Advanced Chemical Technologies, Inc.
 - 2. BASF Corporation; Construction Systems.
 - 3. Degussa Corp.
 - 4. Euclid Chemical Company (The); an RPM company.
 - 5. Karnak Corporation.
 - 6. L&M Construction Chemicals, Inc.
 - 7. Sika Corporation.
 - 8. Symons by Dayton Superior.
 - 9. Tnemec Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.
 - 1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.

2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
 3. Verify that required repairs are complete, cured, and dry before applying water repellent.
- B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.
- B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions and as follows: Cast-in-Place Concrete and: Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of water repellents according to ASTM E 1857.
- C. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live vegetation.
- D. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.
- E. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.
- B. Apply coating of water repellent on surfaces to be treated using 15 psi-pressure spray with a fan-type spray nozzle to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.
- C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 FIELD QUALITY CONTROL

- A. Testing of Water-Repellent Material: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when water repellent is being applied:
1. Owner will engage the services of a qualified testing agency to sample water-repellent material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 2. Testing agency will perform tests for compliance of water-repellent material with product requirements.
 3. Owner may direct Contractor to stop applying water repellents if test results show material being used does not comply with product requirements. Contractor shall remove noncomplying material from Project site, pay for testing, and correct deficiency of surfaces treated with rejected materials, as approved by Architect..
- B. Coverage Test: In the presence of Architect, hose down a dry, repellent-treated surface to verify complete and uniform product application. A change in surface color will indicate incomplete application.
1. Notify Architect seven days in advance of the dates and times when surfaces will be tested.
 2. Reapply water repellent until coverage test indicates complete coverage.

3.5 CLEANING

- A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.
- B. Comply with manufacturer's written cleaning instructions.

END OF SECTION

SECTION 072100 THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass-fiber blanket.
2. Glass-fiber board.
3. Mineral-wool blanket.
4. Mineral-wool board.
5. Loose-fill insulation.

B. Related Requirements:

1. Section 075423 "Thermoplastic Polyolefin (TPO) Roofing" for insulation specified as part of roofing construction.
2. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.2 ACTION SUBMITTALS

- ##### A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- ##### A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.4 DELIVERY, STORAGE, AND HANDLING

- ##### A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- ##### A. General: Provide insulation products achieving a minimum R-value of 19.

2.2 GLASS-FIBER BLANKET

- A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CertainTeed Corporation.
 - 2. Guardian Building Products, Inc.
 - 3. Johns Manville; a Berkshire Hathaway company.
 - 4. Knauf Insulation.
 - 5. Owens Corning.

2.3 GLASS-FIBER BOARD

- A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Glass-Fiber Board, Unfaced: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84, passing ASTM E 136 for combustion characteristics. Nominal density of 4.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
- C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following: Knauf Insulation, or equal.

2.4 MINERAL-WOOL BLANKETS

- A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Industrial Insulation Group, LLC (IIG-LLC).
 - 2. Roxul Inc.
 - 3. Thermafiber, Inc.; an Owens Corning company.

2.5 MINERAL-WOOL BOARD

- A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Mineral-Wool Board, Types IA and IB, Unfaced: ASTM C 612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 4 lb/cu. ft..
- C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Industrial Insulation Group, LLC (IIG-LLC).
 - 2. Roxul Inc.
 - 3. Thermafiber, Inc.; an Owens Corning company.

2.6 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AGM Industries, Inc.
 - 2. Gemco.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
- D. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AGM Industries, Inc.
 - 2. Gemco.
- E. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations: Ceiling plenums.
- F. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch between face of insulation and substrate to which anchor is attached.
- G. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: Gemco.
- H. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.
- I. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AGM Industries, Inc.
2. Gemco.

2.7 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates. Adhesives shall have a VOC content of 70 g/L or less.

PART 3 - EXECUTION

3.1 PREPARATION

- #### A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- #### A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- #### B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- #### C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- #### D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- #### A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials: Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

**SECTION 076200
SHEET METAL FLASHING AND TRIM**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufactured reglets with counterflashing.
2. Formed roof-drainage sheet metal fabrications.
3. Formed low-slope roof sheet metal fabrications.
4. Formed wall sheet metal fabrications.
5. Formed equipment support flashing.

1.2 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.

7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
 8. Include details of roof-penetration flashing.
 9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
 10. Include details of special conditions.
 11. Include details of connections to adjoining work.
 12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples for Verification: For each type of exposed finish. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Manufacturers – Roof edge fascia system is to be provided by the single ply roofing system manufacturer and warranted as an integral part of the NDL roof system warranty.
- B. Other Metal Flashings Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance. For copings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 1. Build mockup of typical roof edge, including built-in gutter, fascia, and fascia trim, approximately 10 feet (3.0 m) long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. FM Approvals Listing: Manufacture and install copings roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-240. Identify materials with name of fabricator and design approved by FM Approvals.
- D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure: Design Pressure: As indicated on Drawings.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed; with smooth, flat surface. Finish: Mill phosphatized for field painting.
- C. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Surface: Smooth, flat and mill phosphatized for field painting and with manufacturer's standard clear acrylic coating on both sides.
 - 2. Exposed Coil-Coated Finish: Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 3. Color: As selected by Architect from manufacturer's full range.
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum.
- C. Roof edge fascia system is to be installed over high temperate self-adhesive waterproofing and PVC roof membrane flashing.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
2. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight. Sealants shall meet VOC and chemical component limits of South Coast Air Quality Management District (SCAQMD) Rule No. 1168 and Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Fry Reglet Corporation or comparable product by one of the following:
 - a. Hickman, W. P. Company.
 - b. Keystone Flashing Company, Inc.
2. Material: Galvanized steel, 0.022 inch (0.56 mm) thick.
3. Surface-Mounted Type: Provide Type SM with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Masonry Type: Provide Type MA with offset top flange for embedment in masonry mortar joint.
5. Accessories:

- a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
6. Finish: With manufacturer's standard color coating.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 2. Obtain field measurements for accurate fit before shop fabrication.
 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- H. Do not use graphite pencils to mark metal surfaces.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Cap:
1. Custom One Piece Fascia provided by the single ply roofing system manufacturer and included within the roofing system manufacturers roof system warranty. Fabricate in minimum 96-inch- (2400-mm-) long, on straight areas and 60 inches on radiused areas, but not exceeding 12-foot- (3.6-m-) long sections. Provide smooth radiused curves; faceted finished are not acceptable. Furnish with 6-inch- (150-mm-) wide, joint back-up plates. Provide factory mitered interior and exterior corners.
 2. Joint Style: Overlapped, 4 inches (100 mm) wide.
 3. Fabricate from the Following Materials: Prefinished Coil Coated Fluoropolymer Finished Aluminum: 0.050 inch (1.27 mm) thick.
- B. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, solder or weld watertight. Shop fabricate interior and exterior corners.
1. Coping Profile: As indicated on Drawings.
 2. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, concealed back-up plate.
 3. Fabricate from the Following Materials: Fabricate from Galvanized Steel: 0.034 inch (0.86 mm) thick.
- C. Roof-to-Roof Edge-Flashing (Gravel-Stop) Transition Roof-to-Roof Edge-Flashing (Gravel-Stop) and Fascia-Cap Transition Expansion-Joint Cover: Provide factory formed interior and exterior corners as part of the fascia system. Fabricate from Galvanized Steel: 0.034 inch (0.86 mm) thick.
- D. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from Galvanized Steel: 0.028 inch (0.71 mm) thick.
- E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from Galvanized Steel: 0.022 inch (0.56 mm) thick.
- F. Roof-Penetration Flashing: Fabricate from Galvanized Steel: 0.028 inch (0.71 mm) thick.
- G. Roof-Drain Flashing: Fabricate from Stainless Steel: 0.016 inch (0.40 mm) thick.

2.8 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from Galvanized Steel: 0.034 inch (0.86 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
1. Verify compliance with requirements for installation tolerances of substrates.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard. Coat concealed side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder metallic-coated steel sheet.
 2. Do not use torches for soldering.
 3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm). Secure in waterproof manner per manufacturers installation instructions
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 077200 ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Roof hatches.
- B. Related Sections:
 - 1. Section 055000 "Metal Fabrications" for metal vertical ladders, ships' ladders, and stairs for access to roof hatches.
 - 2. Section 076200 "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.

1.2 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
- C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
 - 4. Required clearances.

- B. Sample Warranties: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

2.2 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Acudor Products, Inc.
2. Babcock-Davis.
3. Bilco Company (The).
4. Bristolite Daylighting Systems, Inc.
5. Dur-Red Products.
6. JL Industries, Inc.; a division of the Activar Construction Products Group.
7. Milcor; Commercial Products Group of Hart & Cooley, Inc.
8. Williams Bros. Corporation of America (The).

- B. Type and Size: Single-leaf lid, 30 by 36 inches.

- C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.

- D. Hatch Material: Zinc-coated (galvanized) steel sheet.

1. Thickness: Manufacturer's standard thickness for hatch size indicated.
2. Finish: Mill phosphatized.

- E. Construction:

1. Insulation: Glass-fiber board. R-Value: 12.0 according to ASTM C 1363.
2. Nailer: Factory-installed wood nailer continuous around hatch perimeter.
3. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
4. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.

6. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.
 7. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is tapered to accommodate roof slope so that top surfaces of perimeter curb are level. Equip hatch with water diverter or cricket on side that obstructs water flow.
- F. Hardware: Spring operators, hold-open arm, stainless-steel spring latch with turn handles, stainless-steel butt- or pintle-type hinge system, and padlock hasps inside and outside.
- G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
1. Height: 42 inches above finished roof deck.
 2. Posts and Rails: Galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube, 1-5/8 inches in diameter.
 3. Flat Bar: Galvanized steel, 2 inches high by 3/8 inch thick.
 4. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches in diameter.
 5. Chain Passway Barrier: Galvanized proof coil chain with quick link on fixed end.
 6. Self-Latching Gate: Fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
 7. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
 8. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
 9. Fabricate joints exposed to weather to be watertight.
 10. Fasteners: Manufacturer's standard, finished to match railing system.
 11. Finish: Manufacturer's standard. Color: Match Architect's sample.
- H. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder.
1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
 2. Height: 42 inches above finished roof deck.
 3. Material: Steel tube.
 4. Post: 1-5/8-inch- diameter pipe.
 5. Finish: Manufacturer's standard baked enamel or powder coat. Color: As selected by Architect from manufacturer's full range.

2.3 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation and mill phosphatized for field painting where indicated. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.
- B. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- C. Steel Tube: ASTM A 500/A 500M, round tube.

- D. Galvanized-Steel Tube: ASTM A 500/A 500M, round tube, hot-dip galvanized according to ASTM A 123/A 123M.
- E. Steel Pipe: ASTM A 53/A 53M, galvanized.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Glass-Fiber Board Insulation: ASTM C 726, nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F, thickness as indicated.
- C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches thick.
- D. Security Grilles: 3/4-inch diameter, ASTM A 1011/A 1011M steel bars spaced 6 inches o.c. in one direction and 12 inches o.c. in the other; factory finished as follows:
 - 1. Surface Preparation: Remove mill scale and rust, if any, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 - 2. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment.
 - 3. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chromate-free, universal primer; selected for resistance to normal atmospheric corrosion, for compatibility with substrate and field-applied finish paint system indicated, and for capability to provide a sound foundation for field-applied topcoats under prolonged exposure.
- E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- F. Underlayment:
 - 1. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
 - 2. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
 - 3. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
- G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- H. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- I. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

- J. Asphalt Roofing Cement: ASTM D 4586/D 4586M, asbestos free, of consistency required for application.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

- C. Roof-Hatch Installation:
 - 1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
 - 2. Attach ladder-assist post according to manufacturer's written instructions.
- D. Seal joints with elastomeric sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 079200 JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Silicone joint sealants.
 2. Nonstaining silicone joint sealants.
 3. Urethane joint sealants.
 4. Mildew-resistant joint sealants.
 5. Butyl joint sealants.
 6. Latex joint sealants.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with masonry substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Sealants and sealant primers shall comply with the following:
1. Architectural sealants shall have a VOC content of 250 g/L or less.
 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 3. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Dow Corning Corporation.
 2. GE Construction Sealants; Momentive Performance Materials Inc.
 3. May National Associates, Inc.; a subsidiary of Sika Corporation.
 4. Pecora Corporation.
 5. Sika Corporation; Joint Sealants.

2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Dow Corning Corporation.
 2. GE Construction Sealants; Momentive Performance Materials Inc.
 3. May National Associates, Inc.; a subsidiary of Sika Corporation.
 4. Pecora Corporation.
 5. Sika Corporation; Joint Sealants.
 6. Tremco Incorporated.

2.4 URETHANE JOINT SEALANTS

- A. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. BASF Corporation; Construction Systems.
 2. Pecora Corporation.
 3. Polymeric Systems, Inc.
 4. Schnee-Morehead, Inc., an ITW company.
 5. Sherwin-Williams Company (The).

2.5 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing

silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Dow Corning Corporation.
2. GE Construction Sealants; Momentive Performance Materials Inc.
3. May National Associates, Inc.; a subsidiary of Sika Corporation.
4. Soudal USA.
5. Tremco Incorporated.

2.6 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Bostik, Inc.
2. Pecora Corporation.

2.7 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. BASF Corporation; Construction Systems.
2. Franklin International.
3. May National Associates, Inc.; a subsidiary of Sika Corporation.
4. Pecora Corporation.
5. Sherwin-Williams Company (The).
6. Tremco Incorporated.

2.8 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. BASF Corporation; Construction Systems.
2. Construction Foam Products; a division of Nomaco, Inc.

- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Glazed surfaces of ceramic tile.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
 - 4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Tile control and expansion joints.
 - c. Joints between different materials listed above.
 - 2. Joint Sealant: Urethane, M, P, 50, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between metal panels.
 - d. Joints between different materials listed above.
 - e. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
 - f. Control and expansion joints in ceilings and other overhead surfaces.
 - 2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, P, 25, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of unit masonry walls and partitions.
 - d. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
 - a. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - b. Other joints as indicated on Drawings.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

SECTION 081113 HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow-metal work.
- B. Related Requirements: Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, core descriptions, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
 - 8. Details of moldings, removable stops, and glazing.
 - 9. Details of conduit and preparations for power, signal, and control systems.
- C. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
 2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.
- D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Amweld International, LLC.
 2. Ceco Door; ASSA ABLOY.
 3. Curries Company; ASSA ABLOY.
 4. Fleming Door Products Ltd.; Assa Abloy Group Company.
 5. Karpen Steel Custom Doors & Frames.
 6. Mesker Door Inc.

7. Republic Doors and Frames.
8. Steelcraft; an Allegion brand.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.

2. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches.
- c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
- d. Edge Construction: Model 2, Seamless.
- e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
- b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
- c. Construction: Full profile welded.

4. Exposed Finish: Prime.

2.3 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3..

1. Physical Performance: Level A according to SDI A250.4.

2. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
- d. Edge Construction: Model 2, Seamless.
- e. Core: Polystyrene. Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
 - b. Construction: Full profile welded.
4. Exposed Finish: Prime.

2.4 FRAME ANCHORS

- A. Jamb Anchors:
 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows: Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.5 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

- I. Glazing: Comply with requirements in Section 088000 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.6 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
 - 2. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
 - 3. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
 - 4. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 - 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.

- 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
- c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
- 6. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 - 7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
 - E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
 - F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted hairline joints.
 - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 - 4. Provide loose stops and moldings on inside of hollow-metal work.
 - 5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.7 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.8 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.

- B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

**SECTION 083113
ACCESS DOORS AND FRAMES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes access doors and frames for walls and ceilings. Provide and install all access doors in walls and ceilings, whether shown on the Drawings or not, where required for access to Fire/Life Safety and/or MEP devices, valves and equipment. The door size must be appropriate for clear access, and the locations must be shown on Coordination Drawings as approved by the architect before installation.
- B. Related Requirements: Section 077200 "Roof Accessories" for roof hatches.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details material descriptions, dimensions of individual components and profiles, and finishes.
- A. Shop Drawings:
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.
- C. Product Schedule: For access doors and frames.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Exposed Flanges:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Babcock-Davis.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Karp Associates, Inc.
 - d. Lane-Aire Manufacturing Corp.
 - e. Larsens Manufacturing Company.
 - f. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 - g. Nystrom, Inc.

2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: Wall.
4. Door Size: As required to facilitate convenient access to concealed devices or equipment for maintenance or replacement.
5. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage, factory primed.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Cam latch, screwdriver operated.

B. Flush Access Doors with Concealed Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - d. Karp Associates, Inc.
 - e. Lane-Aire Manufacturing Corp.
 - f. Larsens Manufacturing Company.
 - g. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 - h. Nystrom, Inc.
2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: As required to facilitate convenient access to concealed devices or equipment for maintenance or replacement.
5. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage factory primed.
6. Frame Material: Same material and thickness as door.
7. Latch and Lock: Cam latch, screwdriver operated.

C. Exterior Flush Access Doors:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Babcock-Davis.
 - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - c. Karp Associates, Inc.
 - d. Larsens Manufacturing Company.
 - e. Nystrom, Inc.
2. Description: Weatherproof assembly, with face of door fit flush with frame and with exposed frame. Include extruded door gaskets and minimum 2-inch-thick fiberglass insulation.
3. Locations: Wall.
4. Door Size: As required to facilitate convenient access to concealed devices or equipment for maintenance or replacement.
5. Stainless-Steel Sheet for Door: Nominal 0.062 inch, 16 gage, No. 4 finish.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Cam latch operated by key,.

2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.
- E. Frame Anchors: Same material as door face.
- F. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
- D. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 - 2. Keys: Furnish two keys per lock and key all locks alike.

2.4 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish. Factory Primed: Apply manufacturer's

standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

E. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - a. Run grain of directional finishes with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

SECTION 087100 DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Door Hardware for Hollow Metal Door.
 - 2. Other doors to the extent indicated.
 - 3. Keyed Cylinders as indicated.

- B. Related Sections: Division 08 Section "Hollow Metal Doors and Frames".

- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.

- D. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series

1.2 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 1. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 2. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

- e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
3. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Samples: Submit for review, to the Project Manager or Inspector, physical sample of any finished hardware item proposed for use. Such items shall not be used in the work until review is completed.
- D. Temporary Cylinders
- 1. During construction period of Contract, Contractor shall employ temporary construction cylinders with temporary construction keys on door locks in the project to maintain necessary building security. Temporary construction keys shall be furnished in construction master key system.
 - 2. Keying Schedule: Contractor and Hardware Supplier shall meet in prescheduled conference with the Project Manager or Inspector and its authorized representative to finalize the Keying Schedules and requirements, and obtain final instructions in writing. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. On completion of the project, the Contractor shall collect all the construction keys and remove the construction cores from the lock cylinders and turn over the temporary construction keys and cores to the Project Manager or Inspector and/or its authorized representative. The Contractor shall install cylinder locks and keys in accordance with Final Keying Schedule approved by the Engineer.
- E. Informational Submittals:
- 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.
- 1.3 QUALITY ASSURANCE
- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
 - B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
 - C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary

materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- D. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- E. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- F. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.4 KEYING

- A. Lock manufacturer shall ship all master keys and grandmaster keys via registered mail to the address directed by the Project Manager or Inspector. Properly identify all keys as to the Project Name and Key location(s). Provide duplicate copy of key listing to the Project Manager or Inspector.
- B. Provide keyed construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- C. Cylinders, removable and interchangeable core system: Best [Peaks], or approved equal, small format 7-pin, as directed by the Project Manager or Inspector.
- D. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "DO NOT DUPLICATE." Release permanent keys to the Project Manager or Inspector or the Inspector only.
- E. Furnish keys in the following quantities:
 - 1 each Grand Masterkeys
 - 4 each Masterkeys
 - 2 each Change keys each keyed core
 - 15 each Construction masterkeys
 - 1 each Control keys

- F. The Owner, or the Project Manager or Inspector, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Project Manager or Inspector, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Project Manager or Inspector.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Twenty five years for manual surface door closer bodies.
 - 4. Two years for all other hardware.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
- C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
 - a. Two Hinges: For doors with heights up to 60 inches
 - b. Three Hinges: For doors with heights 61 to 90 inches
 - c. Four Hinges: For doors with heights 91 to 120 inches
 - d. For doors with heights more than 120 inches provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings: Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Acceptable Manufacturers:
 - a. Hager Companies (HA).
 - b. McKinney Products (MK).
 - c. Stanley Hardware (ST).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Acceptable Manufacturers:
 - a. Ives (IV).
 - b. McKinney Products (MK).
 - c. Pemko Manufacturing (PE).

2.3 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 3. Acceptable Manufacturers:
 - a. Ives (IV).
 - b. Rockwood Manufacturing (RO).
 - c. Trimco (TC).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated. Acceptable Manufacturers: BEST (BE).

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Provide locksets with 7-pin removable and interchangeable core cylinders.
6. Keyway: Manufacturer's Standard. Match Facility Standard.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body. Acceptable Manufacturers: BEST (BE).

2.6 ELECTRONIC PUSHBUTTON LOCKSET:

A. General:

1. BHMA Grade 1 cylindrical lockset – weather resistant at exterior doors.
2. ADA.
3. Programmable at keypad.
4. Battery Powered.
5. Vandal resistant; metal keys.
6. Non-handed.
7. 2-3/4 in. backset.
8. UL fire rated latchbolt for fire doors.
9. Interchangeable core cylinder.
10. Exit device application: Adaptable to most major manufacture.
11. Acceptable Manufacturers: Trilogy – Alarm Lock (Public Exterior door with Panic Bar)

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 6. Vertical Rod Exit Devices: Provide and install interior surface and concealed vertical rod exit devices as Less Bottom Rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature. Acceptable Manufacturers: Von Duprin (VD) - 99 Series.

2.9 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
 4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of

use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 - a. Where closers are indicated to have mechanical dead-stop, provide heavy duty arms and brackets with an integral positive stop.
 - b. Where closers are indicated to have mechanical hold open, provide heavy duty units with an additional built-in mechanical holder assembly designed to hold open against normal wind and traffic conditions. Holder to be manually selectable to on-off position.
 - c. Where closers are indicated to have a cushion-type stop, provide heavy duty arms and brackets with spring stop mechanism to cushion door when opened to maximum degree.
 - d. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics. Provide drop plates or other accessories as required for proper mounting.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt and security type fasteners as specified in the door Hardware Sets.
- B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Acceptable Manufacturers: Stanley Hardware (ST).

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following: Stainless Steel: 300 grade, 050-inch thick.
4. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
5. Acceptable Manufacturers:
 - a. Don Jo (DJ).
 - b. Rockwood Manufacturing (RO).
 - c. Trimco (TC).

2.11 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

- 1. Acceptable Manufacturers:

- a. Don Jo (DJ).
- b. Rockwood Manufacturing (RO).
- c. Trimco (TC).

2.12 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Acceptable Manufacturers:
 - 1. National Guard Products (NG).
 - 2. Pemko Manufacturing (PE).
 - 3. Reese Enterprises, Inc. (RS).

2.13 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.14 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 3. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Closers: Coordinate installation of closer for maximum degree of hold open or opening. Hold open arms to stop door from hitting wall. Closers typically mount on interior side of room.
- D. Locksets: Provide appropriate backset to center lockset on stile and rail type doors.
- E. Pushbutton Locksets: Prior to installation, deliver Trilogy keypad lockset to the Recreation & Parks Locksmith to be programmed. Contractor responsible for picking up pre-programmed lockset for delivery to project site for installation.
- F. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- G. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants." Securely and permanently anchor

exterior thresholds using countersunk non-ferrous screws to match color of threshold. Stainless steel screws at aluminum thresholds. Set thresholds at interior acoustical rated openings with acoustical sealant.

H. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

I. Replace fasteners damaged by power-driven tools.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

END OF SECTION

SECTION 089119 FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Fixed, extruded-aluminum louvers.
- B. Related Requirements: Section 081113 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.

1.2 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).
- C. Vertical Louver: Louver with vertical blades (i.e., the axes of the blades are vertical).
- D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 - 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
 - 2. Show mullion profiles and locations.
- C. Samples: For each type of metal finish required.
- D. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

- B. Windborne-debris-impact-resistance test reports.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following: AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural and seismic performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building. Wind Loads: Determine loads based on pressures as indicated on Drawings.
- C. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to 2013 CBC.
- D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- F. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Drainable-Blade Louver:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Balance Inc.; a division of MESTEK, Inc.
 - b. Airolite Company, LLC (The).
 - c. Carnes Company.
 - d. Construction Specialties, Inc.
 - e. Greenheck Fan Corporation.
 - f. Nystrom, Inc.
 - g. Ruskin Company.
2. Louver Depth: 4 inches.
3. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
4. Mullion Type: Exposed.
5. Louver Performance Ratings:
 - a. Free Area: Not less than 7.0 sq. ft. for 48-inch-wide by 48-inch-high louver.
 - b. Point of Beginning Water Penetration: Not less than 900 fpm.
 - c. Air Performance: Not more than 0.10-inch wg static pressure drop at 700-fpm free-area intake velocity.
 - d. Air Performance: Not more than 0.15-inch wg static pressure drop at 900-fpm free-area exhaust velocity.
6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 1. Screen Location for Fixed Louvers: Interior face.
 2. Screening Type: Bird screening except where insect screening is indicated.
- B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 2. Finish: Same finish as louver frames to which louver screens are attached.
 3. Type: Rewirable frames with a driven spline or insert.
- D. Louver Screening for Aluminum Louvers:
 1. Bird Screening: Aluminum, 1/2-inch-square mesh, 0.063-inch wire.
 2. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.

2.5 BLANK-OFF PANELS

- A. Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.
 1. Aluminum sheet for aluminum louvers, not less than 0.050-inch nominal thickness.
 2. Panel Finish: Same finish applied to louvers.

3. Attach blank-off panels with sheet metal screws.

2.6 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.
 1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
- D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints. Frame Type: Channel unless otherwise indicated.
- D. Include supports, anchorages, and accessories required for complete assembly.

2.8 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Color and Gloss: Match Architect's sample.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 09200 LATH AND PLASTER

PART ONE – GENERAL

1.0 DESCRIPTION

A. Exterior Portland cement plaster system: Gypsum/ plywood sheathing attached to wood studs, and one layer of waterproofing membrane, paper backing, galvanized metal lath and plaster accessories, fiber reinforced-polymer modified scratch and brown coats, and a integral colored medium texture sand float finish. Contractor to provide all labor, materials, tools and equipment necessary for lath and plaster work where shown on the Contract Drawings and specified herein, including the following:

1. Wood studding, furring and lathing.
2. La Habra Exterior Portland Cement Plaster, Base 200 20/30 Sand

B. Related Work:

1. Work of this Section shall comply with the Contract Documents including, but not necessarily limited to, General Conditions and the General Requirements.
2. Concrete in Section 03300.
3. Rough Carpentry in Section 06100.
4. Metal Doors and Frames in Section 08110.
5. Gypsum Board Systems in Section 09260.
6. Ceramic Tile in Section 09300.
7. Painting in Section 09900.
10. Plumbing and Mechanical in DIVISION 15.
11. Electrical in DIVISION 16.
12. Doors and Windows in DIVISION 8

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Metal Lath Association "Specifications for Metal Lathing and Furring".
2. ASTM C926-86-Application of Portland Cement Based Plaster.
3. ASTM C-1063-86-Installation of Lathing and Furring for Portland Cement Based Plaster.
4. ASTM D2247- Practice for testing water resistance coatings in 100 percent relative humidity

5. ASTM E331- Test method for water penetration by Uniform Static Air Pressure Difference
- B. Allowable Tolerances:** Finish plaster surfaces to be true and even planes within tolerances of 1/8 inch in 5 feet without waver, cracks or imperfections measured by a straight edge placed at any locations on the plaster surfaces.
- C. Qualifications of Personnel:** Use adequate number of skilled Contractor's employees thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and the methods needed for the proper execution of the Work of this Section. Installer shall also have:
1. Shall have marketed Exterior Finish Systems Coatings in United States for at least ten years.
 2. Shall have completed projects of same building size and type as this project.
- D. Codes and Regulations:** Comply with the Uniform Building Code with the latest edition of Los Angeles City Amendments, except those requirements specified herein govern where they exceed those of the City Building Code.

1.3 SUBMITTALS

- A. General:** Comply with provisions of SUBMITTALS Article 10 in DIVISION 1 - GENERAL REQUIREMENTS of these Specifications.
- B. Product Data:** Submit the following within 30 calendar days after award of Contract:
1. Complete materials list of all items proposed to be furnished and installed under this Section. Provide mix proportion and coating sequence.
 2. Sufficient data to demonstrate compliance with the specified requirements.
 4. Samples of the proposed accessories.
 5. Wood Studs:
 - a. Location of backing, furring, and blocking provided in Wood Studs for other trade of work, coordinate if necessary.
 6. Contractor to provide a minimum 4' x 6' Mock-up that showcases all of the elements of the system
- C. LEED Submittals:**
1. Credit MR4 and MR5
 - a. List of proposed regionally manufactured materials
 - b. Identify each regionally manufactured material (within 500 miles) its source, and cost.
- D. Shop Drawings:** 1/8" minimum scale, of each elevation, and reflected ceiling plans showing lath accessory type and location. Layout and location shall comply with the requirements within this section.

1.4 PRODUCT HANDLING

- A. **Delivery:** Deliver materials to the job-site in their original unbroken packages bearing the manufacturer's label and indicating brand and quality of the material.
- B. **Storage of Materials:** Store materials under cover at the job-site and maintain in a cool, dry location, out of sunlight, protected from weather and other harmful environments, and at a temperature above 40 °F (4.4 °C) and below 110 °F (43 °C) until ready for use. Store materials to facilitate inspections and identifications of each shipment. Store each kind of sand separately to prevent the inclusion of foreign matter. Stock sufficient materials on the job-site to prevent interrupting work progress.
 - 1. Immediately remove from the job-site, all materials which have been delivered broken, damaged or in unlabeled conditions.
- C. **Protection:** Use all means necessary to protect the work and materials of this Section before, during and after installation and to protect the work and materials of all other trades.
- D. **Replacements:** In the event of damage, immediately make all repairs and replacements necessary to the approval of the Project Manager or Inspector and at no additional cost to the City.

1.5 INSPECTION

Notify the Project Manager or Inspector prior to installation of lath and after lath is installed, to allow for inspection of framing and lathing and between each coat of plaster.

PART TWO - PRODUCTS

2.1 METAL PRODUCTS (As Applicable)

- A. **Furring Channels:** 3/4-inch hot-rolled or cold-rolled channels weighing not less than 300 pounds per 1,000 lineal feet. 1 ½-inch hot-rolled steel channels weighing not less than 475 pounds per 1,000 lineal feet; with protective coating of rust-inhibitive paint.
- B. **Hanger Wires:** Cold drawn galvanized steel wire, No. 8-gage.
- C. **Metal Lath:** 3.4 pound per square yard diamond mesh expanded, copper-alloy steel galvanized for interior cement plaster and for scratch coat plaster behind tile. Use galvanized or protective paint coated lath elsewhere. Use flat rib or rib lath where lath spans more than 16-inches.
- D. **Tie Wires:** As per latest edition of Los Angeles City Building Code Amendments to the U.B.C.
- E. **Gypsum Lath:** Minimum 3/8-inch thick plain or perforated ASTM C37 conforming to the latest edition of Los Angeles City Building Code Amendments to the U.B.C.
- F. **Waterproof Backing:** K-Lath Corporation "Pyro-K-Lath," or "Agura-K-Lath," or equal. Self-furred type with 16-gage galvanized vertical front wires at 1 2-inches on center and 16-gage horizontal back wires at 2-inches on center with perforated Kraft Paper between front and back wires furred with 1/4-inch furring crimps at 6-inches on center and with a sheet of Class "B" (Fed. Spec. UU-P-147b) waterproof paper laminated to back of back wires.
- G. **Fire Retardant Gypsum Lath:** 5/8-inch thick, ASTM C37, Type "X" conforming to latest edition of Los Angeles City Building Code Amendments to the U.B.C.

- H. **Paper Backing:** Asphalt saturated felt weighing not less than 14-pounds per 108 square feet.
- I. **Self-Furring Paper-Backed Wire Fabric:** Required for exterior vertical surfaces and/or behind ceramic tile where backing is solid. Fabric shall be 1 ½ -inch x 2-inch mesh, 16 x 16 gage galvanized wire crimped 1/4-inch at 6-inches on center and with slotted perforated absorbent paper separation between front and back wires with Type I, Grade B waterproof paper (Fed. Spec. UV-B-790) laminated to back side of separator paper.
- J. **Flat or Non-Furring Paper-Backed Wire Fabric:** Required for horizontal exterior surfaces and for vertical surfaces over wood framing without solid backing. Wire fabric shall be 1-1/2-inch x 2-inch mesh, 16 gage galvanized wire with 11 gage horizontal stiffener wires at 6-inch centers and with slotted perforated absorbent paper between front and back wires. Fabric shall be "Gun-Lath" manufactured by K-Lath Corporation as approved by the Project Manager or Inspector.
- K. **Metal Trim Screed:** Superior No. 21 (for 3/4-inch plaster) or No. 22 (for 7/8-inch plaster) Metal Casing, National Cornice Works, Los Angeles, California, as necessary for required work.

2.2 PLASTERING MATERIALS

- A. **Portland Cement:** ASTM C150 Type I. Use plastic or waterproof cement only upon written approval of the Project Manager or Inspector. Use white cement (Riverside, Medusa of Trinity) for all exterior cement plaster finish coats.
- B. **Gypsum Neat Plaster:** ASTM C28, fibered for scratch coat on metal lath.
- C. **Gaging Plaster:** Calcined gypsum ASTM C28.
- D. **Keenes Cement:** ASTM C61.
- E. **Lime and Lime Putty:** latest edition of Los Angeles City Building Code Amendments to the U.B.C..
- F. **Sand:** ASTM C35. Sand for sand-float finish to pass a No. 20 sieve. Use Del Monte White Silica Sand for all exterior cement plaster finish coats. Per manufacturer, use La Habra Base 200 20/30 Sand
- G. **Water:** From a supply distributed for domestic purposes.
- I. **Bonding Agent:** "Plasterweld" by Larson Products Corp. (distributed by Pioneer Builders Supplies, Inc., Los Angeles, California).
- J. **Vermiculite:** ASTM C35 and provisions of Los Angeles City Building Code with latest Amendments to the U.B.C., Division 47.
- K. **Acoustical Sound Insulating Plaster:** "Hi-Sorb" white color by Highland Stucco and Lime Products Inc., Van Nuys, Calif. (phone (213) 785-3131) or equal.
- L. **Exterior Stucco:** A factory mixed integrally colored Portland Cement base material designed for hand or machine application meeting ASTM standards and government specifications. Exterior stucco shall be a product of Highland Stucco and Lime Products Co., Van Nuys, California, or La Habra Stucco, or a field mixed Portland Cement with addition of pure mineral oxides guaranteed by the manufacturer to be lime proof and show minimum loss of color value due to weather conditions. Color shall be selected by Project

Manager or Inspector.

- N. **Skim Coat Plaster:** "Thoroseal Plaster Mix" by Thoro Systems Products (distributed by L.M. Scofield Co. (213) 723-5285 or equal.

2.3 PLASTER MIXES AND PROPORTIONS

- A. **General:** Mix all ingredients in calibrated boxes or containers designed to permit accurate checking at any time. Use batch-type mixer unless otherwise authorized. Mix materials thoroughly and use within 30 minutes after leaving the mixer. Keep all tools and implements clean.

B. **Portland Cement Plaster:**

1. First coat on metal lath for scratch coat behind tile or for 3-coat work: 1 part Portland cement to 4 parts sand, by volume, with addition of hydrated lime in quantity not exceeding 1/10 the weight of the cement.
2. Second coat on metal lath behind mortar setting bed for ceramic tile and for 3-coat work: 1 part Portland Cement to 5 parts sand, by volume, with addition of hydrated lime in a quantity not exceeding 1/10 of the weight of the cement.
3. Exterior Stucco: As hereinbefore specified in Subsection 2.3L. Mixed as prescribed by the stucco manufacturer and under his supervision.
4. Base Coat on Masonry or Concrete for Two-Coat Work: 1 part Portland Cement to 4 parts sand, by volume, with addition of hydrated lime in quantity not exceeding 1/10 the weight of the cement in 25 percent of the volume of the amount of cement.
5. Finish Coat: 1 part Portland Cement to 3 parts sand with addition of hydrated lime in quantity not exceeding 1/10 the weight of the cement.
6. Gauging-Lime Smooth Finish (Putty Coat): 1 part gauging plaster and not more than 3 parts lime putty by volume.

PART THREE - EXECUTION

3.1 PREPARATION WORK

- A. **Approvals:** Required for work of other trades prior to being concealed. Uncovering work of other trades not approved and recover as directed by the Project Manager or Inspector at no added cost to the CITY.
- B. **Surfaces:** To be cleaned for application of plaster. Exterior plaster surfaces to receive textured coating shall consist of properly applied and cured scratch coat, boron coat and skim coat.
- C. **Temperature and Ventilation:** Maintain temperature not lower than 55 degrees F during plastering operations and until plaster is dry. Properly regulate adequate ventilation at all times.
1. Use screens to prevent uneven heat if necessary.
 2. Avoid plastering during fraying or hot dry winds.

3.2 WORKMANSHIP

- A. **General:** In accordance with best trade practices.

- B. **All Finish Plaster Surfaces:** Subject to a 5-foot long straight-edge test for trueness of plane and plumbness; an 1/8-inch in 10-foot tolerance will be allowed. Squareness of internal and external corners shall be within 1/8-inch in 5-foot tolerance. Conduct such tests in the presence of the City. Remove and replace any work not meeting such tolerance tests rejected by the City at no added cost to the City.
- C. **Walls:** Make straight and plumb, or sloped as indicated on the Contract Drawings.
- D. **Corners and Angeles:** Make Straight, true, and square.
- E. **Finished Surfaces:** To be uniform in true planes, flush with grounds, accessories, outlet boxes, and other features as indicated. Surfaces to be free from laps, cracks, checks, sand spalls, catfaces, slobbers, trowel marks and other imperfections.

3.3 LATHING AND FURRING

- A. **General:** In accordance to latest edition of Los Angeles City Building Code Amendments to the U.B.C., and as indicated on the Contract Drawings.
 - 1. Apply lath with long dimension at right angles to support framing.
 - 2. Stagger end joints at supports and not on opposite sides of same stud when partition is lathed both sides.
 - 3. Joints at walls not to align with joints in ceilings.
 - 4. Bring edges to moderate close contact.
 - 5. Closely fit lath at angles, corners, outlet boxes and at other openings.
 - 6. All lath to have firm bearing for proper fastening.
- B. **Metal Lath:** Use galvanized lath for all exterior plastering and for scratch coats behind ceramic tile. Secure lath in place at intervals not greater than 6-inches. Make side laps at least 1/2 -inch and wire tie between supports at maximum 8-inch intervals and secure to every support. Make end laps at least 1-inch located at supports and staggered. Attach lath in accordance with Los Angeles City Building Code Sections 91.4703 and 91.4711, 1992 Amendments to the U.B.C.
 - 2. Attach lath to screwable or resilient furring channels using wide shouldered self-tapping screws at 6-inches on center.
 - 3. On exterior metal framing, lath shall be attached over waterproof backing to nailable or screw-on studs with stainless steel fasteners and washers. Exercise care not to puncture or damage the waterproof backing wallboard (on sloping surfaces).
- C. **Waterproofing Backing:**
 - 1. Required: Behind metal lath applied to metal studs behind ceramic tile where indicated.
 - 2. Material: As hereinbefore specified in Subsection 2.1 of this Section.
 - 3. Application: Shingle fashion with 3-inch interior laps and 4-inch end laps, lap top edge tile floor waterproofing 4-inches. Make laps over solid backing or supports

only. Fasten to studs with galvanized or stainless steel nails, with 1-inch washers cut from scrap sheeting, at 12-inches on center. Backing to be free from tears or breaks when plaster is applied.

D. Metal Furring:

1. Required: For fire protection, concealment of ducts, pipes, conduit, and other mechanical work and for forming architectural features; as indicated on Drawings.
2. Vertical Furring: Except as otherwise indicated on the Drawings, vertical furring to be 3/4-inch channels at 16-inch centers; vertical channels installed in track channels anchored to concrete with 3/16-inch x 1/4-inch drive bolts at track ends and at intervals of 2-feet-0 inches; attached to ceilings by wiring upper ends to continuous horizontal channel attached to ceiling. Vertical furring to be braced with continuous horizontal 3/4-inch channels spaced at 3-feet-0-inches intervals. Each horizontal brace to be tied to each vertical channel and at each end to be attached to abutting construction; as approved by the PROJECT MANAGER OR INSPECTOR.
3. Attach screwable resilient furring channels to metal decking with self-tapping sheet metal screws at 4-inches on center. Space channels as noted on the Contract Drawings.
4. Attach screwable furring channels to masonry with power driven anchors at 2-foot centers alternating from side to side and with two at or near each end. Space channels as noted on the Contract Drawings.

E. Furring Channels for Suspended Ceilings: Secure 3/4-inch channels to carrying channels with double wrap and twist or tie wire at each intersection. Spacing of furring channels not to exceed 26 inches on center.

3.4 INSTALLATION OF ACCESSORIES (As applicable)

A. General: Install metal accessories plumb, level, straight and true to line, and shimmed as necessary. Accurately miter and tightly fit at corners. Install full height and longest practicable lengths. Hold splices to a minimum. Securely fasten accessories to supports by approved methods. Provide prefabricated corner units where ever possible.

B. Reinforcing Strips: Locate at junction of different materials where cracking of plaster may occur, except as otherwise indicated on the Contract Drawings or specified.

C. Metal Trim Screeds: Locate where indicated on the Contract Drawings. Securely fasten in place. Erect plumb, level straight and true to level.

D. Metal Base Screeds: Locate where plaster joins cement on bases.

E. Expansion Screeds: Locate where indicated on the Contract Drawings. Secure in place with both flanges nailed with galvanized nails at 6-inches on center. Cut the metal lath at the screed centerline and cut back and place on each side of the screed. Upon completion of plastering operations, remove the "Zip" strip.

F. Control Joints: Locate in soffits or horizontal cement plaster areas and space maximum 20 feet apart or as otherwise indicated on the Contract Drawings.

G. Reveal Molding: As indicated on the Contract Drawings, properly secure to structure,

suitably marked, and protected as necessary to protect anodized finish during plastering and curing operations; such protections to be removed upon completion of plastering operations and cleaned without marring the surfaces.

3.5 APPLICATION OF PLASTER

A. General:

1. In 3 coats for all plastering on metal lath, except backing for ceramic tile mortar setting bed. In 2 coats for all plastering on concrete and/or masonry. In 2 coats for backing for ceramic tile.
2. Make finish coats reasonably uniform, thickness not less than 1/16-inch at any point; except not less than 1/8-inch at any point for Portland Cement plaster.
3. Apply finish gypsum plaster coats over plaster base coats.
4. Apply finish Portland Cement plaster coat over Portland Cement plaster base coats.
5. Extend wall plaster down to floor to provide solid backing behind base, except where cement base is indicated on the Contract Drawings.
6. Use of machines for applying plaster is permissible at the option of the printed "Reference Specifications for Machine Applied Plaster" of the Plastering Industries Technical Research Committee. Use of machines for applying and troweling finish plaster coats is not permissible. Plaster screeds will be required on wall and ceiling areas whenever permanent grounds are too far apart to serve as guides for rodding. Apply plaster screeds in conformance with the printed "Reference Specifications Lathing, furring and Plastering in California" of the California Lathing and Plastering Contractors Association, Inc. Locate plaster screeds as directed by the Project Manager or Inspector.
7. Two coats for all plastering on masonry.

B. Minimum Thickness of Plaster (Including Finish Coat)

1. Gypsum Plaster on Gypsum Lath: ½ -inch measured from face of the lath.
2. Portland Cement Plaster on Metal Lath: 7/8-inch, measured from back plane of lath.
3. Portland Cement Plaster Backing for Tile: Scratch coat 3/8-inch, measured from face of lath; second coat as necessary for required level plane to receive mortar settling bed for tile.
4. Gypsum Plaster or Cement Plaster on masonry or on concrete: ½ -inch measured from face of concrete or masonry.
5. Gypsum Plaster on Metal Lath: 5/8-inch, measured from face of lath; 3/4-inch from back plane lath.

- F. Exterior Portland Cement Plaster on Metal Lath: Scratch coat shall be 3/8-inch as measured from face of the lath. The brown coat (second coat) as necessary to produce a level plane to receive final "stucco" finish to produce a total thickness of 1-inch.

3.6 CURING AND PROTECTIONS

- A. **Required:** All plaster work to be cured and protected from excessively rapid or slow drying because of weather or lack of air circulation; heat, as required to control drying.
- B. **Portland Cement Plaster:**
1. Keep each coat damp for 48 hours after application.
 2. Interior Plaster: Keep scratch coat plaster moist minimum 24 hours, then apply brown coat and keep moist for minimum 24 hours, then apply finish coat and keep moist for minimum 24 hours. Fog spray as necessary to maintain moisture during curing periods.
 3. Keep exterior plaster moist cured by application of "Fog Spray" during the curing period.
 4. Keep exterior stucco moist by covering with 7 ounce burlap maintained in a thoroughly wet condition for at least 48 hours after application. Allow burlap to hang in as long as possible, lengths and tied together at joints; temporary battens, securely anchored in place, to maintain wet burlap in direct contact with cement plaster, or stucco surfaces during the curing period.
- C. **Reveal Moldings:** Suitably mask and protect such moldings and trim, including flanges, flush with finish plastering against damage to finish during plastering and curing operations. Remove protections upon completion of plastering and curing operations.

3.8 **PATCHING AND CLEANING**

- A. **Patching:** Neatly patch or replace damaged plaster surfaces after the various other trades have left the work.
1. Cut-out broken or damaged plaster on straight lines with clean and sharp edges. Cut-out cracks to a minimum width of 1-inch. Patch with same materials and methods as original work. Match adjoining work in plane, finish and texture without perceptible joints. Contractor must replace entire section of plaster, up to nearest joint lines, if an approved patch cannot be obtained.
- B. **Cleaning:**
1. At completion of work, remove excess plaster from beads, screeds, base, trim and adjoining work and leave the work clean.
 2. In addition to provisions of Article 7 of the GENERAL REQUIREMENTS as rapidly as plastering is completed in each space, clean-up rubbish, utensils and surplus material and scaffolding. Clean adjacent surfaces splattered with plaster. Sweep floors and leave area in neat condition for work of other trades.

(END OF SECTION)

SECTION 099113 EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on exterior substrates.
- B. Related Requirements:
 - 1. Section 099123 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.2 DEFINITIONS

- A. Conform to PDCA Glossary for interpretation of terms used in this Section except as modified below.
- B. Exposed Surfaces: Surfaces of products, assemblies, and components visible from any angle after final installation. Includes internal surfaces visible when operable doors, panels or drawers are open, and surfaces visible behind registers, grilles, or louvers.
- C. Concealed Surfaces: Surfaces permanently hidden from view in finished construction and which are only visible after removal or disassembly of part or all of product or assembly.
- D. Inaccessible Spaces: Spaces not intended for human use.
- E. Sheen:
 - 1. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
 - 2. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
 - 3. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
 - 4. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
 - 5. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
 - 6. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.

2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Benjamin Moore & Co.
 - 2. Dunn-Edwards Corporation.
 - 3. Sherwin-Williams Company (The).
 - 4. Vista Paint.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- C. Colors: As indicated in a color schedule.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (CMU): 12 percent.
 - 3. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following: SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Paint the following work where exposed to view:
 - 1. Equipment, including panelboards and switch gear.
 - 2. Uninsulated metal piping.
 - 3. Uninsulated plastic piping.
 - 4. Pipe hangers and supports.
 - 5. Metal conduit.
 - 6. Plastic conduit.
 - 7. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Non-traffic Surfaces: 100% Acrylic Low Sheen.
 - 1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. Sherwin-Williams Company (The): A24W300 Loxon Primer
 - d. Vista Paint: 4600 Uniprime II
 - 2. Intermediate Coat:
 - a. Benjamin Moore & Co: N103 MooreGard Low Sheen
 - b. Dunn Edwards: EVSH20 Evershield Low Sheen Exterior
 - c. Sherwin-Williams Company (The): A89 Super Paint Satin
 - d. Vista Paint: 8200 Carefree 100% Acrylic Velva Sheen
 - 3. Finish Coat:
 - a. Benjamin Moore & Co: N103 MooreGard Low Sheen
 - b. Dunn Edwards: EVSH20 Evershield Low Sheen Exterior
 - c. Sherwin-Williams Company (The): A89 Super Paint Satin
 - d. Vista Paint: 8200 Carefree 100% Acrylic Velva Sheen
- B. CMU Substrates: 100% Acrylic Low Sheen.
 - 1. Prime Coat:
 - a. Benjamin Moore & Co: 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler
 - c. Sherwin-Williams Company (The): B25W25 Block Filler
 - d. Vista Paint: 040 Block Filler
 - 2. Intermediate Coat:
 - a. Benjamin Moore & Co: N103 MooreGard Low Sheen
 - b. Dunn Edwards: EVSH20 Evershield Low Sheen Exterior

- c. Sherwin-Williams Company (The): A89 Super Paint Satin
 - d. Vista Paint: 8200 Carefree 100% Acrylic Velva Sheen
3. Finish Coat:
- a. Benjamin Moore & Co: N103 MooreGard Low Sheen
 - b. Dunn Edwards: EVSH20 Evershield Low Sheen Exterior
 - c. Sherwin-Williams Company (The): A89 Super Paint Satin
 - d. Vista Paint: 8200 Carefree 100% Acrylic Velva Sheen
- C. Ferrous Metal Substrate: 100% Acrylic Semi Gloss.
1. Prime Coat:
- a. Benjamin Moore & Co: M04 Acrylic Prime
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. Sherwin-Williams Company (The): B66W1 DTM Acrylic Primer
 - d. Vista Paint: 9600 Protec Primer
2. Intermediate Coat:
- a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
3. Finish Coat:
- a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
- D. Galvanized Metal Substrates: 100% Acrylic Semi Gloss.
1. Prime Coat:
- a. Benjamin Moore & Co: M04 Acrylic Prime
 - b. Dunn Edwards: GAPR00 Galv-Alum Premium
 - c. Sherwin-Williams Company (The): B66A50 DTM Bonding Primer
 - d. Vista Paint: 4800 Metal Pro Primer
2. Intermediate Coat:
- a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
3. Finish Coat:
- a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi Gloss

- d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

END OF SECTION

SECTION 099123 INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.
- B. Related Requirements:
 - 1. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

1.2 DEFINITIONS

- A. Conform to PDCA Glossary for interpretation of terms used in this Section except as modified below.
- B. Exposed Surfaces: Surfaces of products, assemblies, and components visible from any angle after final installation. Includes internal surfaces visible when operable doors, panels or drawers are open, and surfaces visible behind registers, grilles, or louvers.
- C. Concealed Surfaces: Surfaces permanently hidden from view in finished construction and which are only visible after removal or disassembly of part or all of product or assembly.
- D. Inaccessible Spaces: Spaces not intended for human use.
- E. System DFT: Dry film thickness of entire coating system unless otherwise noted.
- F. Sheen:
 - 1. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
 - 2. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
 - 3. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
 - 4. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
 - 5. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
 - 6. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
 - 7. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.

- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
1. Submit Samples on rigid backing, 8 inches square.
 2. Step coats on Samples to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.

- C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co. Montvale, New Jersey 07653; www.benjaminmoore.com.
 - 2. Dunn-Edwards Paint Co. (The), Los Angeles, California 90058; www.dunnedwards.com.
 - 3. Sherwin-Williams Company (The), Cleveland, Ohio 44115; www.sherwin-williams.com.
 - 4. Vista Paint Corporation (The), Fullerton, California 92831; www.vistapaint.com.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 50 g/L.
 - 3. Dry-Fog Coatings: 50 g/L.
 - 4. Primers, Sealers, and Undercoaters: 100 g/L.
 - 5. Rust Preventative Coatings: 100 g/L.
 - 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 - 7. Pretreatment Wash Primers: 420 g/L.
 - 8. Floor Coatings: 50 g/L.
 - 9. Shellacs, Clear: 730 g/L.
 - 10. Shellacs, Pigmented: 550 g/L.
- C. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing

of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- D. Colors: Match Architect's samples or as indicated in a color schedule.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item,

provide surface-applied protection before surface preparation and painting. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following: SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Non-traffic Surfaces: 100% Acrylic Semi Gloss
 - 1. Prime Coat:
 - a. [Benjamin Moore & Co](#): 023 Fresh Start Primer
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. [Sherwin-Williams Company \(The\)](#): A24W300 Loxon Primer
 - d. [Vista Paint](#): 4600 Uniprime II
 - 2. Intermediate Coat:
 - a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
 - 3. Finish Coat:
 - a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
- B. CMU Substrates: 100% Acrylic Semi Gloss
 - 1. Prime Coat:
 - a. [Benjamin Moore & Co](#): 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler
 - c. [Sherwin-Williams Company \(The\)](#): B25W25 Block Filler
 - d. [Vista Paint](#): 040 Block Filler
 - 2. Intermediate Coat:
 - a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss

- d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
3. Finish Coat:
- a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
- C. Ferrous Metal Substrate: 100% Acrylic Semi Gloss
1. Prime Coat:
- a. [Benjamin Moore & Co](#): M04 Acrylic Prime
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. [Sherwin-Williams Company \(The\)](#): B66W1 DTM Acrylic Primer
 - d. [Vista Paint](#): 9600 Protec Primer
2. Intermediate Coat:
- a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
3. Finish Coat:
- a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
- D. Galvanized Metal Substrates: 100% Acrylic Low Sheen
1. Prime Coat:
- a. [Benjamin Moore & Co](#): M04 Acrylic Prime
 - b. Dunn Edwards: GAPR00 Galv-Alum Premium
 - c. [Sherwin-Williams Company \(The\)](#): B66A50 DTM Bonding Primer
 - d. [Vista Paint](#): 4800 Metal Pro Primer
2. Intermediate Coat:
- a. [Benjamin Moore & Co](#): NA
 - b. Dunn Edwards: SPMA20 Suprema Velvet
 - c. [Sherwin-Williams Company \(The\)](#): NA
 - d. [Vista Paint](#): 8200 Carefree 100% Acrylic Velva Sheen
3. Finish Coat:
- a. [Benjamin Moore & Co](#): NA
 - b. Dunn Edwards: SPMA20 Suprema Velvet
 - c. [Sherwin-Williams Company \(The\)](#): NA
 - d. [Vista Paint](#): 8200 Carefree 100% Acrylic Velva Sheen

- E. Wood Substrates: 100% Acrylic Semi Gloss
1. Prime Coat:
 - a. [Benjamin Moore & Co](#): 023 Fresh Start Primer
 - b. Dunn Edwards: EZPR00 E-Z Prime Premium
 - c. [Sherwin-Williams Company \(The\)](#): B51W20 PrepRite Pro Block
 - d. [Vista Paint](#): 4200 Terminator II
 2. Intermediate Coat:
 - a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
 3. Finish Coat:
 - a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
- F. Gypsum Wallboard Substrates: 100% Acrylic Semi Gloss
1. Prime Coat:
 - a. [Benjamin Moore & Co](#): 023 Fresh Start Primer
 - b. Dunn Edwards: VNPR00 PVA Sealer
 - c. [Sherwin-Williams Company \(The\)](#): B28W08111 Premium Wall & Wood Primer
 - d. [Vista Paint](#): 1100 Hi Build PVA Sealer
 2. Intermediate Coat:
 - a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic
 3. Finish Coat:
 - a. [Benjamin Moore & Co](#): W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. [Sherwin-Williams Company \(The\)](#): A98 Duration Semi Gloss
 - d. [Vista Paint](#): 8400 Carefree Semi Gloss 100% Acrylic

END OF SECTION

**SECTION 099600
HIGH PERFORMANCE COATINGS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation cleaners.
- B. Interior high performance paints and coatings systems including surface preparation.
- C. Exterior high performance paints and coatings systems including surface preparation.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 042000 - Unit Masonry.
- C. Section 051210 - Structural Steel Framing.
- D. Section 055000 - Metal Fabrications.
- E. Section 062000 - Finish Carpentry.
- F. Section 064023 – Interior Architectural Woodwork.
- G. Section 081113 - Standard Hollow Metal Doors and Frames.
- H. Division 26 - Electrical.

1.3 REFERENCES

- A. Steel Structures Painting Council (SSPC):
 - 1. SSPC-SP 1 - Solvent Cleaning.
 - 2. SSPC-SP 2 - Hand Tool Cleaning.
 - 3. SSPC-SP 3 - Power Tool Cleaning.
 - 4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
 - 5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
 - 6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.
 - 7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
 - 8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
 - 9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of Metals by

- Waterjetting Prior to Recoating.
10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- B. Safety Data Sheets: Per manufacturer's SDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.
 - C. South Coast Air Quality Management District (SCAQMD): Rule 1113 - Architectural Coatings.
 - D. Green Seal, Inc.:
 1. GS-11 Standard for Paints and Coatings.(1st Edition, May 20,1993)
 2. GC-03 - Environmental Criteria for Anti-Corrosive Paints.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330 - Submittal.
- B. Product Data: For each paint system indicated, including.
 1. Product characteristics.
 2. Surface preparation instructions and recommendations.
 3. Primer requirements and finish specification.
 4. Storage and handling requirements and recommendations.
 5. Application methods.
 6. Cautions for storage, handling and installation.
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors and sheens available.
- D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Finish surfaces for verification of products, colors and sheens.
 2. Finish area designated by Architect.

3. Provide samples that designate primer and finish coats.
4. Do not proceed with remaining work until the Architect approves the mock-up.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
 1. Product name, and type (description).
 2. Application and use instructions.
 3. Surface preparation.
 4. VOC content.
 5. Environmental handling.
 6. Batch date.
 7. Color number.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

1.9 WARRANTY

- A. The technical data and suggestions of use are correct to the best of our knowledge, and offered in good faith. The statements of this specification do not constitute a warranty, expressed, or implied, as to the performance of these products. As

conditions and use of our materials are beyond our control, we can guarantee these products only to conform to our standards of quality, and our liability, if any, will be limited to replacement of defective materials. All technical information is subject to change without notice.

- B. Special written project warranties may be issued on a request basis at the discretion of the Rust-Oleum Corporation Technical and Legal Departments and would not be contained within this specification document.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Rust-Oleum®, which is located at: 11 Hawthorn Pkwy.; Vernon Hills, IL 60061; Toll Free Tel: 800-323-3584; Tel: 847-367-7700; Fax: 847-816-2330; Email: [request info \(productsupport@rustoleum.com\)](mailto:request info (productsupport@rustoleum.com)); Web: www.rustoleum.com or approved equal
- B. Requests for substitutions will be considered in accordance with provisions of Section 01630 - Substitutions.

2.2 APPLICATIONS/SCOPE

- A. Surface Preparation Cleaners
 1. Interior Surface Preparation Cleaners
 2. Exterior Surface Preparation Cleaners
- B. Interior High Performance Paints and Coatings:
 1. Concrete: Poured, precast, tilt-up, cast-in-place, cement board.
 2. Concrete: Ceilings.
 3. Masonry: CMU - concrete, split face, scored, smooth, stucco.
 4. Non-Ferrous Metal: Galvanized steel and aluminum.
 5. Metal Ferrous: Ceilings, structural steel, joists, trusses, beams, and similar items including dryfall coatings.
 6. Wood: Walls, ceilings, doors, trim, cabinet work, and similar items.
 7. Drywall: Drywall board, Gypsum board
 8. Plaster: Walls, ceilings.
- C. Exterior High Performance Paints and Coatings:
 1. Concrete: Cementitious siding, flexboard, transite, and shingles (non-roof).
 2. Masonry: Concrete masonry units, cinder or concrete block.
 3. Concrete: Concrete floors, patios, porches, steps and platforms,(Non-Vehicular)
 4. Metal: Aluminum, galvanized steel.
 5. Metal: Miscellaneous iron, ornamental iron, ferrous metal.
 6. Wood: Floors (non-vehicular), and platforms.

7. Wood: Siding, trim, shutters, sash, and miscellaneous hardboard.
8. Architectural PVC, plastic, fiberglass.
9. Drywall: Gypsum board, and exterior drywall.
10. Vinyl: Siding, EIFS, synthetic stucco.

2.3 PAINT MATERIALS - GENERAL

- A. Paints and Coatings.
 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufacturer's product instructions for optimal color conformance.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- D. Color: Refer to Finish Schedule for paint colors, and as selected.

2.4 SURFACE PREPARATION CLEANERS

- A. Interior Cleaners:
 1. Krud Kutter Original
 2. Zinsser JOMAX Virus and Mold Killer
 3. Krud Kutter Pre Paint Cleaner
 4. Krud Kutter Must for Rust
 5. Krud Kutter Metal Etch
 6. Krud Kutter Mold & Mildew Stain Remover
 7. Krud Kutter Rustex
 8. Krud Kutter Gloss Off
- B. Exterior Cleaners:
 1. Krud Kutter Original
 2. Krud Kutter Multi Purpose Wash
 3. Krud Kutter Concrete Clean & Etch
 4. Krud Kutter House Wash
 5. Krud Kutter Deck & Fence Wash
 6. Zinsser JOMAX - House Cleaner and Mildew Killer
 7. Krud Kutter Concrete & Driveway Cleaner
 8. Krud Kutter Metal Etch

9. Krud Kutter Must for Rust
10. Krud Kutter Rustex
11. Krud Kutter Pre Paint Cleaner
12. Krud Kutter Gloss Off
13. Restore Deck Stripper

2.5 INTERIOR HIGH PERFORMANCE PAINT AND COATING SYSTEMS

- A. CONCRETE - (Walls and Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place) including PLASTER - (Walls, Ceilings).
 1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Semi-Gloss Acrylic.
 - 3) 3rd Coat: R-O 5200 Semi-Gloss Acrylic (1-3 mils dry per coat).
 - c. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - d. Low Sheen Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Eggshell Acrylic.
 - 3) 3rd Coat: R-O 5200 Eggshell Acrylic (1-3 mils dry per coat).
 2. Alkyd System:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Zinsser Cover Stain Classic 100 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - b. Satin Finish:
 - 1) R-O Zinsser Cover Stain Classic 100 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Satin.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Satin (1-3 mils dry per coat).
 3. Epoxy Systems (Water Base):
 - a. Gloss Finish:
 - 1) 1st Coat: Sierra Performance S70/71 No VOC WB Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S60 No VOC WB Epoxy (2-3 mils dry).
 - b. Satin Finish:
 - 1) 1st Coat: Sierra Performance S70/71 No VOC WB Epoxy Primer

- (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S62 No VOC WB Epoxy (2-3 mils dry).
 - 4. Epoxy Systems (Solvent Based):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O 9100 Series Epoxy Mastic.
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
- B. CONCRETE: Ceilings.
 - 1. Dryfall Waterborne Systems:
 - a. Flat Finish:
 - 1) 1st Coat: R-O Zinsser Commercial Dryfall Coating.
 - 2) 2nd Coat: R-O Zinsser Commercial Dryfall Coating (2-3 mils dry per coat).
- C. MASONRY: CMU - Concrete, Split Face, Scored, Smooth, High Density, Low Density, Fluted.
 - 1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
 - c. Satin Finish:
 - 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - d. Low Sheen Finish:
 - 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
 - 2. Alkyd System:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - 3. Epoxy System (Water Based):
 - a. Gloss Finish:

- 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: Sierra Performance S60 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S60 No VOC WB Epoxy (2-3 mils dry per coat).
- b. Satin Finish:
- 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: Sierra Performance S62 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S62 No VOC WB Epoxy (2-3 mils dry per coat).
4. Epoxy Systems (Solvent Based):
- a. Gloss Finish:
- 1) 1st Coat: R-O 9100 Series Epoxy Mastic.
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)

D. METAL: Aluminum, Galvanized.

1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
 - c. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Metal Max No VOC UMA Semi.
 - 3) 3rd Coat: R-O Sierra Performance Metal Max No VOC UMA Semi (1-3 mils dry per coat).
 - d. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Grip Tec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - e. Low Sheen Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
2. Alkyd System:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.

- 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Satin.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Satin (1-3 mils dry per coat).
- 3. Epoxy System (Water Base):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance S70/71 No VOC Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S60 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S60 No VOC WB Epoxy (2-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance S70/71 No VOC Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S62 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S62 No VOC WB Epoxy (2-3 mils dry per coat).
- 4. Epoxy System (Solvent Based):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O 9100 Series Epoxy Mastic.
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
 - b. Self Healing Epoxy System, Gloss (Solvent Based):
 - 1) 1st Coat: R-O META Prime Self Healing Epoxy
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
- 5. Urethane System (Water Base):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat R-O Seal-Krete HP Dura Shell WB Urethane.
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane (2-3 mils dry per coat).
 - b. Satin/Matte Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat R-O Seal-Krete HP Dura Shell WB Urethane.
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane (2-3 mils dry per coat)

E. METAL: Galvanized; Ceilings, Duct work.

- 1. Multi-Surface Acrylic Coating System:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
- 2. Dryfall Waterborne Topcoats:

- a. Flat Finish:
 - 1) 1st Coat: R-O Zinsser Commercial Dryfall Coating.
 - 2) 2nd Coat: R-O Zinsser Commercial Dryfall Coating (2-3 mils dry per coat).

- F. METAL - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous and Ornamental Iron, Structural Iron, Ferrous Metal)
 - 1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
 - c. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Metal Max No VOC UMA Semi.
 - 3) 3rd Coat: R-O Sierra Performance Metal Max No VOC UMA Semi (1-3 mils dry per coat).
 - d. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - e. Low Sheen Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
 - 2. Alkyd System:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O CV740 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - b. Satin Finish (Water Base):
 - 1) 1st Coat: R-O CV740 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Satin.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Satin (1-3 mils dry per coat).
 - 3. Epoxy System (Water Base):
 - a. Gloss Finish:

- 1) 1st Coat: R-O Sierra Performance S70/71 Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S60 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S60 No VOC WB Epoxy (2-3 mils dry per coat).
- b. Satin Finish:
- 1) 1st Coat: R-O Sierra Performance S70/71 Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S62 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S62 No VOC WB Epoxy (2-3 mils dry per coat).
4. Epoxy Systems (Solvent Based):
- a. Gloss Finish:
- 1) 1st Coat: R-O 9100 Series Epoxy Mastic.
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
- b. Self Healing Epoxy System, Gloss (Solvent Based):
- 1) 1st Coat: R-O META Prime Self Healing Epoxy (5-8 mils dry)
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry)
5. Urethane System (Water Base):
- a. Gloss Finish:
- 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat R-O Seal-Krete HP Dura Shell WB Urethane.
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane (2-3 mils dry per coat).
- b. Satin/Matte Finish:
- 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat R-O Seal-Krete HP Dura Shell WB Urethane.
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane (2-3 mils dry per coat)
6. Zinc System (Solvent Based):
- a. Gloss Finish:
- 1) 1st Coat: R-O Rust-O-Zinc Inorganic Zinc Rich Primer (1.5-2.5 mils dry)
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic.
 - 3) 3rd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
- b. Self Healing Zinc/Epoxy System, Gloss (Solvent Based):
- 1) 1st Coat: R-O Rust-O-Zinc Inorganic Zinc Rich Primer (1.5-2.5 mils dry)
 - 2) 2nd Coat: R-O META Prime Self Healing Epoxy (5-8 mils dry)
 - 3) 3rd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry)
7. Elastomeric Acrylics System (Water Based)
- a. Gloss Finish:
- 1) 1st Coat: R-O Mathys Noxyde Acrylic
 - 2) 2nd Coat: R-O Mathys Noxyde Acrylic (7 mils dry per coat)
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry)
- b. Satin Finish:
- 1) 1st Coat: R-O Mathys Noxyde Acrylic

- 2) 2nd Coat: R-O Mathys Noxyde Acrylic (7 mils dry per coat)
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry)
8. Dryfall Waterborne Topcoats:
- a. Flat Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Zinsser Commercial Dryfall Coating.
 - 3) 3rd Coat: R-O Zinsser Commercial Dryfall Coating (2-3 mils dry per coat).
- G. WOOD - (Walls, Ceilings, Doors, Trim):
- 1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi - Gloss Finish:
 - 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
 - c. Satin Finish:
 - 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - d. Low Sheen Finish:
 - 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
 - 2. Alkyd System:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Zinsser Cover Stain Classic 100 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Cover Stain Classic 100 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Satin.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Satin (1-3 mils dry per coat).

- H. DRYWALL - (Walls, Ceilings, Gypsum Board and similar items)
1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
 - c. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - d. Low Sheen Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
 2. Epoxy System (Water Base):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S60 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S60 No VOC WB Epoxy (2-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S62 No VOC WB Epoxy.
 - 3) 3rd Coat: Sierra Performance S62 No VOC WB Epoxy (2-3 mils dry per coat).
 3. Epoxy Systems (Solvent Based):
 - a. Gloss Finish High Performance:
 - 1) 1st Coat: R-O 9100 Series Epoxy Mastic.
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
- I. Concrete - (Floors, Anti Slip)
1. Latex Systems:
 - a. Semi-Gloss Finish:
 - 1) R-O AS5600 Anti Slip WB Coating (12-15 mils dry)
 2. Epoxy System:
 - a. Semi-Gloss Finish:

- 1) R-O AS9100 Anti Slip Epoxy Coating (17-25 mils dry)

2.6 EXTERIOR HIGH PERFORMANCE PAINT AND COATING SYSTEMS

A. CONCRETE (Cementitious Siding, Flexboard, Transite Board, Shingles (Non-Roof), Common Brick, Stucco, Tilt-up, Precast, and Poured-in-place Cement).

1. Latex Systems:

a. Gloss Finish:

- 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
- 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
- 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).

b. Semi-Gloss Finish:

- 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
- 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
- 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).

c. Satin Finish:

- 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
- 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
- 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).

d. Low Sheen Finish:

- 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
- 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
- 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).

e. Flat Finish, High Build Waterproofing Acrylic Coating:

- 1) 1st Coat: R-O Zinsser Water-Tite Flexible Primer & Finish.
- 2) 2nd Coat: R-O Zinsser Water-Tite Flexible Primer & Finish (5-6 mils dry per coat).

2. Clear Water Repellant:

a. Clear:

- 1) 1st Coat: R-O Okon S-20 Siloxane Water Repellant.
- 2) 2nd Coat: R-O Okon S-20 Siloxane Water Repellant, A10T7 (50-200 sq ft/ gal).

B. MASONRY: Concrete Masonry Units (CMU)- Cinder or Concrete Block.

1. Latex Systems:

a. Gloss Finish:

- 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
- 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
- 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).

b. Semi-Gloss Finish:

- 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
- c. Satin Finish:
- 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
- d. Low Sheen Finish:
- 1) 1st Coat: R-O Zinsser High Build Block Filler (7 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
- e. Flat Finish, High Build Waterproofing Acrylic Coating:
- 1) 1st Coat: R-O Zinsser Water-Tite Flexible Primer & Finish.
 - 2) 2nd Coat: R-O Zinsser Water-Tite Flexible Primer & Finish (5-6 mils dry per coat).
2. Clear Water Repellant:
- a. Clear:
 - 1) 1st Coat: R-O Okon S-20 Siloxane Water Repellant.
 - 2) 2nd Coat: R-O Okon S-20 Siloxane Water Repellant, A10T7 (50-200 sq ft/ gal).
- C. Concrete - (Floors, Anti Slip)
1. Latex Systems:
 - a. Semi Gloss Finish
 - 1) R-O AS5600 Anti Slip WB Coating (12-15 mils dry)
 2. Epoxy System:
 - a. Semi-Gloss Finish:
 - 1) R-O AS9100 Anti Slip Epoxy Coating (17-25 mils dry).
- D. METAL: Aluminum, Galvanized.
1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Metal Max No VOC UMA Semi-Gloss.
 - 2) 2nd Coat: R-O Sierra Performance Metal Max No VOC UMA Semi-Gloss (1-3 mils dry per coat).
 - c. Semi-Gloss Finish:
 - 1) 1st Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).

- d. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - e. Low Sheen Finish:
 - 1) 1st Coat: R-O 5200 Series Acrylic Eggshell.
 - 2) 2nd Coat: R-O5200 Series Acrylic Eggshell (1-3 mils dry per coat).
 - 2. Alkyd Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Satin.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Satin (1-3 mils dry per coat).
 - 3. Epoxy/Urethane Systems (Water Base):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance S70/71 No VOC WB Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance S60 No VOC WB Epoxy (2-3 mils dry).
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane Gloss (2-3 mils dry).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance S70/71 No VOC WB Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance S62 No VOC WB Epoxy (2-3 mils dry).
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane Matte (2-3 mils dry).
 - 4. Epoxy/Urethane Systems (Solvent Based):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O 9100 Series Epoxy Mastic.
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
 - 3) 3rd Coat: R-O 3300 Series Aliphatic Urethane (1-3 mils dry)
 - b. Self Healing Epoxy/Urethane System, Gloss (Solvent Based):
 - 1) 1st Coat: R-O META Prime Self Healing Epoxy (5-8 mils dry)
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry)
 - 3) 3rd Coat: R-O 3300 Series Aliphatic Urethane (1-3 mils dry)
- E. METAL: Misc. Iron, Ornamental Iron, Structural Iron and Steel, Ferrous Metal.
- 1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.

- 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Metal Max No VOC UMA Semi-Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Metal Max No VOC UMA Semi-Gloss (1-3 mils dry per coat).
 - c. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
 - d. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec No VOC Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - e. Low Sheen Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
2. Alkyd System:
- a. Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Satin.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Satin (1-3 mils dry per coat).
3. Epoxy/Urethane Systems (Water Base):
- a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance S70/71 Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S60 No VOC WB Epoxy (2-3 mils dry).
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane Gloss (2-3 mils dry).
 - b. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance S70/71 Epoxy Primer (2-3 mils dry).
 - 2) 2nd Coat: Sierra Performance S62 No VOC WB Epoxy (2-3 mils dry).
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane Matte (2-3

- mils dry).
4. Epoxy/Urethane Systems (Solvent Based):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O 9100 Series Epoxy Mastic.
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry per coat)
 - 3) 3rd Coat: R-O 3300 Series Aliphatic Urethane (1-3 mils dry)
 - b. Self Healing System, Gloss (Solvent Based):
 - 1) 1st Coat: R-O META Prime Self Healing Epoxy (5-8 mils dry)
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry)
 - 3) 3rd Coat: R-O 3300 Series Aliphatic Urethane (1-3 mils dry)
 5. Urethane Systems (Water Base):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat R-O Seal-Krete HP Dura Shell WB Urethane.
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane (2-3 mils dry per coat).
 - b. Satin/Matte Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat R-O Seal-Krete HP Dura Shell WB Urethane.
 - 3) 3rd Coat: R-O Seal-Krete HP Dura Shell WB Urethane (2-3 mils dry per coat)
 6. Zinc/Epoxy/Urethane Systems (Solvent Based):
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Rust-O-Zinc Inorganic Zinc Rich Primer (1.5-2.5 mils dry)
 - 2) 2nd Coat: R-O 9100 Series Epoxy Mastic (5-8 mils dry).
 - 3) 3rd Coat: R-O 9800 Urethane Mastic (3-4 mils dry)
 - b. Self Healing System, Gloss (Solvent Based):
 - 1) 1st Coat: R-O Rust-O-Zinc Inorganic Zinc Rich Primer (1.5-2.5 mils dry)
 - 2) 2nd Coat: R-O META Prime Self Healing Epoxy (5-8 mils dry)
 - 3) 3rd Coat: R-O 9800 Urethane Mastic (3-4 mils dry)
 7. Elastomeric Acrylics Systems (Water Based)
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Mathys Noxyde Acrylic
 - 2) 2nd Coat: R-O Mathys Noxyde Acrylic (7 mils dry per coat)
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry)
 - b. Satin Finish:
 - 1) 1st Coat: R-O Mathys Noxyde Acrylic
 - 2) 2nd Coat: R-O Mathys Noxyde Acrylic (7 mils dry per coat)
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry)

F. WOOD - (Walls, Doors, Trim Solid Color):

1. Latex Systems:
 - a. Gloss Finish:

- 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
- b. Semi - Gloss Finish:
- 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
- c. Satin Finish:
- 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
- d. Low Sheen Finish:
- 1) 1st Coat: R-O Zinsser Bulls Eye Water Based Primer (1-2 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).
2. Alkyd System:
- a. Gloss Finish:
- 1) 1st Coat: R-O Zinsser Cover Stain Classic 100 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Gloss.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Gloss (1-3 mils dry per coat).
- b. Satin Finish:
- 1) 1st Coat: R-O Cover Stain Classic 100 Alkyd Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O CV740 Alkyd Enamel Satin.
 - 3) 3rd Coat: R-O CV740 Alkyd Enamel Satin (1-3 mils dry per coat).

G. ARCHITECTURAL PVC, PLASTIC, FIBERGLASS

1. Latex Systems:
- a. Gloss Finish:
- 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
- b. Semi-Gloss:
- 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).

- c. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
- d. Satin Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).

H. DRYWALL: Gypsum Board, Exterior Drywall.

- 1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
 - c. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
 - d. Satin Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).

I. VINYL SIDING EIFS, SYNTHETIC STUCCO:

- 1. Latex Systems:
 - a. Gloss Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Gloss (1-3 mils dry per coat).
 - b. Semi-Gloss Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Semi-Gloss.

- 3) 3rd Coat: R-O 5200 Series Acrylic Semi-Gloss (1-3 mils dry per coat).
- c. Satin Finish:
 - 1) 1st Coat: R-O Sierra Performance Griptec Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O Sierra Performance Beyond No VOC UMA Satin.
 - 3) 3rd Coat: R-O Sierra Performance Beyond No VOC UMA Satin (1-3 mils dry per coat).
- d. Satin Finish:
 - 1) 1st Coat: R-O Universal Acrylic Primer (1-3 mils dry).
 - 2) 2nd Coat: R-O 5200 Series Acrylic Eggshell.
 - 3) 3rd Coat: R-O 5200 Series Acrylic Eggshell (1-3 mils dry per coat).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
 - 1. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry a minimum of 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
 - 2. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers

- skilled in the trades involved.
3. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
- B. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
 - C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
 - D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
 - E. Cement Composition Siding/Panels: Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments.
 - F. Copper and Stainless Steel: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.
 - G. Exterior Composition Board (Hardboard): Some composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.
 - H. Drywall - Exterior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds.

- I. Drywall - Interior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
- J. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.
- K. Plaster: Must be allowed to dry thoroughly for at least 30 days before painting, unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.
- L. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
 1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
 2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
 3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
 4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light

shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
 7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
 8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.
 10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.
- M. Vinyl Siding, Architectural Plastics, EIFS and Fiberglass: Clean vinyl siding thoroughly by scrubbing with a warm, soapy water solution. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color.
- N. Stucco: Must be clean and free of any loose stucco. If recommended procedures for applying stucco are followed, and normal drying conditions prevail, the surface may be painted in 30 days. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments.
- O. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. Inspection: The coated surface must be inspected and approved by the Architect just prior to the application of each coat.

3.4 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

**SECTION 099650
ANTI - GRAFFITI COATINGS**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and application of anti-graffiti coatings to the following vertical surfaces.
1. Concrete masonry units
 2. Plaster

1.2 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1.3 SUBMITTALS

- A. Product Data: For each anti-graffiti coating system specified.
1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference the specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 2. Manufacturer's Information: Technical information including label analysis and instructions for handling, storing, and applying each coating material.
 3. Certification by anti-graffiti coating manufacturer that products supplied comply with VOC regulations of SCAQMD.
- B. Samples for Verification: Furnish samples on the same materials to which coating will be applied on. Indicate satin or flat finish. Coat one-half of each Sample, with the other half non-coated.
- C. Qualification Data: For Applicator.
- D. Material Certificates: For each anti-graffiti coating material, signed by manufacturers.
- E. Product Test Reports: Based on evaluation of comprehensive tests by a qualified testing agency for each anti-graffiti coating material indicating compliance of anti-graffiti coatings with requirements based on comprehensive testing within the last two years of current product formulations.
- F. Maintenance Material: Furnish five gallons of each product specified.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying anti-graffiti coating systems similar in material and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

- B. Source Limitations: Obtain products from one manufacturer.
- C. Benchmark Samples (Mockups): Provide full-coat benchmark finish samples for each type of coating on each substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample submittals.
 - 1. Apply anti-graffiti coating per manufacturer's application instructions as directed by the Architect to substrate material that matches actual job conditions. Determine the acceptability of appearance and optimum coverage rate required for application.
 - 2. After sample treatment has cured in accordance with manufacturers recommendations, verify the substrate is coated with sufficient material to produce the desired appearance, color and graffiti protection.
 - 3. Approved benchmark samples will be used to evaluate coating systems.
 - 4. Obtain Architect's approval of benchmark samples before starting application of coatings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
 - 1. Product name or title of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Contents by volume, for pigment and vehicle constituents.
 - 4. Thinning instructions (if permitted).
 - 5. Application instructions.
 - 6. Color name and number.
 - 7. Handling instructions and precautions.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue. Protect anti-graffiti coating materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.6 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 90 deg F, unless otherwise permitted by manufacturer's written instructions.
- B. Do not apply coatings in rain, fog, or mist; when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

PART 2 - PRODUCTS

2.1 ANTI-GRAFFITI COATING MATERIALS, GENERAL

- A. Material Compatibility: Provide anti-graffiti finish-coat materials and related materials that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality anti-graffiti coating materials that are factory formulated, comply with requirements in FS TT-C-555, and are recommended by manufacturer for the application indicated. Material containers not displaying manufacturer's product identification are not acceptable.

2.2 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, provide one of the following non-sacrificial, anti-graffiti coating products:
 - 1. SEI Graffiti Proofer Anti-Stick GPA 200.
 - 2. ChemMasters, Duraguard 100WB.
 - 3. Rainguard International, VandlGuard.
 - 4. Wearlon 711/722 Clear Anti-Graffiti Coating.
 - 5. Monochem Premashield Premium.
 - 6. Or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for coating application. Comply with procedures specified in PDCA P4.
 - 1. Proceed with coating application only after unsatisfactory conditions have been corrected and surfaces are thoroughly dry.
 - 2. Start of coating application will be construed as Applicator's acceptance of surface conditions.
- B. Coordination of Work: Review other Sections in which other materials are specified to ensure compatibility of total system for various substrates. Notify Architect about anticipated problems when using coatings specified over substrates prepared by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, light fixtures, and similar items already installed that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating. After completing coating operations, reinstall items removed, using workers skilled in trades involved.

- B. Cleaning: Before applying coatings or other surface treatments, clean substrates of substances that could impair bond of coating systems. Remove oil and grease before cleaning. Schedule cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- C. Protect shrubs, metal, wood trim, glass, asphalt and other building hardware during application from over-spray.
- D. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for particular substrate conditions and as specified. Cementitious Surfaces: Prepare concrete surfaces to receive anti-graffiti coatings. Remove efflorescence, chalk, dust, dirt, release agents, grease, oils, and similar impediments to good adhesion by water blasting followed by a clear water rinse.
 - 1. Remove mildew and neutralize surfaces according to manufacturer's written instructions before patching materials are applied.
 - 2. Roughen as required to remove glaze. Use abrasive blast-cleaning methods if recommended by coating manufacturer.
 - 3. If hardeners or sealers have been used to improve concrete curing, use mechanical methods for surface preparation.
 - 4. Determine alkalinity and moisture content of surfaces to be coated by performing appropriate tests. If surfaces are sufficiently alkaline to cause finish paint to blister and burn, correct this condition before application. Do not apply coatings over surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
- E. Material Preparation: Mix and prepare materials according to coating manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying anti-graffiti coatings in a clean condition, free of foreign materials and residue.
 - 2. Stir materials before application to produce a mixture of uniform density. Stir as required during application. If surface film forms, do not stir film into material. If necessary, remove film and strain coating material before using.

3.3 APPLICATION

- A. General: Apply anti-graffiti coatings according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
 - 1. Surfaces to receive anti-graffiti coating are indicated on Drawings.
 - 2. Do not apply over conditions detrimental to formation of a durable coating film, such as dirt, rust, scale, grease, moisture, and scuffed surfaces.
 - 3. Do not apply sacrificial graffiti coating until all joint sealants have been installed and cured
 - 4. Do not allow anti-graffiti coating to flow onto glass, metal, and other adjacent finish surfaces.
- B. Application Procedures: Apply sacrificial graffiti coating on surfaces indicated for treatment using airless paint spray equipment. Comply with manufacturer's written instructions, unless otherwise indicated. Apply a second spray coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

- C. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or recoat work not complying with specified requirements.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during coating operations:
 - 1. Engage a qualified independent testing agency to sample coating material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency Shall perform appropriate tests for the following characteristics as required by Owner:
 - a. Elongation.
 - b. Accelerated weathering.
 - c. Low-temperature flexibility.
 - d. Moisture-vapor transmission.
 - e. Wind-driven rain resistance.
 - f. Minimum solids content by volume.
 - 3. Owner may direct Contractor to stop coating application if test results show materials being used do not comply with requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. If necessary, Contractor may be required to remove rejected materials from previously coated surfaces if, on recoating with specified materials, the two coatings are not compatible.

3.5 CLEANING

- A. Cleanup: At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site. After completing coating work, clean glass and spattered surfaces. Remove spattered coatings by washing, scraping, or other methods, being careful not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades from damage whether being coated or not. Correct damage by cleaning, repairing, replacing, and recoating as approved by Architect. Leave in an undamaged condition.
- B. Provide "Wet Paint" signs to protect newly coated finishes. Remove temporary protective wrappings provided by others to protect their work after completing coating operations. After construction activities of other trades are complete, touch up and restore damaged or defaced coated surfaces. Comply with procedures specified in PDCA P1.

END OF SECTION

SECTION 102800 TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories
 - 2. Underlavatory guards
- B. Related Requirements:
 - 1. Section 093013 "Ceramic Tiling" for ceramic toilet and bath accessories.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Include electrical characteristics.
- B. Samples: Full size, for each exposed product and for each finish specified. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
- B. Basis of Design Products: Subject to compliance with requirements, provide products listed in Accessories Schedule on Drawings, or equal.

2.3 UNDERLAVATORY GUARDS

- A. Underlavatory Guard:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Plumberex Specialty Products, Inc.
 - b. Truebro by IPS Corporation.
 - 2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
 - 3. Material and Finish: Antimicrobial, molded plastic, white.

2.4 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

**SECTION 220500
COMMON WORK RESULTS FOR PLUMBING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 SUBMITTALS

- A. Product Data: Submit brochures for the following materials to the Architect in accordance with the provisions of Division 1 of these specifications.
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.

1.5 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. All governing Codes, Ordinances and Agencies, in accordance with the provisions of Division 1 of these specifications.
- B. Warranty: In accordance with the provisions of Division 1 of these specifications.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

1.7 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in PLUMBING SPECIALTIES Section 221119.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 15 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

2.4 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and

with ends compatible with, piping to be joined.

1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. JCM Industries.
 2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
 3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
 4. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
1. Manufacturers:
 - a. Eslon Thermoplastics, or equal.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
1. Manufacturers:
 - a. Thompson Plastics, Inc., or equal.
- D. Plastic-to-Metal Transition Unions: MSS SP-107, PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
1. Manufacturers:
 - a. NIBCO INC., or equal.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
1. Manufacturers:
 - a. Epco Sales, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
 - c. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
1. Manufacturers:
 - a. Epco Sales, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Pipeline Seal and Insulator, Inc.
 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lin-

ing; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

1. Manufacturers:
 - a. Precision Plumbing Products, Inc.
 - b. Sioux Chief Manufacturing Co., Inc.
 - c. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 1. Manufacturers:
 - a. Calpico, Inc.
 - b. Metraflex Co.
 - c. Thunderline "Line-Seal".
 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 3. Pressure Plates: Stainless steel. Include two for each sealing element.
 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening. Polished chrome-plated with set screw.

PART 3 – EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as closely as practical to routing indicated on plans.

- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - f. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - g. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/2 inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint.
- Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechan-

ical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with approved firestop materials, equal to Hilti.
- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end.
Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

- A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

END OF SECTION

- D. Tube Background: Satin-faced, nonreflective aluminum with permanently etched scale markings.
- E. Window: Glass.
- F. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.
- G. Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.
- H. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

2.2 PRESSURE GAGES

- A. Manufacturers:
 - 1. Palmer – Wahl Instruments Inc.
 - 2. Trerice, H. O. Co.
 - 3. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
- B. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
 - 1. Case: Liquid-filled type, drawn steel or cast aluminum, 6-inch diameter.
 - 2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
 - 3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
 - 4. Movement: Mechanical, with link to pressure element and connection to pointer.
 - 5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
 - 6. Pointer: Red or other dark-color metal.
 - 7. Window: Glass.
 - 8. Ring: Metal.
 - 9. Accuracy: Grade B, plus or minus 2 percent of middle half scale.
 - 10. Vacuum-Pressure Range: 30-inch Hg of vacuum to 15 psig of pressure.
 - 11. Range for Fluids under Pressure: Two times operating pressure.
- C. Pressure-Gage Fittings:
 - 1. Valves: NPS 1/4 brass or stainless-steel needle type.
 - 2. Syphons: NPS 1/4 coil of brass tubing with threaded ends.
 - 3. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

2.3 TEST PLUGS

- A. Manufacturers:
 - 1. Flow Design, Inc.
 - 2. MG Piping Products Co.
 - 3. Watts Industries, Inc.; Water Products Div.
- B. Description: Corrosion-resistant brass or stainless-steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.
- C. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- D. Core Inserts: One or two self-sealing rubber valves.
 - 1. Insert material for air, water, oil, or gas service at 20 to 200 degrees F shall be CR.
 - 2. Insert material for air or water service at minus 30 to plus 275 degrees F shall be EPDM.

PART 3 – EXECUTION

3.1 THERMOMETER APPLICATIONS

- A. Install liquid-in-glass thermometers in the following locations:

1. Outlet of each domestic water heater.
 2. Each domestic hot water return pipe.
- B. Provide the following temperature ranges for thermometers:
1. Domestic Hot Water: 30 to 180 degrees F, with 2-degree scale divisions.

3.2 GAGE APPLICATIONS

- A. Install dry-case-type pressure gages for discharge of each pressure-reducing valve.

3.3 INSTALLATIONS

- A. Install direct-mounting thermometers and adjust vertical and tilted positions.
- B. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.
- C. Install test plugs in tees in piping.

3.4 CONNECTIONS

- A. Install meters and gages adjacent to machines and equipment to allow service and maintenance for meters, gages, machines, and equipment.

3.5 ADJUSTING

- A. Adjust faces of thermometers and gages to proper angle for best visibility.

END OF SECTION

**SECTION 220523
GENERAL-DUTY VALVES FOR PLUMBING PIPING**

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. GENERAL-DUTY VALVES FOR PLUMBING PIPING consists of furnishing transportation, labor, materials, and equipment to furnish and install the following general-duty valves:
 - 1. Ball valves.
 - 2. Check valves.
 - 3. Gate valves.

1.2 RELATED WORK

- A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 1 of these specifications.
- B. COMMON WORK RESULTS FOR PLUMBING Section 220500

1.3 REFERENCES

- A. American Society of Mechanical Engineers (ASME)
- B. American Water Works Association (AWWA)

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated. Include body, seating, and trim materials; valve design; pressure and temperature classifications; end connections; arrangement; dimensions; and required clearances. Include list indicating valve and its application. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

1.5 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. All governing Codes, Ordinance and Agencies, in accordance with the provisions of Division 1 of these specifications.
- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valved dimensions and design criteria.
 - 2. ASME B31.9 for building service piping valves.
- C. NSF Compliance: NSF 61-G for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set gate valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.

2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

PART 2 - PRODUCTS

2.1 VALVES, GENERAL

- A. Refer to Valve Applications Article in this Section for applications of valves.
- B. Bronze valves shall be made with dezincification-resistant materials.
 1. Valves for potable water must comply with California Lead Free Law.
 2. Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$. Source: California Health Safety Code (116875).
 3. All valves must be 3rd party certified.
- C. Bronze Valves: NPS 2 and smaller with threaded ends, unless otherwise indicated.
- D. Ferrous Valves: NPS 2-1/2" and larger with flanged ends, unless otherwise indicated.
- E. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream pipe, unless otherwise indicated.
- G. Valve Actuator Types:
 1. Handwheel: For valves other than quarter-turn types.
 2. Handlever: For quarter-turn valves NPS 6 and smaller, except plug valves.
- H. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
 1. Gate Valves: With rising stem.
 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeves that allows operation of valve without breaking the vapor seal or disturbing insulation and memory stops that are fully adjustable after insulation is applied.
- I. Valve-End Connections:
 1. Flanged: With flanges according to ASME B16.1 for iron valves, ASME B16.5 for steel valves.
 2. Solder Joint: With sockets according to ASME B16.18.
 3. Threaded: With threads according to ASME B1.20.1.
- J. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE BALL VALVES

- A. Manufacturers:
 1. Two-Piece, Full-Port, Bronze Ball Valves:
 - a. Conbraco Industries, Inc.; Apollo Div.
 - b. NIBCO INC., Model T-685-80-66-LF
- B. Two-Piece, Bronze Ball Valves: Dezincification resistant lead free bronze body with full-port, stainless steel ball and trim; TFE seats; and **600-psig** minimum cold working pressure rating and blow-out-proof stem.

2.3 BRONZE CHECK VALVES

- A. Manufacturers:
 1. Type 4, Bronze, Swing Check Valves with Nonmetallic TFE Disc:
 - a. Milwaukee Valve Company.
 - b. NIBCO INC., Model T-413-Y-LF
- B. Bronze Check Valves, General: MSS SP-80.
- C. Type 4, Class 125, Bronze, Swing Check Valves: Dezincification resistant lead free bronze body

with nonmetallic disc and bronze seat.

2.4 BRONZE GATE VALVES

- A. Manufacturers:
 - 1. Type 1, Bronze, Rising-Stem Gate Valves:
 - a. Milwaukee Valve Company.
 - b. NIBCO INC., Model T-111-LF
 - c. Red-White Valve Corp.
 - d. Watts Industries, Inc.; Water Products Div.
- B. Bronze Gate Valves, General: MSS SP-80, with ferrous-alloy handwheel.
- C. Type 1, Class 125, Bronze Gate Valves: Lead free bronze body with rising stem and bronze solid wedge.

2.5 CAST-IRON GATE VALVES

- A. Manufacturers:
 - 1. Type I, Cast-Iron, Nonrising-Stem Gate Valves:
 - a. Grinnell Corporation.
 - b. Milwaukee Valve Company.
 - c. NIBCO INC., Model F-619-RW
- B. Cast-Iron Gate Valves, General: MSS SP-70, Type I.
- C. Class 125, NRS, Bronze-Mounted, Cast-Iron Gate Valves: Ductile body with ductile iron trim, non-rising stem, and resilient-wedge.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- C. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- D. Examine threads on valve and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- F. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE APPLICATIONS

- A. Refer to piping Sections for specific valve applications. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, or gate valves.
 - 2. Throttling Service: Ball valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Domestic Water Piping: Use the following types of valves:

1. Ball Valves, NPS 2 and Smaller: Two-piece, 600-psig CWP rating, copper alloy.
2. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125, bronze.
3. Swing Check Valves, NPS 2-1/2 and Larger: Type II, Class 125, gray iron.
4. Spring-Loaded, Lift-Disc Check Valves, NPS 2 and Smaller: Type IV, Class 125 minimum.
5. Gate Valves, NPS 2-1/2 and Larger: Type I, Class 125, OS&Y, bronze-mounted cast iron.

3.3 VALVE INSTALLATION

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement.
- F. Install check valves for proper direction of flow and as follows:
 1. Swing Check Valves: In horizontal position with hinge pin level.
 2. Lift Check Valves: With stem upright and plumb.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION

SECTION 220529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Hangers and supports for plumbing piping and equipment consists of furnishing transportation, labor, materials and equipment to furnish and install the following:
 - 1. Steel pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Thermal-hanger shield inserts.
 - 5. Fastener systems.
 - 6. Pipe stands.
 - 7. Pipe positioning systems.
 - 8. Equipment supports.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
 - 1. Division 5 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
 - 2. Division 21 Section "Fire-Suppression Piping" for pipe hangers for fire-suppression piping.
- 3. Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for vibration isolation devices.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel pipe hangers and supports.
 - 2. Thermal-hanger shield inserts.
 - 3. Powder-actuated fastener systems.
 - 4. Pipe positioning systems.

2.5 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers:
 - 1. ERICO/Michigan Hanger Co.
 - 2. Pipe Shields, Inc.
- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.
- D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.
- E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.6 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head.
 - c. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. B-Line Systems, Inc.; a division of Cooper Industries.
 - b. Hilti, Inc.
 - c. ITW Ramset/Red Head.
 - d. Powers Fasteners.

2.7 PIPE STAND FABRICATION

- A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
 - 1. Manufacturers:
 - a. ERICO/Michigan Hanger Co.
 - b. MIRO Industries.
- C. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural- steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

2.8 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.
- B. Manufacturers:
 - 1. C & S Mfg. Corp.

2. HOLDRITE Corp.; Hubbard Enterprises.
3. Samco Stamping, Inc.

2.9 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.10 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 2. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
 3. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 4. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
 5. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
 6. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 3.
 7. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
 8. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 9. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
 10. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
 11. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
 12. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 13. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.

14. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 15. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 16. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 8. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 9. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 10. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 11. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 12. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 13. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 14. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer.

- er to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- O. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Fiberglass Strut System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled fiberglass struts.

- E. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- F. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- G. Pipe Stand Installation:
 - 1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 - 2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division Section "Roof Accessories" for curbs.
- H. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Section "Plumbing Fixtures" for plumbing fixtures.
- I. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- J. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- K. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- L. Install lateral bracing with pipe hangers and supports to prevent swaying.
- M. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- N. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- P. Insulated Piping: Comply with the following:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

- d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
- e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
- 5. Pipes NPS 8 and Larger: Include wood inserts.
- 6. Insert Material: Length at least as long as protective shield.
- 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

**SECTION 220548
NOISE, VIBRATION AND SEISMIC CONTROL**

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Noise, vibration and seismic control of plumbing piping and equipment consists of furnishing transportation, labor, materials, and equipment to furnish and install the following:
 - 1. Isolators
 - 2. Seismic Restraints

1.2 RELATED DOCUMENTS

- A. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 of these specifications.

1.3 DESCRIPTION

- A. Work Included: Isolation of domestic hot and cold water lines, circulation pumps, and water heaters.

1.4 QUALITY ASSURANCE

- A. Codes and Standards
 - 1. All governing Codes, Ordinances and Agencies in accordance with the provisions of Division 1 of these specifications.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

- A. Type A: Neoprene pad. Waffle, ribbed, or other forms. Typically 1/4 to 5/16 inch thick. Durometers of 40 to 65. Static deflections from 0.01 to 0.07 inches. Nominal design 40 durometer for 0.05 inches static deflection. Provide steel load distribution plates. Size of pad to be specified by isolator supplier based on load per pot. Mason W and WM, Vibrex R, or equivalent.
- B. Type D: Is a molded neoprene element enclosed by a ductile housing. The isolator may be utilized in compression, shear or tension. The isolator shall provide seismic restraint in any direction up to 1.0g. The isolator shall be Mason Industries "BR" or approved equal.
- C. Type I: Spring hangers. Steel spring with neoprene cap in steel hanger frame. Static deflection range 1.2 to 2.0 inches nominal. Designed to preclude contact of hanger rods with frame (30 degree misalignment.) Mason 30, Vibex RMSA, or equivalent.
- D. Type T: Trisolators. Sheet metal sleeve with felt insert to be installed at attachment points of hangers or piping. Semco, Elcen, Elmdor/Stoneman or equivalent shop-fabricated device.
- E. Vibration Isolation for Domestic Hot and Cold Water Plumbing Lines.
 - 1. Riser Support: 0.06 inch deflection Type A neoprene pads with load-distribution pads under riser clamps.
 - 2. Horizontal Piping: Minimum 3/8 inch felt between pipe and clevis hanger.

3. Miscellaneous Attachments: Trisolators.
4. Seismic Restraints: Suspended piping - cables as required by code.
5. Vibration Isolation: Isolate plumbing lines within the vicinity of pumps. Plumbing line isolators shall have a static deflection equal to that of the pump isolation.
- F. Vibration Isolation for Water Heaters:
 1. 0.06 inch deflection Type A neoprene pads.
- G. Seismic Restraints: Suspended piping cables as required by Code.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Vibration Isolation: In accordance with the manufacturer's directions.
- B. Seismic Restraint: In accordance with the requirements of all applicable Code and Standards, and manufacturers recommendations.

END OF SECTION

SECTION 220553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Identification for plumbing piping and equipment consists of furnishing transportation, labor, materials, and equipment to furnish and install the following:
 - 1. Pipe labels.
 - 2. Valve tags.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. COMMON WORK RESULTS FOR PLUMBING Section 220500

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

1.5 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. All governing codes, ordinances and agencies, in accordance with the provisions of Division 1 of these specifications.

PART 2 - PRODUCTS

2.1 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

2.2 VALVE TAGS

- A. Valve Tags: Provide a valve tag consisting of a 2 in. dia., 20 ga. brass disk for each valve with 1/2 in. letters identifying service designation. Fasten tags in place with continuous chain around valve stem.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Pipe Label Color Schedule:
 - 1. Domestic Water Piping:
 - a. Background Color: Yellow.
 - b. Letter Color: Black.
 - 2. Sanitary Waste and Storm Drainage Piping:
 - a. Background Color: Green.
 - b. Letter Color: White.

3.3 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units.

END OF SECTION

SECTION 220719 PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. PLUMBING PIPING INSULATION consists of furnishing transportation, labor, materials, and equipment to furnish and install piping insulation including preformed, rigid and flexible pipe insulation; field-applied jackets; accessories and attachments; and sealing compounds.

1.2 RELATED WORK

- A. COMMON WORK RESULTS FOR PLUMBING Section 220500
- B. HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT Section 220529

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM International)

1.4 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.5 QUALITY ASSURANCE

- A. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.
- B. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.
- C. Codes and Standards:
 - 1. All governing Codes, Ordinances and agencies, in accordance with the provisions of Division 1 of these specifications.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT Section.
- B. Coordinate clearance requirements with piping Installer for insulation application.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Glass Fiber Insulation:
 - 1. Johns-Manville
 - 2. Pittsburgh-Corning Corporation
- B. Closed-Cell Phenolic-Foam Insulation:
 - 1. Kooltherm Insulation Products, Ltd.

2.2 INSULATION MATERIALS

- A. Glass Fiber Insulation: Inorganic, foamed or cellulated glass, annealed, rigid, hermetically sealed cells, incombustible.
 - 1. Preformed Pipe Insulation, without Jacket: Comply with ASTM C552, Type II, Class 1.
 - 2. Preformed Pipe Insulation, with Jacket: Comply with ASTM C552, Type II, Class 2.
 - 3. Closed-Cell Phenolic-Foam Insulation: Preformed pipe insulation of rigid, expanded, closed-cell structure. Comply with ASTM C1126, Type III, Grade 1.
- B. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C450 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.

2.3 FIELD-APPLIED JACKETS

- A. General: ASTM C921, Type 1, unless otherwise indicated.
- B. Foil and Paper Jacket: Laminated, glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil.
- C. PVC Jacket: High-impact, ultraviolet-resistant PVC; 20 mils thick; roll stock ready for shop or field cutting and forming.
 - 1. Adhesive: As recommended by insulation material manufacturer.
 - 2. PVC Jacket Color: Color-code piping jackets based on materials contained within the piping system.
 - 3. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
 - 4. Adhesive: As recommended by insulation material manufacturer.
- D. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil- thick, high-impact, ultraviolet-resistant PVC.
 - 1. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
 - 2. Adhesive: As recommended by insulation material manufacturer.
- E. Aluminum Jacket: Factory cut and rolled to indicated sizes. Comply with ASTM B209, 3003 alloy, H-14 temper.
 - 1. Finish and Thickness: Smooth finish, 0.010 inch thick.
 - 2. Moisture Barrier: 1-mil- thick, heat-bonded polyethylene and kraft paper.
 - 3. Elbows: Preformed, 45- and 90-degree, short- and long-radius elbows; same material, finish, and thickness as jacket.

2.4 ACCESSORIES AND ATTACHMENTS

- A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, presized a minimum of 8 ounces per square yard.
 - 1. Tape Width: 4 inches.
- B. Bands: 3/4 inch wide, in one of the following materials compatible with jacket:
 - 1. Stainless Steel: ASTM A666, Type 304; 0.020 inch thick.
 - 2. Galvanized Steel: 0.005 inch thick.
 - 3. Aluminum: 0.007 inch thick.
 - 4. Brass: 0.010 inch thick.
 - 5. Nickel-Copper Alloy: 0.005 inch thick.
- C. Wire: 0.080-inch, nickel-copper alloy; 0.062-inch, soft-annealed, stainless steel; or 0.062-inch, soft-annealed, galvanized steel.

2.5 VAPOR RETARDERS

- A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.
- E. Apply multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- H. Keep insulation materials dry during application and finishing.
- I. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- J. Apply insulation with the least number of joints practical.
- K. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.
- L. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
 - 1. Apply insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
 - 3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.
- M. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material

manufacturer to maintain vapor retarder.

- N. Apply adhesives and mastics at the manufacturer's recommended coverage rate.
- O. Apply insulation with integral jackets as follows:
 - 1. Pull jacket tight and smooth.
 - 2. Circumferential Joints: Cover with 3-inch wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches on center.
 - 3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches. Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches on center.
 - a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.
 - 4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
 - 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.
- P. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
 - 1. Seal penetrations with vapor-retarder mastic.
 - 2. Apply insulation for exterior applications tightly joined to interior insulation ends.
 - 3. Extend metal jacket of exterior insulation outside roof flashing at least 2 inches below top of roof flashing.
 - 4. Seal metal jacket to roof flashing with vapor-retarder mastic.
- Q. Exterior Wall Penetrations: For penetrations of below-grade exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.
- R. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.
- S. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Firestopping and fire-resistive joint sealers are specified in FIRESTOPPING Section.
- T. Floor Penetrations: Apply insulation continuously through floor assembly.
 - 1. For insulation with vapor retarders, seal insulation with vapor-retarder mastic where floor supports penetrate vapor retarder.

3.4 GLASS FIBER INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
 - 1. Secure each layer of insulation to pipe with wire, tape, or bands without deforming insulation materials.
 - 2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic.
 - 3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches on center.
 - 4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
- B. Apply insulation to flanges as follows:
 - 1. Apply preformed pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of the same thickness as pipe insulation.
 - 4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch, and seal joints with vapor-retarder mastic.

- C. Apply insulation to fittings and elbows as follows:
 - 1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 - 2. When premolded sections of insulation are not available, apply mitered sections of cellular-glass insulation. Secure insulation materials with wire, tape, or bands.
 - 3. Cover fittings with heavy PVC fitting covers. Overlap PVC covers on pipe insulation jackets at least 1 inch at each end. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
- D. Apply insulation to valves and specialties as follows:
 - 1. Apply premolded segments of cellular-glass insulation or glass-fiber blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to strainer basket without disturbing insulation.
 - 2. Apply insulation to flanges as specified for flange insulation application.
 - 3. Use preformed standard PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
 - 4. Use preformed heavy PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
 - 5. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.5 CLOSED-CELL PHENOLIC-FOAM INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
 - 1. Secure each layer of insulation to pipe with wire, tape, or bands without deforming insulation materials.
 - 2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic.
 - 3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches on center.
 - 4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
- B. Apply insulation to flanges as follows:
 - 1. Apply preformed pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of the same material and thickness as pipe insulation.
 - 4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch, and seal joints with vapor-retarder mastic.
- C. Apply insulation to fittings and elbows as follows:
 - 1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 - 2. When premolded sections of insulation are not available, apply mitered sections of phenolic-foam insulation. Secure insulation materials with wire, tape, or bands.
 - 3. Cover fittings with heavy PVC fitting covers. Overlap PVC covers on pipe insulation jackets at least 1 inch at each end. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
- D. Apply insulation to valves and specialties as follows:
 - 1. Apply premolded insulation sections of the same material as straight segments of pipe insulation

- when available. Secure according to manufacturer's written instructions.
- 2. When premolded sections of insulation are not available, apply mitered segments of phenolic-foam insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to strainer basket without disturbing insulation.
- 3. Apply insulation to flanges as specified for flange insulation application.
- 4. Use preformed heavy PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
- 5. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.6 FIELD-APPLIED JACKET APPLICATION

- A. Apply glass-cloth jacket, where indicated, directly over bare insulation or insulation with factory-applied jackets.
 - 1. Apply jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 - 2. Embed glass cloth between two 0.062-inch- thick coats of jacket manufacturer's recommended adhesive.
 - 3. Completely encapsulate insulation with jacket, leaving no exposed raw insulation.
- B. Foil and Paper Jackets: Apply foil and paper jackets where indicated.
 - 1. Draw jacket material smooth and tight.
 - 2. Apply lap or joint strips with the same material as jacket.
 - 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 - 4. Apply jackets with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
 - 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-retarder mastic.
- C. Apply PVC jacket where indicated, with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
- D. Apply metal jacket where indicated, with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches on center and at end joints.

3.7 PIPING SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.
- B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
 - 1. Flexible connectors.
 - 2. Vibration-control devices.
 - 3. Fire-suppression piping.
 - 4. Drainage piping located in crawl spaces, unless otherwise indicated.
 - 5. Below-grade piping, unless otherwise indicated.
 - 6. Chrome-plated pipes and fittings, unless potential for personnel injury.
 - 7. Air chambers, unions, strainers, check valves, plug valves, and flow regulators.

3.8 INSULATION APPLICATION SCHEDULE, GENERAL

- A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.
- B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

3.9 INTERIOR INSULATION APPLICATION SCHEDULE

- A. Service: Domestic hot, tempered and recirculated hot water.

1. Operating Temperature: 60 to 165 degrees F.
 2. Insulation Material: Cellular glass fiber, with jacket.
 3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Copper Pipe, 1/2 in to 1 inch: 1 inch thick.
 - b. Copper Pipe, 1-1/4 inch and larger: 1-1/2 inches thick.
 4. Field-Applied Jacket: Foil and paper at mechanical rooms where piping is exposed.
 5. Vapor Retarder Required: Yes.
 6. Finish: None.
- B. Service: Condensate drain.
1. Operating Temperature: 35 to 60 degrees F.
 2. Insulation Material: Closed-cell phenolic foam.
 3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Copper Pipe, 1/2 inch to 1 inch: 1/2 inch thick.
 - b. Copper Pipe, 1-1/4 inches and larger: 1/2 inch thick.
 4. Finish: None.

END OF SECTION

SECTION 221116 DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Under-building slab and above ground domestic water pipes, tubes, fittings, and specialties inside the building.
 - 2. Encasement for piping.
 - 3. Specialty valves.
 - 4. Flexible connectors.
- B. Related Section:
 - 1. Division 2 Section "Water Distribution" for water-service piping outside the building from source to the point where water-service piping enters the building.

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Domestic water piping and support and installation shall withstand effects of earthquake motions determined according to SMACNA Guidelines.

1.4 SUBMITTALS

- A. Product Data: For the following products:
 - 1. Specialty valves.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Flexible connectors.
 - 5. Backflow preventers and vacuum breakers.
 - 6. Water penetration systems.
- B. Water Samples: Specified in "Cleaning" Article.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 61-G and California Lead Free Law for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type K and L water tube, drawn temper.
 - 1. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
 - 2. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105.
- B. Material: Factory coated with 20 mil high density polyethylene coating.
- C. Color: Yellow.

2.5 SPECIALTY VALVES

- A. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.
- B. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

2.6 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cascade Waterworks Manufacturing.
 - b. Dresser, Inc.; Dresser Piping Specialties.
 - c. Ford Meter Box Company, Inc. (The).
 - d. JCM Industries.
 - e. Romac Industries, Inc.
 - f. Smith-Blair, Inc; a Sensus company.
 - g. Viking Johnson; c/o Mueller Co.
- D. Plastic-to-Metal Transition Fittings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Charlotte Pipe and Foundry Company.
 - b. Harvel Plastics, Inc.
 - c. Spears Manufacturing Company.
 - 2. Description: Schedule 80 PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert and one solvent-cement-socket end.
- E. Plastic-to-Metal Transition Unions:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Colonial Engineering, Inc.
 - b. NIBCO INC.
 - c. Spears Manufacturing Company.

2. Description: Schedule 80 PVC four-part union. Include brass or stainless-steel threaded end, solvent-cement-joint plastic end, rubber O-ring, and union nut.

2.7 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. Hart Industries International, Inc.
 - d. Jomar International Ltd.
 - e. Matco-Norca, Inc.
 - f. McDonald, A. Y. Mfg. Co.
 - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - h. Wilkins; a Zurn company.
 2. Description:
 - a. Standard: ASSE 1079.
 - b. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. Matco-Norca, Inc.
 - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - e. Wilkins; a Zurn company.
 2. Description:
 - a. Standard: ASSE 1079.
 - b. Factory-fabricated, bolted, companion-flange assembly.
 - c. Pressure Rating: 150 psig.
 - d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Insulating Kits:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 2. Description:
 - a. Nonconducting materials for field assembly of companion flanges.
 - b. Pressure Rating: 150 psig.
 - c. Gasket: Neoprene or phenolic.
 - d. Bolt Sleeves: Phenolic or polyethylene.
 - e. Washers: Phenolic with steel backing washers.
- E. Dielectric Nipples:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Elster Perfection.
 - b. Grinnell Mechanical Products.
 - c. Matco-Norca, Inc.
 - d. Precision Plumbing Products, Inc.

- e. Victaulic Company.
- 2. Description:
 - a. Standard: IAPMO PS 66
 - b. Electroplated steel nipple. complying with ASTM F 1545.
 - c. End Connections: Male threaded or grooved.
 - d. Lining: Inert and noncorrosive, propylene.

2.8 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Flex-Hose Co., Inc.
 - 2. Flexicraft Industries.
 - 3. Flex Pression, Ltd.
 - 4. Flex-Weld, Inc.
 - 5. Hyspan Precision Products, Inc.
 - 6. Mercer Rubber Co.
 - 7. Metraflex, Inc.
 - 8. Proco Products, Inc.
 - 9. Tozen Corporation.
 - 10. Unaflex, Inc.
 - 11. Universal Metal Hose; a Hyspan company
- B. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
 - 1. Working-Pressure Rating: Minimum 200 psig.
 - 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
 - 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic and recycled water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105.
- C. Install shutoff valve and hose-end drain valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.
- D. Install shutoff valve immediately upstream of each dielectric fitting.
- E. Install domestic water piping level with slope up in direction of water flow to air elimination device and plumb.
- F. Install seismic restraints on piping. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.
- G. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- H. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

- I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- J. Install piping adjacent to equipment and specialties to allow service and maintenance.
- K. Install piping to permit valve servicing.
- L. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- P. Install thermostats in hot-water circulation piping. Comply with requirements in Division 22 Section "Domestic Water Pumps" for thermostats.
- Q. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- S. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.
- E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.4 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball valves for piping NPS 2 and smaller. Use gate valves for piping NPS 2-1/2 and larger.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section

"Domestic Water Piping Specialties."

1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

3.5 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 1. NPS 1-1/2 and Smaller: Fitting-type coupling.
 2. NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.6 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples or unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges, flange kits, nipples.

3.7 FLEXIBLE CONNECTOR INSTALLATION

- A. Install stainless-steel-hose flexible connectors in copper domestic water tubing.

3.8 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.
- B. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
 1. Vertical Piping: MSS Type 8 or 42, clamps.
 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet If Indicated: MSS Type 49, spring cushion rolls.
 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1-1/2 and Smaller: 72 inches with 3/8-inch rod.
 2. NPS 2 and larger: 10 feet with 3/8-inch rod.
- F. Install supports for vertical copper tubing every 10 feet.
- G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.9 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
 - 3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.10 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 15 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

3.11 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:
 - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - 3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- C. Piping Tests:
 - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - 3. Leave new, altered, extended, or replaced domestic and recycled water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - 5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
 - 6. Prepare reports for tests and for corrective action required.
- D. Domestic water piping will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.12 ADJUSTING

- A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
7. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.13 CLEANING

- A. Clean and disinfect potable and non-potable domestic water piping as follows:
 1. Purge new piping.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- B. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.14 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Below ground, domestic water piping shall be the following:
 1. Hard copper tube, ASTM B 88, Type K; wrought-copper solder-joint fittings; and brazed joints.
- D. Aboveground domestic water piping shall be the following:
 1. Hard copper tube, ASTM B 88, Type L; wrought- copper solder-joint fittings; and soldered joints.

3.15 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller. Use gate valves with flanged ends for piping NPS 2-1/2 and larger.
 2. Throttling Duty: Use ball valves for piping NPS 2 and smaller. Use ball valves with flanged ends for piping NPS 2-1/2 and larger.
 3. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION

SECTION 221119 PLUMBING SPECIALTIES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. PLUMBING SPECIALTIES consists of furnishing transportation, labor, materials, and equipment to furnish and install the following plumbing specialties:
1. Backflow preventers.
 2. Water pressure reducing valves.
 3. Temperature-actuated water mixing valves.
 4. Strainers.
 5. Outlet boxes.
 6. Wall hydrants.
 7. Drain valves.
 8. Air vents.
 9. Trap seal primer valves.
 10. Miscellaneous piping specialties.
 11. Access Panels.
 12. Flashing materials.
 13. Cleanouts.
 14. Drains.
 15. Water Hammer Arrestors.

1.2 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, apply to this Section.
- B. METERS AND GAGES FOR PLUMBING SYSTEMS Section 220519
- C. COMMON WORK RESULTS FOR PLUMBING Section 220500

1.3 REFERENCES

- A. American Water Works Association (AWWA)
- B. American Society of Testing and Materials (ASTM)
- C. American Society of Sanitation Engineers (ASSE)
- D. American Society of Mechanical Engineering (ASME)

1.4 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:
1. Domestic Water Piping: 125 psig.
 2. Sanitary Waste and Vent Piping: 10-foot head of water.
 3. Storm Drainage Piping: 10-foot head of water.

1.5 QUALITY ASSURANCE

- A. Codes and Standards:
1. All governing Codes, Ordinances and Agencies, in accordance with the provisions of Division 1 of these specifications.
 2. Comply with NSF 61-G and California Lead Free Law for potable domestic water piping and components.

1.6 SUBMITTALS

- A. Product Data:
 - 1. Backflow preventers.
 - 2. Balancing valves and strainers.
 - 3. Water hammer arresters, air vents, and trap seal primer valves and systems.
 - 4. Hose bibbs.
 - 5. Cleanouts, floor drains, open receptors and roof drains.
 - 6. Vent caps, vent terminals, and roof flashing assemblies.
 - 7. Sleeve penetration systems.
- B. Operation and Maintenance Data:
 - 1. Backflow preventers.
 - 2. Trap seal primer valves and systems.
 - 3. Balancing Valves.
 - 4. Hose bibbs.

PART 2 - PRODUCTS

2.1 BACKFLOW PREVENTERS

- A. Manufacturers:
 - 1. Watts.
 - 2. Cla-Val Co.
 - 3. Zurn Industries, Inc.; Wilkins Div.
- B. General: ASSE standard, backflow preventers.
 - 1. NPS 2 and Smaller: Bronze body with threaded ends.
 - 2. NPS 2-1/2 and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.
- a. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.
 - 3. Interior Components: Corrosion-resistant materials.
 - 4. Exterior Finish: Polished chrome plate if used in chrome-plated piping system.
 - 5. Strainer: On inlet.
- C. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013, suitable for continuous pressure application. Include ball valves on inlet and outlet, and strainer on inlet; test cocks; and pressure-differential relief valve with ASME A112.1.2 air-gap fitting Model AG-8 located below device. Wilkins Model 975. Pipe full size drain to nearest indirect waste receptor.

2.2 WATER PRESSURE-REDUCING VALVES

- A. 3 in. and smaller: Wilkins Model 500XL-YGBR-XL, lead free, bronze, stainless steel seat and strainer.

2.3 TEMPERATURE-ACTUATED WATER MIXING VALVES

- A. Lead free bronze body, integral check valves on hot and cold inlets, 0.5 gpm min. flow, 125 PSI max. pressure, ASSE 1017 certified. Leonard 270-LF or equivalent.

2.4 STRAINERS

- A. Strainers: Lead free Y-pattern, unless otherwise indicated, and full size of connecting piping. Include ASTM A 666, Type 304, stainless-steel screens with 3/64-inch round perforations, unless otherwise indicated. Wilkins model YBS-XL.
 - 1. Pressure Rating: 125-psig minimum working pressure, unless otherwise indicated.
 - 2. NPS 3 and Smaller: Bronze body, with female threaded ends.

2.5 OUTLET BOXES
Not Applicable.

2.6 WALL HYDRANTS

A. Nonfreeze Wall Hydrants (HB-1):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Woodford Manufacturing company.
 - b. Zurn Plumbing Products Group; Specification Drainage Operation.
 - c. Chicago Faucets.
2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Inlet: NPS 3/4 or NPS 1.
7. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
8. Box: Deep, flush mounting with cover.
9. Box and Cover Finish: Nickel bronze.
10. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7
11. Nozzle and Wall-Plate Finish: Nickel bronze.
12. Operating Key(s): One with each wall hydrant.

2.7 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.8 WATER HAMMER ARRESTORS

A. Water Hammer Arrestors:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. PPP Inc.
 - e. Sioux Chief Manufacturing Company, Inc.
 - f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - g. Tyler Pipe; Wade Div.
 - h. Watts Drainage Products Inc.
 - i. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.9 AIR VENTS

A. Bolted-Construction Automatic Air Vents:

1. Body: Bronze.
2. Pressure Rating: 125-psig minimum pressure rating at 140 deg. F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 1/2 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

B. Welded-Construction Automatic Air Vents:

1. Body: Stainless steel.
2. Pressure Rating: 150-psig minimum pressure rating.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

2.10 TRAP SEAL PRIMER VALVES (TP-1)

- A. Piston Operated Trap Seal Primer Valves: ASSE 1018, pressure drop activated, with distribution unit as required.
 1. Manufacturers:
 - a. Precision Plumbing Products Model P-1 or P-2, or equal.
 2. Provide for drains and floor sinks where trap primer is not provided from a water closet and as indicated and specified, each including trap primer valve, standpipe, and distribution unit(s) required for the specified distribution. Provide each concealed assembly with access panel, 8 in. by 8 inch size when distribution units are not required and 12 inches by 12 inches size when one or two distribution units are required. Provide trap primer piping same as specified for domestic water, including pipe wrapping.

2.11 MISCELLANEOUS PLUMBING SPECIALTIES

- A. Access Panels:
 1. Access Panels in Plaster Walls and Ceilings: Karp #DSC214PL, Elmdor PW, 24x24 in. with metal access door and frame, prime coated steel and painted to match adjacent surfaces. For fire rated areas use Karp #KRP-150 FR 1-1/2 hour "B" Label access panels, U.L. listed.
 2. Access Panels in Acoustic Tile Ceilings: Karp #DSC-210, Elmdor AT, 24x24 in. with metal access door and frame, 24x24 in. minimum size, prime coated steel, recessed to accept standard tile in full opening door.
 3. Access Panels in Ceramic Tile Walls: Karp #DSC214M, Smith 4730, chrome-plated cover and frame of suitable size for purpose intended, but not less than 8x8 in. size. For fire rated areas use Karp #FRP-150 FR 1-1/2 hour "B" Label access panels, U.L. listed.
- B. Roof Flashing Assemblies: Manufactured assembly made of 4 pounds per square foot, 0.0625-inch-thick, one piece lead flashing collar and skirt extending at least 6 inches from pipe with galvanized steel boot reinforcement, and counterflashing fitting.
 1. Manufacturers:
 - a. Semco Model 1100.
 2. Low-Silhouette Vent Cap: With vandal-proof vent cap.

2.12 SLEEVE PENETRATION SYSTEMS

- A. Fire-rated wall and floor penetrations installed in conformance with manufacturers directions. Pro Set, Hilti, Nelson.
- B. Description: UL 1479, through-penetration firestop assembly through fire rated walls and floors.
- C. Provide at concrete or masonry exterior bearing walls, Adjust-to-Crete, Paramount, or Sperzel Cretesleeve. Wall sleeves shall be flush with finished surface. Sleeves shall be sized to allow 1/2 in.

clearance around pipe or insulation. Insulation and covering shall be continuous through sleeves.

- D. At exterior walls below grade provide a modular mechanical seal consisting of inter-locking EPDM rubber links shaped to continuously fill the annular space between the pipe and the wall opening with a molded high density polyethylene sleeve water-stop ring, end caps and reinforcing ribs. ASTM B117, ISO 9002. Mechanical seals shall be "Thunderline" Link Seal.

2.13 CLEANOUTS

- A. For cast-iron soil pipe, iron body with extra heavy bronze plugs screwed into caulking ferrules; for steel pipe, extra heavy bronze plugs; and for vitrified clay pipe, vitrified clay plugs. Where cleanouts occur in finished interior walls, provide access panels, plates, and frames for flush mounting. Exposed parts of floor cleanouts shall have adjustable top. All cleanouts and cleanout plugs shall be accessible. Cleanout shall be the following:
 - 1. In finished floors: Cast-iron with polished nickel bronze round top, non-skid diamond tread set flush with the floor. Provide with carpet marker when located in future carpeted areas and flashing flange when used with waterproofing membrane.
 - a. Smith - 4023
 - b. Wade - W-6000
 - c. Zurn - ZN-1420-2
 - 2. In mechanical equipment areas: Cast-iron with heavy cast-iron round top, non-skid diamond tread set flush with the floor. Provide flashing flange when used with waterproofing membrane.
 - a. Smith - 4223
 - b. Wade - W-6000
 - c. Zurn - Z-1400
 - 3. In walls: Cleanout tee with squared polished nickel bronze access plate with vandalproof screws and frames. Opening 8 inches by 8 inches minimum.
 - a. Smith - 4558-U
 - b. Wade - W-8460-S
 - c. Zurn - ZN-1447
 - 4. In exterior grades: Cast-iron body, vandalproof cover, non-skid diamond tread, set flush with grade or finished surface. In non-surfaced area, they shall be cast in a concrete block 14 inches by 14 by 6 inches deep.
 - a. Smith - 4248
 - b. Wade - 6010-Z-75

2.14 FLOOR DRAINS AND FLOOR SINKS

- A. Floor Drain (FD-1): Foot traffic.
 - 1. Cast-iron double drainage drain with clamping flange, bottom outlet and 5 inch round polished stainless steel adjustable strainer and trap primer tapping.
 - a. Smith - 2005-B
 - b. Zurn - Z-415
- B. Floor Sink (FS-1)
 - 1. 8-1/2 inch square, 6 inch deep acid-resisting enameled cast-iron drain with stainless steel rim and grate, sediment bucket and anchor flange with membrane clamp. Provide partial grate for discharge pipes.
 - a. Smith - 3100Y
 - b. Zurn - ZN-1910-K

2.15 ROOF DRAINS

- A. Roof Drain (RD-1):
 - 1. Cast-iron drain, adjustable extension sleeve, flashing collar, gravel stop cast-iron dome strainer, sump receiver and underdeck clamp.
 - a. Smith - 1010-ERC
 - b. Zurn - Z-100-ERC

- B. Overflow Drain (OD-1):
 - 1. Cast-iron drain, extension sleeve, flashing collar, 2 inch high water dam, cast-iron dome strainer, sumo receiver and underdeck clamp.
 - a. Smith – 1070-Y
 - b. Zurn – Z-100-W2

2.16 DECK DRAINS
Not applicable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to COMMON WORK RESULTS FOR PLUMBING Section 220500 for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 - 1. Locate backflow preventers as indicated on plans.
 - 2. Install drain for backflow preventers with fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to receptor. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
 - 3. Do not install bypass piping around backflow preventers.
- C. Install pressure regulators with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- D. Install strainers on supply side of each pressure regulator.
- E. Install outlet boxes recessed in wall. Install 2 x 4 inch fire-retardant-treated-wood blocking wall reinforcement between studs. Fire-retardant-treated-wood blocking is specified in Division 6 Section "Rough Carpentry".
- F. Install water hammer arrestors in water piping according to PDI-WH201.
- G. Install air vents at high points of water piping.
- H. Install trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- I. Install cleanout deck plates with top flush with finished floor for floor cleanouts on piping below floors.
- J. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.
- K. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.
- L. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.
- M. Install drains at low points of surface areas to be drained as indicated on the architectural drawings. Set grates of drains flush with finished floor, unless otherwise indicated.
- N. Install roof drains at low points of roof areas as indicated on the architectural Drawings.
- O. Fasten wall-hanging plumbing specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.
- P. Fasten recessed-type plumbing specialties to reinforcement built into walls.
- Q. Install blocking reinforcement for wall-mounting and recessed-type plumbing specialties.
- R. Install individual shutoff valve in each water supply to plumbing specialties. Use ball, gate, or globe

valve if specific valve is not indicated. Install shutoff valves in accessible locations. See GENERAL-DUTY VALVES Section 220523 for general-duty ball, butterfly, check, gate, and globe valves.

- S. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Connect plumbing specialties to piping specified in other Division 22 Sections.
- D. Connect plumbing specialties and devices that require power conforming to Division 22 Sections.

3.3 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Department maintenance personnel to adjust, operate, and maintain plumbing specialties.

3.5 FIELD QUALITY CONTROL

- A. Remove and replace malfunctioning domestic water piping specialties and retest.

3.6 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure reducing valves.
- B. Set field-adjustable temperature set points of temperature actuated water mixing valves.

END OF SECTION

**SECTION 221316
SANITARY WASTE AND VENT PIPING**

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. SANITARY WASTE AND VENT PIPING consists of furnishing transportation, labor, materials, and equipment to furnish and install the following for soil, waste, and vent piping inside the building:
 - 1. Pipe and fittings.
 - 2. Special pipe fittings.
 - 3. Encasement for underground metal piping.

1.2 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, apply to this Section.
- B. EARTHWORK Division 31
- C. TRENCHING AND BACKFILLING Division 31
- D. COMMON WORK RESULTS FOR PLUMBING Section 220500

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM International)
- B. American Water Works Association (AWWA)
- C. Cast Iron Soil Pipe Institute (CISPI)
- D. Sheet Metal and Air Condition Contractor's National Association (SMACNA)

1.4 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be in conformance with the SMACNA Guidelines.

1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Codes and Standards:
 - 1. All governing Codes, Ordinances and Agencies in accordance with the provisions of Division 1 of these specifications.

PART 2 - PRODUCTS

2.1 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings:
 - 1. Soil, waste, vent and storm drain piping to 5 feet outside building: Cast-iron soil pipe and fittings conforming to the requirements of CISPI Standard 301, ASTM A888 or ASTM A74 for all pipe and fittings. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil

Pipe Institute or receive prior approval of the Engineer. Wrap all underground piping per paragraph 3.3 G, 1 herein.

- a. Manufacturers:
 - 1) Tyler Pipe
 - 2) A.B. & I.
 - 3) Charlotte Pipe and Foundry
- B. Shielded Couplings: ASTM C1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 1. Above Ground: Type 300 Series stainless steel, "No-Hub" standard duty, shielded couplings as approved by the Cast Iron Soil Pipe Institute, CISPI-310-85 with stainless steel corrugated shield, stainless steel bands and tightening devices and ASTM C564 rubber sleeve. Equivalent to Tyler.
 2. Below Ground, 4 inches and Larger: Type 304 stainless steel, "No-Hub" by the Cast Iron Soil Pipe Institute, CISPI-310-85 with stainless steel shield, stainless steel band and tightening devices and ASTM C564 rubber sleeve. Equivalent to Husky HD-2000.
 - a. Manufacturers:
 - 1) Clamp-All Corporation
 - 2) Husky Technologies.
 - 3) Tyler Pipe; Soil Pipe Division

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Refer to EARTHWORK and TRENCHING AND BACKFILLING Sections for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. Soil and waste piping shall be hubless cast-iron soil pipe and fittings; standard-duty shielded, stainless-steel couplings; and hubless-coupling joints.
- B. Vent piping shall be hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.

3.3 PIPING INSTALLATION

- A. Sanitary sewer piping outside the building is specified in SANITARY SEWERAGE Section, or civil drawings.
- B. Basic piping installation requirements are specified in COMMON WORK RESULTS FOR PLUMBING Section 220500.
- C. Install seismic restraints on piping. Seismic-restraint devices are specified in NOISE, VIBRATION AND SEISMIC CONTROLS OF PLUMBING PIPING AND EQUIPMENT Section 220548.
- D. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- E. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in PLUMBING SPECIALTIES Section.
- F. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.
- G. Install cast-iron soil piping in conformance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 1. Where soil is corrosive install 8 mil. polyethylene encasement on underground piping in conformance with ASTM A674 or AWWA C105/ANSI AZ1.5.

- H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- I. Install soil and waste drainage piping at 2 percent minimum slope, unless otherwise indicated on Drawings:
- J. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in COMMON WORK RESULTS FOR PLUMBING Section 220500.
- B. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in NOISE, VIBRATION AND SEISMIC CONTROLS Section 220548.
- B. Pipe hangers and supports are specified in HANGERS AND SUPPORTS FOR PLUMBING PIPING & EQUIPMENT Section 220529. Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs in conformance with to the following:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Install supports according to Hangers and Supports Section.
- D. Support vertical piping and tubing at base and at each floor.
- E. Horizontal cast-iron no-hub piping: Provide hangers or supports at each side of a no-hub fitting.
- F. Install hangers for cast-iron soil piping with maximum horizontal spacing and minimum rod diameters in accordance with the requirements of the California Plumbing Code.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by the CPC.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by the CPC.
 - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by the CPC.

3.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 - C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 - D. Test sanitary drainage and vent piping according to procedures of the authorities having jurisdiction or, in absence of published procedures, in accordance with the requirements of the California Plumbing Code.
- 3.8 CLEANING
- A. Clean interior of piping. Remove dirt and debris as work progresses.
 - B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
 - C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION

SECTION 223400
FUEL-FIRED WATER HEATERS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. FUEL-FIRED WATER HEATERS consists of furnishing transportation, labor, materials, and equipment to furnish and install the following:
1. Commercial, gas-fired, high efficiency, storage, domestic-water heater.
 2. Compression tanks.
 3. Water heater accessories.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to SMACNA Guidelines.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to seismic forces specified."

1.4 SUBMITTALS

- A. Product Data: For each type and size of water heater indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. Operation and Maintenance Data: For water heaters to include in emergency, operation, and maintenance manuals.
- C. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain same type of water heaters through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of water heaters and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. ASME Compliance:
1. Where ASME-code construction is indicated, fabricate and label commercial water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
 2. Where ASME-code construction is indicated, fabricate and label commercial, finned-tube water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.
- E. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9" for all components that will be in contact with potable water.
- F. Codes and Standards:
1. All governing codes, ordinances and agencies, in accordance with the provisions of Division 1 of these specifications.

- G. ASHRAE/IESNA 90.1 Compliance: Fabricate and label fuel-fired, domestic water heaters to comply with ASHRAE/IESNA 90.1.
- 1.6 COORDINATION
 - A. Coordinate size and location of concrete bases with Architectural and Structural Drawings.
- 1.7 WARRANTY
 - A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired water heaters that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including storage tank and supports.
 - b. Faulty operation of controls.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period(s): From date of Substantial Completion:
 - a. Commercial, Gas Water Heaters:
 - 1) Storage Tank: Three years.
 - 2) Controls and Other Components: One year.
 - b. Compression Tanks: One year.

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
 - A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
- 2.2 COMMERCIAL, GAS WATER HEATERS (GWH-1 & GWH-2)
 - A. Commercial, Ultra High Efficiency, Storage, Gas Water Heaters: Comply with ANSI Z21.10.3/CSA 4.3.
 - 1. Manufacturers:
 - a. Bradford White Corporation.
 - b. Lochinvar Corporation.
 - c. Rheem Water Heater Div.; Rheem Manufacturing Company.
 - d. Smith, A. O. Water Products Company.
 - 2. Storage-Tank Construction: Non-ASME-code steel with 150-psig working-pressure rating.
 - a. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.
 - 1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
 - 2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.
 - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Lining: Glass complying with NSF 61 barrier materials for potable-water tank linings, including extending lining into and through tank fittings and outlets.
 - 3. Factory-Installed, Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
 - c. Insulation: Comply with ASHRAE/IESNA 90.1. Surround entire storage tank except connections and controls.
 - d. Jacket: Steel with enameled finish.

- e. Burner: UL795 for power-burner, gas-fired, domestic water heater and gas fuel.
 - f. Automatic Ignition: ANSI Z21.20, electric, automatic, gas-ignition system.
 - g. Temperature Control: Adjustable electronic thermostat.
 - h. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
 - i. Combination Temperature and Pressure Relief Valves: ANSI Z21.22/CSA 4.4. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.
- 4. Premix closed combustion system for direct venting using 3 in. PVDF.
 - 5. Capacity and Characteristics: As scheduled on drawings.

2.3 COMPRESSION TANKS

- A. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
 - 1. Manufacturers:
 - a. AMTROL Inc.
 - b. Smith, A. O.; Aqua-Air Div.
 - c. Watts Regulator Co.
 - 2. Construction:
 - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
 - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Air-Charging Valve: Factory installed.
- 3. Capacity and Characteristics: As indicated on drawings.

2.4 WATER HEATER ACCESSORIES

- A. Gas Shutoff Valves: ANSI Z21.15/CGA 9.1, manually operated. Furnish for installation in piping.
- B. Gas Pressure Regulators: ANSI Z21.18, appliance type. Include pressure rating, capacity, and pressure differential required between gas supply and water heater.
- C. Combination Temperature and Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select each relief valve with sensing element that extends into storage tank.
 - 1. Gas Water Heaters: ANSI Z21.22/CSA 4.4.
- D. Water Heater Mounting Brackets: Water heater manufacturer's factory-fabricated steel bracket for wall mounting and capable of supporting water heater and water.
- E. Drain Pans: Corrosion-resistant metal with raised edge. Provide dimensions not less than base of water heater and include drain outlet not less than NPS 3/4.

2.5 SOURCE QUALITY CONTROL

- A. Test and inspect water heater storage tanks, specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test commercial water heater storage tanks before shipment to minimum of one and one-half times pressure rating.
- C. Prepare test reports.

PART 3 - EXECUTION

3.1 WATER HEATER INSTALLATION

- A. Install commercial water heaters on concrete bases.
 - B. Install water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
 - C. Install seismic restraints for commercial water heaters. Anchor to substrate.
 - D. Install gas water heaters according to NFPA 54.
 - E. Install gas shutoff valves on gas supplies to gas water heaters without shutoff valves.
 - F. Install gas pressure regulators on gas supplies to gas water heaters without gas pressure regulators if gas pressure regulators are required to reduce gas pressure at burner.
 - G. Install automatic gas valves on gas supplies to gas water heaters, if required for operation of safety control.
 - H. Install combination temperature and pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater, relief-valve outlet, with drain piping same as domestic water piping in continuous downward pitch, and discharge by positive air gap into closest floor sink.
 - I. Install water heater drain piping as indirect waste to spill by positive air gap into open drains or over floor sinks. Install hose-end drain valves at low points in water piping for water heaters that do not have tank drains. Refer to Division 22 Section "Plumbing Specialties" for hose-end drain valves.
 - J. Install thermometer on outlet piping of water heaters. Refer to Division 22 Section "Meters and Gages" for thermometers.
 - K. Fill water heaters with water.
 - L. Charge compression tanks with air.
- 3.2 CONNECTIONS
- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
 - B. Install piping adjacent to water heaters to allow service and maintenance. Arrange piping for easy removal of water heaters.
 - C. Ground equipment according to Division 26.
 - D. Connect wiring according to Division 26 Section.
- 3.3 FIELD QUALITY CONTROL
- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
 - B. Perform the following field tests and inspections and prepare test reports:
 1. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
 2. Operational Test: After electrical circuitry has been energized, confirm proper operation.
 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - C. Remove and replace water heaters that do not pass tests and inspections and retest as specified above.
- 3.4 DEMONSTRATION
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial water heaters. Refer to Division 1 Section.

END OF SECTION

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION

**WO# E1908366
02/24/2020**

**FUEL-FIRED
WATER HEATERS
DIVISION 22
223400-5**

SECTION 224000 PLUMBING FIXTURES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. PLUMBING FIXTURES consists of furnishing transportation, labor, materials, and equipment to furnish and install the following plumbing fixtures and related components:
 - 1. Faucets
 - 2. Flushometers
 - 3. Toilet seats
 - 4. Protective shielding guards
 - 5. Fixture supports
 - 6. Water closets
 - 7. Urinals
 - 8. Lavatories

1.2 RELATED WORK

- A. DRINKING FOUNTAINS AND WATER COOLERS Section 22 47 00
- B. PLUMBING SPECIALTIES Section 22 11 19
- C. COMMON WORK RESULTS FOR PLUMBING Section 22 05 00

1.3 DEFINITIONS

- A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- B. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- C. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.4 SUBMITTALS

- A. Manufacturer's Literature: Submit brochures on all materials and equipment to the Architect.
- B. Other Submittals:
 - 1. Operations and Maintenance Manuals.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
 - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- B. Codes and Standards:
 - 1. All governing codes, ordinances and agencies, in accordance with the provisions of Division 1 of these specifications.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities," Public Law 90-480, "Architectural Barriers Act;" and Public Law 101-336, "Americans with Disabilities Act;" for plumbing fixtures for people with disabilities.

- E. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- F. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- G. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- H. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
 - 2. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
 - 3. Slip-Resistant Bathing Surfaces: ASTM F 462.
 - 4. Stainless-Steel Commercial, Handwash Sinks: NSF 2 construction.
 - 5. Vitreous-China Fixtures: ASME A112.19.2M.
 - 6. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
 - 7. Water-Closet, Flushometer Tank Trim: ASSE 1037.
- I. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
 - 1. Faucets: ASME A112.18.1.
 - 2. Hose-Connection Vacuum Breakers: ASSE 1011.
 - 3. Hose-Coupling Threads: ASME B1.20.7.
 - 4. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
 - 5. NSF Potable-Water Materials: NSF 61.
 - 6. Pipe Threads: ASME B1.20.1.
 - 7. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
 - 8. Supply Fittings: ASME A112.18.1.
 - 9. Brass Waste Fittings: ASME A112.18.2.
- J. Comply with the following applicable standards and other requirements specified for shower faucets:
 - 1. Backflow Protection Devices for Hand-Held Showers: ASME A112.18.3M.
 - 2. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.
 - 3. Deck-Mounted Bath/Shower Transfer Valves: ASME 18.7.
 - 4. Faucets: ASME A112.18.1.
 - 5. Hand-Held Showers: ASSE 1014.
 - 6. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
 - 7. Hose-Coupling Threads: ASME B1.20.7.
 - 8. Manual-Control Antiscald Faucets: ASTM F 444.
 - 9. Pipe Threads: ASME B1.20.1.
 - 10. Pressure-Equalizing-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
 - 11. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
 - 12. Thermostatic-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
- K. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
 - 1. Atmospheric Vacuum Breakers: ASSE 1001.
 - 2. Brass and Copper Supplies: ASME A112.18.1.
 - 3. Dishwasher Air-Gap Fittings: ASSE 1021.
 - 4. Manual-Operation Flushometers: ASSE 1037.
 - 5. Plastic Tubular Fittings: ASTM F 409.
 - 6. Brass Waste Fittings: ASME A112.18.2.
 - 7. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.
- L. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Disposers: ASSE 1008 and UL 430.
 - 2. Dishwasher Air-Gap Fittings: ASSE 1021.
 - 3. Flexible Water Connectors: ASME A112.18.6.
 - 4. Floor Drains: ASME A112.6.3.

5. Grab Bars: ASTM F 446.
6. Hose-Coupling Threads: ASME B1.20.7.
7. Hot-Water Dispensers: ASSE 1023 and UL 499.
8. Off-Floor Fixture Supports: ASME A112.6.1M.
9. Pipe Threads: ASME B1.20.1.
10. Plastic Shower Receptors: ANSI Z124.2.
11. Plastic Toilet Seats: ANSI Z124.5.
12. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Flush Valves: As specified.
- B. Plumbing Fixtures: As specified.
- C. Toilet Seats: As Specified.
- D. Faucets: As specified.

2.2 PLUMBING FIXTURES AND TRIMS

- A. See fixture schedules on contract drawings

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install wall-mounting fixtures with tubular waste piping attached to supports.
- E. Install counter-mounting fixtures in and attached to casework.
- F. Install fixtures level and plumb according to roughing-in drawings.
- G. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
- H. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- J. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- K. Install toilet seats on water closets.

- L. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- M. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- N. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- O. Install shower flow-control fittings with specified maximum flow rates in shower arms.
- P. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
- Q. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- R. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings.
- S. Set shower receptors and service basins in leveling bed of cement grout.
- T. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.
- D. Operate and adjust disposers. Replace damaged and malfunctioning units.

3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION

**SECTION 230500
COMMON WORK RESULTS FOR HVAC**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Equipment installation requirements common to equipment sections.
 - 9. Painting and finishing.
 - 10. Concrete bases.
 - 11. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. CPVC: Chlorinated polyvinyl chloride plastic.
 - 3. PE: Polyethylene plastic.
 - 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.

- B. Welding certificates.
- 1.5 QUALITY ASSURANCE
 - A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
 - B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
 - C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
- 1.6 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
 - B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.
- 1.7 COORDINATION
 - A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.
 - B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
 - C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
 - A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Basis of Design Product: The design for each product is based on manufacturer named on the drawings. Subject to compliance with requirements, provide either named product or a comparable equivalent product by one of the other manufacturers specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 3. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
- 2.2 PIPE, TUBE, AND FITTINGS
 - A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
 - B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.
- 2.3 JOINING MATERIALS
 - A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
 - C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
 - D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
 - E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
 - F. Brazing Filler Metals: AWS A5.8, BcuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
 - G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
 - H. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.
 - I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.
- 2.4 TRANSITION FITTINGS
- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
 - 1. Available Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
 - 2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
 - 3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
 - 4. Aboveground Pressure Piping: Pipe fitting.
 - B. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Available Manufacturers:
 - a. Eslon Thermoplastics.
 - C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Available Manufacturers:
 - a. Thompson Plastics, Inc.
 - D. Plastic-to-Metal Transition Unions: MSS SP-107, PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
 - 1. Available Manufacturers:
 - a. NIBCO INC.

- b. NIBCO, Inc.; Chemtrol Div.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
 - 1. Available Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epcos Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
 - 1. Available Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epcos Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Available Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
 - 1. Available Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
 - 1. Available Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Manufacturers:
 - a. Thunderline Link Seal
 - b. Calpico, Inc.
 - c. Metraflex Co.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - h. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - i. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.

3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
 - S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section "Through-Penetration Firestop Systems" for materials.
 - T. Verify final equipment locations for roughing-in.
 - U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- 3.2 PIPING JOINT CONSTRUCTION
- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
 - B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
 - E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
 - F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
 - G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
 - H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
 - I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
 - J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

- A. Painting of mechanical systems, equipment, and components is specified in Division 9.
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

END OF SECTION

SECTION 230529 SUPPORTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following hangers and supports for mechanical system piping and equipment:
 - 1. Equipment supports.
- B. Related Sections include the following:
 - 1. Division 5 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
 - 2. Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment for vibration isolation devices.
 - 3. Division 23 Section "Metal Ducts and Casings" for duct hangers and supports.
 - 4. Comply with Section 016100 for seismic requirements for non-structural components.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Equipment supports.
- B. Shop Drawings: Show fabrication and installation details and include calculations for Equipment supports.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
 - 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
 - 4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to

SOUTH PARK RENOVATION – PUBLIC RESTROOM RENOVATION

**HANGERS AND SUPPORTS
FOR HVAC PIPING AND EQUIPMENT**

**WO# E1908366
02/24/2020**

**DIVISION 23
230529-1**

product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.3 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

PART 3 - EXECUTION

3.1 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.2 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.3 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

**SECTION 230553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following mechanical identification materials and their installation:
 - 1. Equipment nameplates.
 - 2. Equipment markers.
 - 3. Equipment signs.
 - 4. Access panel and door markers.
 - 5. Pipe markers.
 - 6. Duct markers.
 - 7. Stencils.
 - 8. Valve tags.
 - 9. Valve schedules.
 - 10. Warning tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Valve numbering scheme.
- C. Valve Schedules: For each piping system. Furnish extra copies (in addition to mounted copies) to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

1.5 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.
 - 2. Location: Accessible and visible.
 - 3. Fasteners: As required to mount on equipment.

- B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive.
 - 1. Terminology: Match schedules as closely as possible.
 - 2. Data:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
 - 3. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.
- C. Equipment Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
 - 1. Data: Instructions for operation of equipment and for safety procedures.
 - 2. Engraving: Manufacturer's standard letter style, of sizes and with terms to match equipment identification.
 - 3. Thickness: 1/16 inch for units up to 20 sq. in. or 8 inches in length, and 1/8 inch for larger units.
 - 4. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.
- D. Access Panel and Door Markers: 1/16-inch- thick, engraved laminated plastic, with abbreviated terms and numbers corresponding to identification. Provide 1/8-inch center hole for attachment.
 - 1. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.2 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 - 2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 - 3. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
 - 4. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
 - 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pretensioned Pipe Markers: Precoiled semirigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.
- C. Shaped Pipe Markers: Preformed semirigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.
- D. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.
- E. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure-sensitive, permanent-type, self-adhesive back.
 - 1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
 - 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.3 DUCT IDENTIFICATION DEVICES

- A. Duct Markers: Engraved, color-coded laminated plastic. Include direction and quantity of air-flow and duct service (such as supply, return, and exhaust). Include contact-type, permanent adhesive.
- 2.4 STENCILS
- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door markers, equipment markers, equipment signs, and similar operational instructions.
 - 1. Stencil Material: Metal or fiberboard.
 - 2. Stencil Paint: Exterior, gloss, black, unless otherwise indicated. Paint may be in pressurized spray-can form.
 - 3. Identification Paint: Exterior, in colors according to ASME A13.1, unless otherwise indicated.
- 2.5 VALVE TAGS
- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2- inch numbers, with numbering scheme approved by Architect or Engineer. Provide 5/32-inch hole for fastener.
 - 1. Material: 0.032-inch- thick brass.
 - 2. Valve-Tag Fasteners: Brass wire-link or beaded chain; or S-hook.
- 2.6 VALVE SCHEDULES
- A. Valve Schedules: For each piping system, on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-Schedule Frames: Glazed display frame for removable mounting on masonry walls for each page of valve schedule. Include mounting screws.
 - 2. Frame: Extruded aluminum.
 - 3. Glazing: ASTM C 1036, Type I, Class 1, Glazing Quality B, 2.5-mm, single-thickness glass.
- 2.7 WARNING TAGS
- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.
 - 1. Size: 3 by 5-1/4 inches minimum.
 - 2. Fasteners: Brass grommet and wire.
 - 3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
 - 4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 23 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
 - 1. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
 - 2. Pumps, compressors, chillers, condensers, and similar motor-driven units.

3. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
 4. Fans, blowers, primary balancing dampers, and mixing boxes.
 5. Packaged HVAC central-station and zone-type units.
- B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
 3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
 - a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - b. Fire department hose valves and hose stations.
 - c. Meters, gages, thermometers, and similar units.
 - d. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
 - e. Pumps, compressors, chillers, condensers, and similar motor-driven units.
 - f. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
 - g. Fans, blowers, primary balancing dampers, and mixing boxes.
 - h. Packaged HVAC central-station and zone-type units.
 - i. Tanks and pressure vessels.
 - j. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.
- C. Stenciled Equipment Marker Option: Stenciled markers may be provided instead of laminated-plastic equipment markers, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- D. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.
1. Identify mechanical equipment with equipment markers in the following color codes:
 - a. Green: For cooling equipment and components.
 - b. Yellow: For heating equipment and components.
 - c. Green and Yellow: For combination cooling and heating equipment and components.
 - d. Brown: For energy-reclamation equipment and components.
 2. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 3. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
 4. Include signs for the following general categories of equipment:
 - a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - b. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
 - c. Pumps, compressors, chillers, condensers, and similar motor-driven units.
 - d. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.

- ment.
- e. Fans, blowers, primary balancing dampers, and mixing boxes.
- f. Packaged HVAC central-station and zone-type units.
 - g. Tanks and pressure vessels.
 - h. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.
- E. Stenciled Equipment Sign Option: Stenciled signs may be provided instead of laminated-plastic equipment signs, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- F. Install access panel markers with screws on equipment access panels.

3.3 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
- B. Pipes with OD, Including Insulation, Less Than 6 Inches: Pretensioned pipe markers. Use size to ensure a tight fit.
 - 1. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
- C. Stenciled Pipe Marker Option: Stenciled markers may be provided instead of manufactured pipe markers, at Installer's option. Install stenciled pipe markers with painted, color-coded bands or rectangles on each piping system.
 - 1. Identification Paint: Use for contrasting background.
 - 2. Stencil Paint: Use for pipe marking.
- D. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 40 feet along each run. Reduce intervals to 20 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.4 DUCT IDENTIFICATION

- A. Install duct markers with permanent adhesive on air ducts in the following color codes:
 - 1. Green: For cold-air supply ducts.
 - 2. Yellow: For hot-air supply ducts.
 - 3. Blue: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
 - 4. ASME A13.1 Colors and Designs: For hazardous material exhaust.
 - 5. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- B. Stenciled Duct Marker Option: Stenciled markers, showing service and direction of flow, may be provided instead of laminated-plastic duct markers, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- C. Locate markers near points where ducts enter into concealed spaces and at maximum intervals of 40 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches, round.
 - b. Hot Water: 1-1/2 inches, round.
 - c. Fire Protection: 1-1/2 inches, round.
 - d. Gas: 1-1/2 inches, round.
 - e. Steam: 1-1/2 inches, round.
 - 2. Valve-Tag Color:
 - a. Cold Water: Natural.
 - b. Hot Water: Red.
 - c. Fire Protection: Black.
 - d. Gas: Green.
 - e. Chilled Water: Blue.
 - f. Condenser Water: Yellow.
 - g. Heating Hot Water: Red.
 - 3. Letter Color:
 - a. Cold Water: Black.
 - b. Hot Water: White.
 - c. Fire Protection: White.
 - d. Gas: White.
 - e. Chilled Water: White.
 - f. Condenser Water: Black.
 - g. Heating Hot Water: White.

3.6 VALVE-SCHEDULE INSTALLATION

- A. Mount valve schedule on wall in accessible location in each major equipment room.

3.7 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

3.8 ADJUSTING

- A. Relocate mechanical identification materials and devices that have become visually blocked by other work.

3.9 CLEANING

- A. Clean faces of mechanical identification devices and glass frames of valve schedules.

END OF SECTION

**SECTION 230800
TESTING, ADJUSTING AND BALANCING FOR HVAC**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Requirements Division 01, Division 23 Specification Sections, and Common Work Requirements for HVAC apply to the work specified in this Section.

1.2 SUMMARY

A. This Section includes the providing of labor, materials, equipment, and services necessary for complete testing, adjusting, balancing (TAB) of all heating, ventilating and air conditioning systems in accordance with the contract documents and all applicable codes and authorities having jurisdiction, for the following:

1. Air Systems: Balancing of air distribution systems including supply, return and exhaust systems, condensing units, all fan-coils and related equipment for:
 - a. Constant-volume air systems.
 - b. Variable-air-volume systems.
 - c. Terminal devices for HVAC systems.
2. HVAC equipment quantitative-performance settings.
3. Vibration measuring.
4. Sound level measuring.
5. Indoor-air quality measuring.
6. Verifying that automatic control devices are functioning properly.
7. Reporting results of activities and procedures specified in this Section.
8. Required Controlled Inspection, including Equipment Use Permits.

1.3 DEFINITIONS

A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.

C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.

- D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.
- E. NC: Noise criteria.
- F. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- G. RC: Room criteria.
- H. Report Forms: Test data sheets for recording test data in logical order.
- I. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.
- J. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.
- K. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- L. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- M. TAB: Testing, adjusting, and balancing.
- N. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- O. Test: A procedure to determine quantitative performance of systems or equipment.
- P. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

1.4 SUBMITTALS

- A. Qualification Data: Within 30 days from Contractor's Notice to Proceed, submit 2 copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article. Contractor shall also submit Form TR 1 listing person designated to perform controlled inspection so as not to impede the obtaining of required building permits.
- B. Contract Documents Examination Report: Within 30 days from Contractor's Notice to Proceed, submit 2 copies of the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days from Contractor's Notice to Proceed, submit 2 copies of TAB strategies and step-by-step procedures as specified in Part 3 "Preparation" Article. Include a complete set of report forms intended for use on this Project.
- D. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.

E. Sample Report Forms: Submit two sets of sample TAB report forms.

F. Warranties specified in this Section.

G. At least fifteen (15) days prior to starting field work, submit three (3) copies of report forms filled out, including design flow values, installed equipment pressure drops and required air flow for air terminals. Submit a complete list of instruments proposed to be used, organized in appropriate categories and include data sheets for each. Indicate each manufacturer and model number, description and use when needed to further identify instrument, size or capacity range and latest calibration date.

1. Owner/Engineer will review submittals for compliance with Contract Documents, and will return one set marked to indicate discrepancies noted between data shown and Contract Documents, additional, or more accurate, instruments required and requests for recalibration of specific instruments.
2. Submit proposed method of balancing variable air volume systems to account for system diversity.

1.5 REFERENCE STANDARDS

- A. Published Specifications' standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this Section.
- B. Unless otherwise indicated, all systems shall be balanced and adjusted in accordance with AABC - Associated Air Balance Council, NEBB - National Environmental Balance Bureau and SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Inc.
- C. Comply with all applicable national, state and local codes and refer to Section 15010 GENERAL PROVISIONS FOR MECHANICAL WORK for additional Reference Standards.

1.6 QUALITY ASSURANCE

- A. Prior to start of testing, adjusting and balancing, verify that the systems installation is complete and in full operation. Verify that outside conditions are within reasonable range relative to design conditions and that doors and windows are in place or under normal traffic conditions. Ensure that lights are turned "on" for cooling load checks and are turned "off" for heating load checks.
- B. Ensure that special equipment such as computers and electronic equipment are in full operation.
- C. Dummy loads: When operation testing is performed before final computer and other equipment are installed, provide temporary electric heat loads in rooms, at no extra cost to Owner. Capacity of heating devices shall be such as to equal full heat gain in rooms, with exact capacity and location as directed by the Owner. Provide heating devices, wiring, connecting fittings compatible with electric circuits, operating and safety controls and other devices, as required. Other heating mediums than electrical may be proposed for approval by Owner and/or Engineer.
- D. Verify that requirements for preparation for testing and balancing have been met for elements of each of the systems which require testing.

- E. End result of balancing of air systems shall be satisfactory relationship of air pressures, flow directions, room temperatures, etc., whether quantitative data on drawings result in these conditions or not. Make measurements and adjustments in addition to drawing indications if necessary to result in satisfactory air balance. Building air balance shall comprehend overall balance between all systems, whether or not drawing figures may have to be modified to achieve overall balance.
- F. Make air balance measurements and adjustments for multiple operating conditions where areas are subject to variety of circumstances (doors open and/or shut, etc.).

1.7 SUBMITTALS

- A. Furnish to Owner and/or Engineer documentation that the Air Balance Company is a member of the Associated Air Balance Council, or National Environmental Balancing Bureau and that it has satisfactorily balanced at least three systems of comparable type and size. Include list of such projects. Sample forms for use in compiling and recording test and balance data shall also be submitted.
- B. Final submission shall include records and tabulations required hereinafter and certified by a registered professional mechanical engineer experienced in balancing HVAC systems.
- C. At least fifteen (15) days prior to starting field work, submit three (3) copies of report forms filled out, including design flow values, installed equipment pressure drops and required CFM for air terminals. Submit a complete list of instruments proposed to be used, organize in appropriate categories and include data sheets for each. Indicate each manufacturer and model number, description and use when needed to further identify instrument, size or capacity range and latest calibration date.
 - 1. Owner/Engineer will review submittals for compliance with Contract Documents, and will return one set marked to indicate discrepancies noted between data shown and Contract Documents, additional, or more accurate, instruments required and requests for re-calibration of specific instruments.
 - 2. Submit proposed method of balancing variable air volume systems to account for system diversity.
- D. At least fifteen (15) days prior to Contractor's request for final inspection, submit three (3) copies of final reports, on applicable reporting forms, for review.
 - 1. Schedule testing and balancing of parts of systems which are delayed due to seasonal, climatic, occupancy, or other conditions beyond control of Contractor, as early as proper conditions will allow, after consultation with the Owner and/or Engineer.
 - 2. Submit reports of delayed testing promptly after execution of those services.
 - 3. Submit proposed method of balancing hydronic systems.
 - 4. Each individual final reporting form must bear the signature of the person who recorded data and the signature of the Registered Professional Engineer Supervising air balance of the reporting organization.
 - a. When more than one certified organization performs total air balance services, the firm having managerial responsibility shall make submittals.

- b. Identify the instruments of all types which were used, and the last date of calibration of each.

1.8 PROJECT REVIEW

A. Pre-Construction Review:

1. Review Contract Documents (drawings, specifications, bulletin, addenda), submittal data, shop drawings and automatic temperature control drawings.
2. Assure that design intent is clearly understood. Identify potential problems from standpoint of total system balance.
3. Review specifications for scope of work, special requirements and items that will make balancing difficult or impossible.
4. Review drawings for potential problems for total system balance, including location of balancing devices, lack of balancing devices, general system layout, architectural features and accessibility. Determine the most effective system balancing procedures and determine scheduling and coordination requirements.
5. Review submittal data for completeness of data, conformity with Contract Documents, special instructions for use of balancing devices, factors for flow meters, limitations affecting accuracy of measurements and equipment performance data and curves.
6. Review shop drawings for potential problems for total system balance, as specified above for review of Contract Drawings.
7. Review automatic temperature control drawings for thorough understanding of system functions and determining the most effective total system balancing procedure for minimum control manipulation. Avoid disturbing calibration of control devices and coordinate required control manipulation with Control Contractor.
8. Submit report recommending addition and/or relocation of balancing devices, including, but not limited to, volume dampers, balancing valves, flow metering devices for air and water, and pressure and temperature measuring points.

B. Construction Review: make on-site visits during progress of construction. Number of visits shall be as required to perform the functions specified below.

1. The purpose of the review is to identify potential problems for performing total system balance. Identify modification which will affect total system balance. Schedule and coordinate total system balance with other work. Identify conditions that could create hazardous environment for building occupants.
2. Typical activities: check that necessary balancing and measuring hardware are located properly, are accessible and installed correctly. Identify and evaluate variations from system design. Record data from equipment nameplates. Identify and report possible restrictions in systems, such as closed fire dampers, long runs of flexible duct, poorly designed duct fittings, questionable piping connections and others. Verify that construction progress will not delay total system balance. Identify best location for duct pitot tube traverses. Identify scaffolding needs.

C. Leakage testing shall be in accordance with AABC National Standards:

1. Perform before closing of shafts, ceiling and other areas where ductwork will not be accessible.
 2. Leakage testing shall be observed by Owner/Engineer representatives. Test report shall be submitted to Owner/Engineer for approval.
- D. Refer to AABC National Standards, Latest Edition.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Products and materials shall be as described in pertinent Sections of DIVISION NO. 15.

2.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system readiness checks and prepare system readiness reports. Verify the following:
1. Permanent electrical power wiring is complete.
 2. Automatic temperature-control systems are operational.
 3. Equipment and duct access doors are securely closed.
 4. Balance, smoke, and fire dampers are open.
 5. Isolating and balancing valves are open and control valves are operational.
 6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 7. Windows and doors can be closed so indicated conditions for system operations can be met.
 8. Ensure that special equipment such as computers, laboratory equipment, and electronic equipment are in full operation.

2.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111 ,AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems", NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing" and this Section.
1. Comply with requirements in the latest edition of ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

D. Take and report testing and balancing measurements in [inch-pound (IP)] [metric (SI)] [inch-pound (IP) and metric (SI)] units.

2.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

E. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling unit components.

L. Check for proper sealing of air duct system.

2.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure fan static pressures to determine actual static pressure as follows:

a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.

- b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
 - 3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
 - 4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
 - 5. Obtain approval from Owner for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
 - 6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
 - 1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
 - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 - 2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure terminal outlets and inlets without making adjustments.
 - 1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within plus or minus 5 percent of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

2.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a maximum set-point airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set outside-air dampers at minimum, and return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
3. Measure total system airflow. Adjust to within +10% of indicated airflow.
4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.
7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record the final fan performance data.

C. Pressure-Dependent, Variable-Air-Volume Systems without Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Balance systems similar to constant-volume air systems.
2. Set terminal units and supply fan at full-airflow condition.

3. Adjust inlet dampers of each terminal unit to indicated airflow and verify operation of the static-pressure controller. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
4. Readjust fan airflow for final maximum readings.
5. Measure operating static pressure at the sensor that controls the supply fan, if one is installed, and verify operation of the static-pressure controller.
6. Set supply fan at minimum airflow if minimum airflow is indicated. Measure static pressure to verify that it is being maintained by the controller.
7. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the condition but leave the outlets balanced for maximum airflow.
8. Measure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.

D. Pressure-Dependent, Variable-Air-Volume Systems with Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set system at maximum indicated airflow by setting the required number of terminal units at minimum airflow. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.
2. Adjust supply fan to maximum indicated airflow with the variable-airflow controller set at maximum airflow.
3. Set terminal units at full-airflow condition.
4. Adjust terminal units starting at the supply-fan end of the system and continuing progressively to the end of the system. Adjust inlet dampers of each terminal unit to indicated airflow. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
5. Adjust terminal units for minimum airflow.
6. Measure static pressure at the sensor.
7. Measure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.

PART 3 - EXECUTION

3.1 AIR SYSTEM BALANCING

- A. Check that filters are installed clean and free of bypass, and are the type as specified. Make allowance for air filter resistance at time of tests. At design air quantity, the pressure drop across filter banks should be midway between the drops for clean and dirty filters. Submit written report that above was done.

- B. In cooperation with the automatic control manufacturer, set adjustments of automatically operated dampers and air terminal boxes to operate as indicated. In cooperation with the automatic control manufacturer and the terminal box manufacturer, verify factory setting of air terminal boxes. Make adjustments required to produce design conditions. Submit written verification that all items listed above have been completed.
- C. Fan testing: test and adjust fans speed to design requirements and test and record motors full load amperes.
- D. Duct testing: make pitot tube traverse of main supply ducts and obtain design air quantities (cfm) at fans. Adjust main supply, return, and exhaust air ducts to proper design cfm. Adjust each zone supply, return and exhaust to proper design cfm's. Test and adjust recirculated air systems for design cfm's. Test and adjust outside air systems for design cfm's. Test and record suction and discharge systems' static pressures.
- E. Air outlet balancing: test and adjust each diffuser, grille and register to within 5 percent of design requirements. Identify each grille, diffuser and register as to location size, type and manufacturer and submit in recorded tabulation with floor plan. Readings and tests of diffusers, grilles and registers shall include required velocity (fpm), test resultant velocity, required cfm, test resultant cfm after adjustments; all in accordance with manufacturers' ratings. Adjust diffusers, throw pattern, grilles and registers to minimize drafts. When balancing return air slots in lights, start with all slots open, and close down dampers as required nearest to return/exhaust air intakes above ceiling.
- F. Record in tabulated form balance data by clearly identifying floors, zones, rooms and air outlet/inlet locations to correspond to those in the Contract Documents.
- G. Temperature conditions; read and record the following:
1. Outside climatic conditions at time of testing, including DB and WB temperatures and whether it is sunny, cloudy, windy, etc.
 2. Entering DB heating and cooling temperature.
 3. Entering WB cooling temperature.
 4. Leaving DB heating and cooling temperature.
 5. Leaving WB cooling temperature.
 6. DB temperature and velocity in occupied zones.
- H. Sound level readings: take sound level readings at one or more diffusers in each zone approximately 5 feet above the floor. The allowable room sound-pressure level shall fall within range of specified allowable sound power level in the area. See Section Noise Control for the requirements.
1. 33 to 37 db.
- I. Belt drive changes: make all changes in belts and sheaves required to obtain proper air balance.
1. At no extra cost to Owner.
 2. At end of project, submit an accounting of the costs of additional drives. Upon approval of Owner and/or Engineer, these costs form part of change order to contract. Base accounting is based upon replaced drive material list price times a factor of 2.5 (or other rate as determined by Owner and/or Engineer).

3.2 CONTROL COORDINATION

- A. Cooperate with automatic control installer and equipment installer in making adjustments to following items as required to accomplish indicated performance, including terminal air boxes, air valves, fan inlet vanes and adjustable and controllable pitch fan blades.

END OF SECTION

SECTION 230802 MECHANICAL TESTING REQUIREMENTS

PART 1 – GENERAL

1.01 INCLUDED SYSTEMS AND EQUIPMENT

A. The following is a list of the equipment and system test requirements included in this section:

1. Packaged air handling units – including fans, power exhausters, economizers, dampers, UVC lights, variable speed drives, heaters, humidifiers, CO2 sensors, and controls.
2. Temperature Control System
3. Exhaust fans
4. Split system heat pump – including fans, dampers, UVC lights, variable speed drives, heaters, humidifiers, CO2 sensors, and controls.
5. Test and balance (TAB) work

1.02 DESCRIPTION

A. This section specifies the functional testing requirements for Division 15 systems and equipment. From these requirements, the Commissioning Authority (CA) shall develop step-by-step procedures to be executed by the Subs or the Commissioning Authority. The general functional testing process, requirements and test method definitions are described in Section 01810. The test requirements for each piece of equipment or system contain the following:

1. The contractors responsible to execute the tests, under the direction of the CA.
2. A list of the integral components being tested.
3. Prefunctional checklists associated with the components.
4. Functions and modes to be tested.
5. Required conditions of the test for each mode.
6. Special procedures.
7. Required methods of testing.
8. Required monitoring.
9. Acceptance criteria.
10. Sampling strategies allowed.

1.03 PREREQUISITES

The following applicable generic prerequisite checklist items shall be listed on each written functional test form and be completed prior to functional testing.

1. All related equipment has been started up and start-up reports and prefunctional checklists submitted and approved ready for functional testing. Sample prefunctional checklists can be found in Section 01813. These are samples and for reference only. Final prefunctional checklists will be provided as part of the Construction Phase Commissioning Plan.
2. All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final setpoints and schedules with debugging, loop tuning and sensor calibrations completed.

Controls Contractor Signature or Verbal

Date

3. Piping system flushing complete and required report approved.
4. Test and balance (TAB) complete and approved for the hydronic system.
5. All A/E punchlist items for this equipment corrected.
6. These functional test procedures reviewed and approved by installing contractor.
7. Safeties and operating ranges reviewed by the CA.
8. Test requirements and sequences of operation attached.
9. Schedules and setpoints attached.
10. False loading equipment, system and procedures ready.
11. Sufficient clearance around equipment for servicing.
12. Record of all values for pre-test setpoints changed to accommodate testing has been made and a check box provided to verify return to original values (control parameters, limits, delays, lockouts, schedules, etc.).
13. Other miscellaneous checks of the prefunctional checklist and start-up reports completed successfully.

1.04 TEST METHODS

A. MANUAL

1. Manual testing involves using hand-held instruments, immediate control system readouts or direct observation to verify performance of a system.

B. MONITORING

1. Monitoring is a method of testing as a stand-alone method or to augment manual testing.
2. All points listed in the required monitoring section of the test requirements which are control system monitored points shall be trended by the controls contractor. At the option of the CA, some control system monitoring may be replaced with datalogger monitoring. At the CA's request, the controls contractor shall trend up to 20% more points than listed herein at no extra charge.
3. Hard copies of monitored data must be in columnar format with time down the left column and at least 5 columns of point values on the same page.
4. Graphical output is desirable, and will be required for all output, if the system can produce it.

PART 2 – PRODUCTS

NOT LISTED

PART 3 – EXECUTION

3.01 TEMPERATURE CONTROL SYSTEM

A. Parties Responsible to Execute Functional Test

1. Controls contractor: operate the controls to activate the equipment.
2. CA: to witness, direct and document testing, Mechanical Contractor assist in testing

sequences.

- B. Integral Components or Related Equipment Being Tested
1. Building Automation System, if any
 2. All prefunctional checklists of controlled equipment
- C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The commissioning agent will also spot-check misc. items and calibrations on the prefunctional checklists previously completed by the installer, before the beginning of functional testing.
- D. A significant part of the temperature control system functional testing requirements is the successful completion of the functional tests of equipment the temperature control system controls or interlocks with. Uncompleted equipment functional tests or outstanding deficiencies in those tests lend the required temperature control system functional testing incomplete.
- E. Integral or stand-alone controls are functionally tested with the equipment they are attached to, including any interlocks with other equipment or systems and thus are not covered under the temperature control system testing requirements, except for any integrated functions or interlocks listed below.
- F. The following testing requirements are in addition to and do not replace any testing requirements elsewhere in the specifications.

<u>Function / Mode</u>	<u>Test Method</u> Manual (demonstration), Monitoring, Either or Both
MISC. FUNCTIONS	
1. All specified functions and features are set up, debugged and fully operable	Verbal discussion of features
2. Power failure and battery backup and power-up restart functions	Demonstration
3. Specified trending and graphing features demonstration	See equipment trends
4. Global commands features	Demonstration
5. Security and access codes	Demonstration
6. Occupant over-rides (manual, telephone, key, keypad, etc.)	Demonstration
7. O&M schedules and alarms	Demonstration
8. Scheduling features fully functional and setup, including weekends and holidays	Observation in terminal screens or printouts
9. Date and time setting in central computer and verify field panels read the same time	Demonstration
10. Included features not specified to be setup are installed (list)	Demonstration
11. Demonstrate functionality of field panels using local operator keypads and local ports (plug-ins)	Demonstration of 100% of panels and 10% of ports
12. All graphic screens and value readouts completed	Demonstration
13. Setpoint changing features and functions	Done during equipment testing
14. Communications to remote sites	Demonstration

<u>Function / Mode</u>	<u>Test Method</u> Manual (demonstration), Monitoring, Either or Both
15. Sensor calibrations	Sampled during equipment tests
16. "After hours" use tracking and billing	
17. Final as-builts or redlines (per spec) control drawings, final points list, program code, setpoints, schedules, warranties, etc. per specs, submitted for O&Ms.	Observation
18. Verify that points that are monitored only, having no control function, are checked for proper reporting.	Observation
INTEGRATED TESTS	
19. Fire alarm interlocks and response	Demonstration
20. Duty cycling (if specified)	Monitoring
21. Demand limiting (including over-ride of limiting)	Monitoring
22. Sequential staging ON of equipment	Either
23. Optimum start-stop functions	Monitoring
24. All control strategies and sequences not tested during controlled equipment testing	Either

G. Additional Required Monitoring

1. Besides the trending and monitoring required with the functional testing of equipment, all points listed below which are control system monitored points shall be trended by the controls contractor. Refer to the Monitoring section at the beginning of Section 15997 for additional monitoring details.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
Misc. equipment current or status for duty cycling and demand limiting	5	5 days incl. weekend	Y	Y	20, 21
Equipment or building kW or current for demand limiting	5	5 days incl. weekend	Y	Y	20, 21
Optimum start/stop equip.	5	5 days incl. weekend	Y	Y	23

H. Acceptance Criteria (referenced by function or mode ID)

1. For the conditions, sequences and modes tested, the integral components and related equipment respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.

I. Sampling Strategy for Identical Units

1. Sample 10% of the field panels for procedure 9, and 10% of the local ports for procedure 11. If 10% fail, test another 10%. If 10% of those fail, test all remaining units at the contractor's expense.

3.02 EXHAUST FANS

A. Parties Responsible to Execute Functional Test

1. Controls contractor: operate the controls to activate the equipment, if BAS controlled.
2. CA: to witness, direct and document testing.

B. Integral Components or Related Equipment Being Tested

1. Exhaust fans

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The commissioning agent will also spot-check misc. items and calibrations on the prefunctional checklists previously completed by the installer, before the beginning of functional testing.

D. Functions / Modes Required To Be Tested, Test Methods and Seasonal Test Requirements

1. The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Function / Mode</u>	<u>Test Method</u> Manual, Monitoring, Either or Both	<u>Required</u> <u>Seasonal</u> <u>Test</u>
General 1. Test each sequence in the sequence of operations, and other significant modes and sequences not mentioned; including startup, shutdown, unoccupied & manual modes and power failure. Test functionality of this piece of equipment or system in all control strategies or interlocks that it is associated with.	Manual	
In addition to, or as part of (1) above, the following modes or tests are required:		
2. Verify schedules and setpoints to be reasonable and appropriate		
3. Function at fire alarm (off, depressurization, etc.)	Manual	
4. Interlocks to building pressurization control	Manual	
5. Speed controls	Either	
6. Check TAB report record of sound power level tests and space pressures and compare to specifications	Review	
7. Sensor calibration checks on any controlling temperature or pressure sensor	Manual	

E. Acceptance Criteria (referenced by function or mode ID)

1. For the conditions, sequences and modes tested, the fans, integral components and related equipment respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.

F. Sampling Strategy for Identical

1. No sampling, test all.

3.03 PACKAGED DX AIR CONDITIONING OR HEAT PUMP UNITS

A. Parties Responsible to Execute Functional Test

1. Controls contractor: operate the controls to activate the equipment.
2. CA: to witness, direct and document testing. Mechanical contractor or equipment vendor to assist in testing sequence as needed.

B. Integral Components or Related Equipment Being Tested

1. Unit (fans, coils, condenser, compressors).
2. Power exhausters
3. Economizers

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The commissioning agent will also spot-check misc. items and calibrations on the prefunctional checklists previously completed by the installer, before the beginning of functional testing.

D. Functions / Modes Required To Be Tested, Test Methods and Seasonal Test Requirements

1. The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Function / Mode</u>	<u>Test Method</u> Manual, Monitoring, Either or Both ³	<u>Required</u> <u>Seasonal</u> <u>Test</u> ¹
General 1. Test each sequence in the sequence of operations, and other significant modes and sequences not mentioned; including startup, shutdown, unoccupied & manual modes and power failure. Test functionality of this piece of equipment or system in all control strategies or interlocks that it is associated with.	Manual	
In addition to, or as part of (1) above, the following modes or tests are required:		
2. Supply air, and reset temp. control functions	Both	
3. Compressor unloading & condenser fan staging for head pressure control	Both	
4. Demand limiting control (if applicable)	Monitoring	Cooling
5. Duct static pressure (SP) control	Both	
6. Return or exhaust fan tracking and building SP	Monitoring	
7. Damper interlocks and correct modulation in all modes, including fire and smoke dampers	Manual	
8. Verification of minimum OSA quantity	Either	2
9. Verification of Economizer and Power Exhauster operation	Either	2
10. Verify TAB reported SF cfm with control system reading	Manual	2
11. All alarms (low limits, high static, freezestat, etc.)	Manual	

Function / Mode	Test Method Manual, Monitoring, Either or Both ³	Required Seasonal Test ¹
12. Sensor and actuator calibration checks on: duct static pressure sensor on units >10 tons, SAT, MAT, OSAT, economizer and RA dampers and other random checks (EMS readout against hand-held calibrated instrument must be within 0.5°F for temps. or within a tolerance equal to 10% of static pressure setpoint, with an inclined manometer)	Manual	
13. Verify control strategies, schedules and setpoints to be reasonable and appropriate		

¹Cooling season, Heating season or Both. "Design" means within 5° of season design (ASHRAE 2 1/2%), or 95% of loading design. A blank cell denotes no special seasonal test is required and that test can be executed during any season, if condition simulation is appropriate.

²Seasonal test not required if seasonal conditions can be adequately simulated.

E. Special Procedures (other equipment to test with, etc.; reference to function ID)

1. Reduced Testing for Smaller Units. For standard application AHU's less than 15 tons, the following modifications to the testing requirements apply: 1) either Manual or Monitoring will satisfy the verification requirement--where Both is listed, choose one. 2) Testing Modes 6, 8, 11, 13 and 16 is not required.

Point	Time Step (min.)	Minimum Time Period of Trend	Hard Copy? (Y/N)	ASCII File? (Y/N)	Function Being Tested
For each Unit being tested:					
RAT	5	5 days incl. weekend	Y	Y	1-3, 11
SAT	5	5 days incl. weekend	Y	Y	1-3
CC LAT	5	5 days incl. weekend	Y	Y	1-3
MAT	5	5 days incl. weekend	Y	Y	1, 3, 11
SF speed	5	5 days incl. weekend	Y	Y	1, 3-6
Duct SP	5	5 days incl. weekend	Y	Y	5, 6
OSAT	5	5 days incl. weekend	Y	Y	All
Indoor dry-bulb all zones	5	5 days incl. weekend	Y	Y	All
Compressor amps or stage	5	5 days incl. weekend	Y	Y	3
Condenser fan amps or stage	5	5 days incl. weekend	Y	Y	3

F. Acceptance Criteria

1. For the conditions, sequences and modes tested, the system, integral components and related equipment respond to varying loads and changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice.
2. RTU shall be able to maintain the SA temperature within 1.0F either side of the deadband of the current setpoint without excessive hunting.
3. RTU and controls shall control the duct static pressure so that it does not drift more than an amount equal to 10% of the setpoint value either side of the deadband

without excessive hunting.

G. Sampling Strategy for Identical Units

1. No sampling, test all.

3.04 TEST AND BALANCE WORK (TAB)

A. Parties Responsible to Execute Functional Test

1. TAB contractor: perform checks using test instruments.
2. Controls contractor: operate the controls to activate the equipment.
3. CA: to witness, direct and document testing.

B. Integral Components or Related Equipment Being Tested

1. TAB air-side

C. Prerequisites The applicable prerequisite checklist items listed in the beginning of Section 15997 shall be listed on each functional test form and checked off prior to functional testing. The commissioning agent will also spot-check misc. items and calibrations on the prefunctional checklists previously completed by the installer, before the beginning of functional testing.

D. Purpose. The purpose of this test is to spot check the TAB work to verify that it was done in accordance with the contract documents and acceptable practice and that the TAB report is accurate.

E. The following tests and checks will be conducted. The following testing requirements are in addition to and do not replace any testing requirements elsewhere in this Division.

<u>Test or Check</u>	<u>Test Method</u>	<u>Required Seasonal Test³</u>
<p>1. A random sample of up to 50 % the TAB report data shall be selected for verification (air velocity, air or water flow rate, pressure differential, electrical or sound measurement, etc.). The original TAB contractor will execute the checks, witnessed by the commissioning authority. The TAB contractor will use the same test instruments as used in the original TAB work.</p> <p>A failure¹ of more than 10% of the selected items of a given system² shall result in the failure of acceptance of the system TAB report and the TAB contractor shall be responsible to rebalance the system, provide a new system TAB report and repeat random verifications of the new TAB report.</p> <p>The random testing will include the verification of minimum outdoor air intake flows at minimum, maximum and intermediate total airflow rates for all of the air handlers. Other selected data to be verified will be made known upon day of testing.</p>	Demonstration	

<u>Test or Check</u>	<u>Test Method</u>	<u>Required Seasonal Test³</u>
2. Verify that final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked by the TAB Contractor.	Demonstration	
3. Verification that the air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity. This shall include a review of TAB methods, control setpoints established by TAB and a physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all TUs taking off downstream of the static pressure sensor, the TU on the critical leg has its damper 90% or more open.	Demonstration	
4. Verification that the water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity. This shall include a review of TAB methods, control setpoints established by TAB and a physical verification of at least one leg from the pump to the coil having all balancing valves wide open and that during full cooling the cooling coil valve of that leg is 90% or more open.	Demonstration	

¹Failure of an item is defined as follows:

- For air flow of supply and return: a deviation of more than 10% of instrument reading
- For minimum outside air flow: 20% of instrument reading (30% for reading at intermediate supply low for inlet vane or VFD OSA compensation system using linear proportional control)
- For temperatures: a deviation of more than 1°F
- For air and water pressures: a deviation of more than 10% of full scale of test instrument reading
- For sound pressures: a deviation of more than 3 decibels. (Variations in background noise must be considered)

²Examples of a “system” are: the air distribution system served by one air handler or the hydronic chilled water supply system served by a chiller or the condenser water system. Systems can be defined smaller if inaccuracies in TAB work within the smaller defined system will have little or no impact on connected systems.

³Cooling season, Heating season or Both. “Design” means within 5° of season design (ASHRAE 2 1/2%), or 95% of loading design. A blank cell denotes no special seasonal test is required and that test can be executed during any season, if condition simulation is appropriate.

F. Special Procedures

- 1. None.

G. Required Monitoring

- 1. None.

H. Acceptance Criteria

- 1. Provided in footnote to test table above.

I. Sampling Strategy for Identical Units

1. Described in test table above.

END OF SECTION

SECTION 233100 METAL DUCTS AND CASINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related sections include the following:

1.2 SUMMARY

- A. This Section includes metal ducts for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 2- to plus 10-inch wg. Metal ducts include the following:
 - 1. Rectangular ducts and fittings.
 - 2. Single-wall, round, and flat-oval spiral-seam ducts and formed fittings.
- B. Related Sections include the following:
 - 1. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 DEFINITIONS

- A. FRP: Fiberglass-reinforced plastic.

1.4 SYSTEM DESCRIPTION

- A. Duct system design, as indicated, has been used to select size and type of air-moving and -distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.

1.5 SUBMITTALS

- A. Shop Drawings: CAD-generated and drawn to 1/4 inch equals 1 foot scale. Show fabrication and installation details for metal ducts.
 - 1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
 - 2. Duct layout indicating sizes and pressure classes.
 - 3. Elevations of top and bottom of ducts.
 - 4. Dimensions of main duct runs from building grid lines.
 - 5. Fittings.
 - 6. Reinforcement and spacing.
 - 7. Seam and joint construction.
 - 8. Penetrations through fire-rated and other partitions.
 - 9. Equipment installation based on equipment being used on Project.
 - 10. Duct accessories, including access doors and panels.
 - 11. Hangers and supports, including methods for duct and building attachment, vibration isolation, and seismic restraints.
- B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Ceiling suspension assembly members.
 - 2. Other systems installed in same space as ducts.
 - 3. Ceiling- and wall-mounting access doors and panels required to provide access to dampers and other operating devices.

- 4. Ceiling-mounting items, including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - C. Welding certificates.
 - D. Field quality-control test reports.
- 1.6 QUALITY ASSURANCE
- A. NFPA Compliance:
 - 1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
 - 2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
 - B. Comply with NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," Ch. 3, "Duct System," for range hood ducts, unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.
- D. Stainless Steel: ASTM A 480/A 480M, Type 304.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 DUCT LINER

- A. Fibrous-Glass Liner: Comply with NFPA 90A or NFPA 90B and with NAIMA AH124.
 - 1. Manufacturers:
 - a. CertainTeed Corp.; Insulation Group.
 - b. Johns Manville International, Inc.
 - c. Knauf Fiber Glass GmbH.
 - d. Owens Corning.
 - 2. Materials: ASTM C 1071; surfaces exposed to airstream shall be coated to prevent erosion of glass fibers.
 - a. Thickness: 1 inch.
 - b. Thermal Conductivity (k-Value): 0.26 at 75 deg F mean temperature.
 - c. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
 - d. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
 - e. Mechanical Fasteners: Galvanized steel suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in duct.

- 1) Tensile Strength: Indefinitely sustain a 50-lb- tensile, dead-load test perpendicular to duct wall.
 - 2) Fastener Pin Length: As required for thickness of insulation and without projecting more than 1/8 inch into airstream.
 - 3) Adhesive for Attaching Mechanical Fasteners: Comply with fire-hazard classification of duct liner system.
3. *Mold Resistance: ASTM C 1338; ASTM G21; ASTM G22; surfaces exposed to airstream shall be resistive to and not support mold, fungal, and bacterial growth.*

2.4 SEALANT MATERIALS

- A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.
- B. Joint and Seam Tape: 2 inches wide; glass-fiber-reinforced fabric.
- C. Tape Sealing System: Woven-fiber tape impregnated with gypsum mineral compound and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
- D. Low VOC Solvent-Based Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant formulated with a minimum of 75 percent solids.
- E. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.
- F. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.5 HANGERS AND SUPPORTS

- A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
- B. Hanger Materials: Galvanized sheet steel or threaded steel rod.
 1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
 2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.
 3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.
 3. Supports for Aluminum Ducts: Aluminum support materials unless materials are electrolytically separated from ducts.

2.6 RECTANGULAR DUCT FABRICATION

- A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
 1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
 2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC

Duct Construction Standards--Metal and Flexible."

- B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.
 - 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Nexus Inc.
 - c. Ward Industries, Inc.
- C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.
 - 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Lockformer.
 - 2. Duct Size: Maximum 30 inches wide and up to 2-inch wg pressure class.
 - 3. Longitudinal Seams: Pittsburgh lock sealed with noncuring polymer sealant.
- D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of nonbraced panel area unless ducts are lined.
- E. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
 - 1. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.

2.7 ROUND AND FLAT-OVAL DUCT AND FITTING FABRICATION

- A. Diameter as applied to flat-oval ducts in this Article is the diameter of a round duct with a circumference equal to the perimeter of a given size of flat-oval duct.
- B. Round, Spiral Lock-Seam Ducts: Fabricate supply ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
- C. Flat-Oval, Spiral Lock-Seam Ducts: Fabricate supply ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible. Fabricate ducts larger than 72 inches in diameter with butt-welded longitudinal seams.
- D. Duct Joints:
 - 1. Ducts up to 20 Inches in Diameter: Interior, center-beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.
 - 2. Ducts 21 to 72 Inches in Diameter: Three-piece, gasketed, flanged joint consisting of two internal flanges with sealant and one external closure band with gasket.
 - 3. Ducts Larger Than 72 Inches in Diameter: Companion angle flanged joints per SMACNA "HVAC Duct Construction Standards--Metal and Flexible," Figure 3-2.
 - 4. Round Ducts: Prefabricated connection system consisting of double-lipped, EPDM rubber gasket. Manufacture ducts according to connection system manufacturer's tolerances.
 - a. Manufacturers:
 - 1) Ductmate Industries, Inc.
 - 2) Lindab Inc.
 - 5. Flat-Oval Ducts: Prefabricated connection system consisting of two flanges and one synthetic rubber gasket.
 - a. Manufacturers:
 - 1) Ductmate Industries, Inc.
 - 2) McGill AirFlow Corporation.
 - 3) SEMCO Incorporated.
- E. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal-seam straight ducts.

- F. Diverging-Flow Fittings: Fabricate with reduced entrance to branch taps and with no excess material projecting from fitting onto branch tap entrance.
- G. Fabricate elbows using die-formed, pleated, or mitered construction. Bend radius of die-formed, and pleated elbows shall be 1-1/2 times duct diameter. Unless elbow construction type is indicated, fabricate elbows as follows:
 - 1. Mitered-Elbow Radius and Number of Pieces: Welded construction complying with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
 - 2. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from minus 2- to plus 2-inch wg:
 - a. Ducts 3 to 36 Inches in Diameter: 0.034 inch.
 - b. Ducts 37 to 50 Inches in Diameter: 0.040 inch.
 - c. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
 - d. Ducts 62 to 84 Inches in Diameter: 0.064 inch.
 - 3. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from 2- to 10-inch wg:
 - a. Ducts 3 to 26 Inches in Diameter: 0.034 inch.
 - b. Ducts 27 to 50 Inches in Diameter: 0.040 inch.
 - c. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
 - d. Ducts 62 to 84 Inches in Diameter: 0.064 inch.
 - 4. Flat-Oval Mitered Elbows: Welded construction with same metal thickness as longitudinal-seam flat-oval duct.
 - 5. 90-Degree, 2-Piece, Mitered Elbows: Use only for supply systems or for material-handling Class A or B exhaust systems and only where space restrictions do not permit using radius elbows. Fabricate with single-thickness turning vanes.
 - 6. Round Elbows 8 Inches and Less in Diameter: Fabricate die-formed elbows for 45- and 90-degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
 - 7. Round Elbows 9 through 14 Inches in Diameter: Fabricate gored or pleated elbows for 30, 45, 60, and 90 degrees unless space restrictions require mitered elbows. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
 - 8. Round Elbows Larger Than 14 Inches in Diameter and All Flat-Oval Elbows: Fabricate gored elbows unless space restrictions require mitered elbows.
 - 9. Die-Formed Elbows for Sizes through 8 Inches in Diameter and All Pressures 0.040 inch thick with 2-piece welded construction.
 - 10. Flat-Oval Elbow Metal Thickness: Same as longitudinal-seam flat-oval duct specified above.
 - 11. Pleated Elbows for Sizes through 14 Inches in Diameter and Pressures through 10-Inch wg: 0.022 inch.

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

- A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:
 - 1. Main Supply Ducts: 4-inch wg, medium pressure.
 - 2. Supply Ducts (before Air Terminal Units): 4-inch wg, medium pressure.
 - 3. Supply Ducts (after Air Terminal Units): 2-inch wg, low pressure.
 - 4. Return Ducts (Negative Pressure): 2-inch wg, low pressure
 - 5. Exhaust Ducts (Negative Pressure): 2-inch wg, low pressure.
- B. All ducts shall be galvanized steel except as follows:
 - 1. Range Hood Exhaust Ducts: Comply with NFPA 96.
 - a. Exposed: Type 304, stainless steel with finish to match kitchen equipment and range hood.

- b. Weld and flange seams and joints.
- 2. Dishwasher Hood Exhaust Ducts:
 - a. Type 304, stainless steel with finish to match kitchen equipment and range hood. Weld and flange seams and joints.

3.2 DUCT INSTALLATION

- A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards-Metal and Flexible," unless otherwise indicated.
- B. Install round and flat-oval ducts in lengths not less than 12 feet unless interrupted by fittings.
- C. Install ducts with fewest possible joints.
- D. Install fabricated fittings for changes in directions, size, and shape and for connections.
- E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches, with a minimum of 3 screws in each coupling.
- F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.
- J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- K. Seal all joints and seams. Apply low VOC based sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.
- L. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches.
- N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 23 Section "Air Duct Accessories" Firestopping materials and installation methods are specified in Division 7 Section "Through-Penetration Firestop Systems."
- O. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."
- P. Paint interiors of metal ducts, that do not have duct liner, for 24 inches upstream of registers and grilles. Apply one coat of flat, black, latex finish coat over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 9 painting Sections.

3.3 SEAM AND JOINT SEALING

- A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.
 - 1. For pressure classes lower than 2-inch wg, seal transverse joints.
- B. Seal ducts before external insulation is applied.

3.4 HANGING AND SUPPORTING

- A. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

- B. Support vertical ducts at maximum intervals of 16 feet and at each floor.
- C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.
- D. Install concrete inserts before placing concrete.
- E. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 1. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors according to Division 23 Section "Air Duct Accessories".
- B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports:
 1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
 2. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
 3. Maximum Allowable Leakage: Comply with requirements for Leakage Class 3 for round and flat-oval ducts, Leakage Class 12 for rectangular ducts in pressure classes lower than and equal to 2-inch wg (both positive and negative pressures), and Leakage Class 6 for pressure classes from 2- to 10-inch wg.
 4. Remake leaking joints and retest until leakage is equal to or less than maximum allowable.

3.7 CLEANING NEW SYSTEMS

- A. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before air balancing.
- B. Use service openings, as required, for physical and mechanical entry and for inspection.
 1. Create other openings to comply with duct standards.
 2. Disconnect flexible ducts as needed for cleaning and inspection.
 3. Remove and reinstall ceiling sections to gain access during the cleaning process.
- C. Vent vacuuming system to the outside. Include filtration to contain debris removed from HVAC systems, and locate exhaust down wind and away from air intakes and other points of entry into building.
- D. Clean the following metal duct systems by removing surface contaminants and deposits:
 1. Air outlets and inlets (registers, grilles, and diffusers).
 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
 4. Coils and related components.
 5. Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.
 6. Supply-air ducts, dampers, actuators, and turning vanes.
- E. Mechanical Cleaning Methodology:
 1. Clean metal duct systems using mechanical cleaning methods that extract contaminants

- from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
 3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
 4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet.
 5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
- F. Cleanliness Verification:
1. Visually inspect metal ducts for contaminants.
 2. Where contaminants are discovered, re-clean and reinspect ducts.

END OF SECTION

**SECTION 233300
AIR DUCT ACCESSORIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Backdraft dampers.
2. Volume dampers.
3. Volume damper remote control cable assemblies.
4. Motorized control dampers.
5. Fire dampers.
6. Ceiling fire dampers.
7. Combination fire and smoke dampers.
8. Turning vanes.
9. Duct-mounting access doors.
10. Flexible connectors.
11. Flexible ducts.
12. Duct accessory hardware.
13. Duct silencers.

- B. Related Sections include the following:

1. Division 28 Section "Fire Alarm" for duct-mounting fire and smoke detectors.
2. Division 23 Section "HVAC Instrumentation for electric and pneumatic damper actuators.

1.3 SUBMITTALS

- A. Product Data: For the following:

1. Backdraft dampers.
2. Volume dampers.
3. Motorized control dampers.
4. Fire dampers.
5. Ceiling fire dampers.
6. Combination fire and smoke dampers.
7. Turning vanes.
8. Duct-mounting access doors.
9. Flexible connectors.
10. Flexible ducts.
11. Duct Accessory hardware.

- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Special fittings.
2. Manual-volume damper installations.
3. Motorized-control damper installations.
4. Fire-damper, smoke-damper, and combination fire- and smoke-damper installations, including sleeves and duct-mounting access doors.
5. Wiring Diagrams: Power, signal, and control wiring.

- C. Coordination Drawings: Reflected ceiling plans, drawn to scale and coordinating penetrations and ceiling-mounting items. Show ceiling-mounting access panels and access doors required for access to duct accessories.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.
- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Stainless Steel: ASTM A 480/A 480M.
- D. Aluminum Sheets: ASTM B 209, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Extruded Aluminum: ASTM B 221, alloy 6063, temper T6.
- F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 BACKDRAFT DAMPERS

- A. Manufacturers:
 - 1. Air Balance, Inc.
 - 2. Greenheck.
 - 3. Penn Ventilation Company, Inc.
 - 4. Ruskin Company.
- B. Description: Multiple-blade, parallel action gravity balanced, with center-pivoted blades of maximum 6-inch width, with sealed edges, assembled in rattle-free manner with 90-degree stop, steel ball bearings, and axles; adjustment device to permit setting for varying differential static pressure.
- C. Frame: 0.052-inch- thick, galvanized sheet steel, with welded corners and mounting flange.
- D. Blades: 0.025-inch- thick, roll-formed aluminum.
- E. Blade Seals: Vinyl or Neoprene.
- F. Blade Axles: Galvanized steel.
- G. Tie Bars and Brackets: Galvanized steel.
- H. Return Spring: Adjustable tension.

2.4 VOLUME DAMPERS

- A. Manufacturers:
1. Air Balance, Inc.
 2. METALAIRE, Inc.
 3. Nailor Industries Inc.
 4. Penn Ventilation Company, Inc.
 5. Ruskin Company.
- B. General Description: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
1. Pressure Classes of 3-Inch wg or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.
- C. Standard Volume Dampers: Multiple- or single-blade, parallel- or opposed-blade design as indicated, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
 2. Roll-Formed Steel Blades: 0.064-inch- thick, galvanized sheet steel.
 3. Aluminum Frames: Hat-shaped, 0.10-inch- thick, aluminum sheet channels; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
 4. Roll-Formed Aluminum Blades: 0.10-inch- thick aluminum sheet.
 5. Extruded-Aluminum Blades: 0.050-inch- thick extruded aluminum.
 6. Blade Axles: Galvanized steel.
 7. Bearings: Oil-impregnated bronze.
 8. Tie Bars and Brackets: Galvanized steel.
- D. Low-Leakage Volume Dampers: Multiple- or single-blade, parallel- or opposed-blade design as indicated, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
 2. Roll-Formed Steel Blades: 0.064-inch- thick, galvanized sheet steel.
 3. Blade Axles: Galvanized steel.
 4. Bearings: Oil-impregnated bronze thrust or ball.
 5. Blade Seals: Vinyl or Neoprene.
 6. Jamb Seals: Cambered stainless steel.
 7. Tie Bars and Brackets: Galvanized steel.
- E. Jackshaft: 1-inch- diameter, galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
1. Length and Number of Mountings: Appropriate to connect linkage of each damper in multiple-damper assembly.
- F. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.5 VOLUME DAMPER CONTROL CABLE ASSEMBLIES

A. Manufacturer:

1. Young Regulator Company.

B. Concealed Ceiling Regulator:

1. Damper controller and cable shall be concealed above the ceiling. Cable to consist of Bowden cable .054" stainless steel control wire encapsulated in 1-16" flexible galvanized spiral wire sheath. Control kit shall consist of 2-5/8" diameter die cast aluminum housing with 3" diameter zinc plated (polished chrome is optional) cover and 14 gauge steel rack and pinion gear drive converting rotary motion to push-pull motion. Control shaft shall be D-style flatted and 1/4" diameter with 265-degree rotation providing graduations for positive locking and control, and 1-1/2" linear travel capability. Control kit is designed to be imbedded in the ceiling flush with the finished surface. Control kit shall be manually operated using Young Regulator Model 030-12 wrench. Control kit shall be Young Regulator Model 270-301.

C. Controller Mounted in Plenum of Slot Diffusers:

1. Damper controller and cable shall be concealed above the ceiling. Cable to consist of Bowden cable .054" stainless steel control wire encapsulated in 1/16" flexible galvanized spiral wire sheath. Control kit shall be designed for use with internally or externally controlled round or rectangular dampers and shall consist of 14 gauge steel rack and pinion gear drive converting rotary motion to push-pull motion. Control shaft shall be D-style flatted and 1/4" diameter with 265-degree rotation providing 1-1/2" linear travel capability. Control kit mounting bracket to be field mounted on ceiling framework, behind grilles on or inside plenum slot diffusers and other various types of diffusers. Control kit shall be manually operated using Young Regulator Model 030-12 wrench. Control kit shall be Young Regulator Model 270-275.
2. Damper(s) to be constructed of heavy duty galvanized steel spiral shell design with rolled-in stiffening beads for superior rigidity. Spiral shell shall have one crimped end and one straight end for ease of installation. Damper to include "V" style 20 gauge galvanized steel blade secured with 1/2" diameter steel shafts and high strength Teflon bushings requiring no lubrication. Damper shall include all necessary hardware to ensure compatibility with Bowden remote cable control system. Damper(s) shall be Young Regulator Model 5020-CC.

2.6 MOTORIZED CONTROL DAMPERS

A. Manufacturers:

1. Air Balance, Inc.
2. Duro Dyne Corp.
3. Greenheck.
4. McGill AirFlow Corporation.
5. METALAIR, Inc.
6. Nailor Industries Inc.
7. Penn Ventilation Company, Inc.
8. Ruskin Company.

B. General Description: AMCA-rated, opposed-blade design; minimum of 0.1084-inch- thick, galvanized-steel frames with holes for duct mounting; minimum of 0.0635-inch- thick, galvanized-steel damper blades with maximum blade width of 8 inches.

1. Secure blades to 1/2-inch- diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
2. Operating Temperature Range: From minus 40 to plus 200 deg F.
3. Provide closed-cell neoprene edging.

2.7 FIRE DAMPERS

- A. Manufacturers:
 - 1. Air Balance, Inc.
 - 2. Greenheck.
 - 3. McGill AirFlow Corporation.
 - 4. METALAIRE, Inc.
 - 5. Nailor Industries Inc.
 - 6. Penn Ventilation Company, Inc.
 - 7. Ruskin Company.
- B. Fire dampers shall be labeled according to UL 555 and California State Fire Marshal requirements.
- C. Fire Rating: 1-1/2 or 3 hours.
- D. Frame: Curtain type with blades outside airstream; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
- E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
 - 1. Minimum Thickness: 0.052 or 0.138 inch thick as indicated and of length to suit application.
 - 2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.
- F. Mounting Orientation: Vertical or horizontal as indicated.
- G. Blades: Roll-formed, interlocking, 0.034-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.
- H. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- I. Fusible Links: Replaceable, 165 deg F rated.

2.8 CEILING FIRE DAMPERS

- A. Manufacturers:
 - 1. Air Balance, Inc.
 - 2. Greenheck.
 - 3. McGill AirFlow Corporation.
 - 4. METALAIRE, Inc.
 - 5. Nailor Industries Inc.
 - 6. Penn Ventilation Company, Inc.
 - 7. Ruskin Company.
- B. General Description: Labeled according to UL 555C and California State Fire Marshal requirements; comply with construction details for tested floor- and roof-ceiling assemblies as indicated in UL's "Fire Resistance Directory."
- C. Frame: Galvanized sheet steel, round or rectangular, style to suit ceiling construction.
- D. Blades: Galvanized sheet steel with refractory insulation.
- E. Fusible Links: Replaceable, 165 deg F rated.

2.9 COMBINATION FIRE AND SMOKE DAMPERS

- A. Manufacturers:
 - 1. Air Balance, Inc.
 - 2. Greenheck.
 - 3. Nailor Industries Inc.
 - 4. Penn Ventilation Company, Inc.
 - 5. Ruskin Company.

- B. General Description: Labeled according to UL 555S and California State Fire Marshal requirements. Combination fire and smoke dampers shall be labeled according to UL 555 for 1-1/2-hour rating.
- C. Fusible Links: Replaceable, 165 deg F rated.
- D. Frame and Blades: 0.064-inch- thick, galvanized sheet steel.
- E. Mounting Sleeve: Factory-installed, 0.052-inch- thick, galvanized sheet steel; length to suit wall or floor application.
- F. Damper Motors: Modulating and two-position action.
 - 1. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC".
 - 2. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
 - 3. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
 - 4. Outdoor Motors and Motors in Outside-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
 - 5. Nonspring-Return Motors: For dampers larger than 25 sq. ft., size motor for running torque rating of 150 in. x lbf and breakaway torque rating of 300 in. x lbf.
 - 6. Electrical Connection: 115 V, single phase, 60 Hz.

2.10 TURNING VANES

- A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.
- B. Manufactured Turning Vanes: Fabricate 1-1/2-inch- wide, double-vane, curved blades of galvanized sheet steel set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into vane runners suitable for duct mounting.
 - 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Duro Dyne Corp.
 - c. METALAIRE, Inc.
 - d. Ward Industries, Inc.
- C. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.11 DUCT-MOUNTING ACCESS DOORS

- A. General Description: Fabricate doors airtight and suitable for duct pressure class.
- B. Door: Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.
 - 1. Manufacturers:
 - a. American Warming and Ventilating.
 - b. CESCO Products.
 - c. Ductmate Industries, Inc.
 - d. Flexmaster U.S.A., Inc.
 - e. Greenheck.
 - f. McGill AirFlow Corporation.
 - g. Nailor Industries Inc.
 - h. Ventfabrics, Inc.
 - i. Ward Industries, Inc.
 - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.

3. Provide number of hinges and locks as follows:
 - a. Less Than 12 Inches Square: Secure with two sash locks.
 - b. Up to 18 Inches Square: Two hinges and two sash locks.
 - c. Up to 24 by 48 Inches: Three hinges and two compression latches with outside and inside handles.
 - d. Sizes 24 by 48 Inches and Larger: One additional hinge.
- C. Door: Double wall, duct mounting, and round; fabricated of galvanized sheet metal with insulation fill and 1-inch thickness. Include cam latches.
 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Flexmaster U.S.A., Inc.
 2. Frame: Galvanized sheet steel, with spin-in notched frame.
- D. Pressure Relief Access Door: Double wall and duct mounting; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel where indicated, latches, and retaining chain.
 1. Manufacturers:
 - a. American Warming and Ventilating.
 - b. CESCO Products.
 - c. Ductmate Industries, Inc.
 - d. Greenheck.
 - e. KEES, Inc.
 - f. McGill AirFlow Corporation.
 - g. Nexus PDQ.
 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
- E. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.
- F. Insulation: 1-inch- thick, fibrous-glass or polystyrene-foam board.

2.12 FLEXIBLE CONNECTORS

- A. Manufacturers:
 1. Ductmate Industries, Inc.
 2. Duro Dyne Corp.
 3. Ventfabrics, Inc.
 4. Ward Industries, Inc.
- B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.
- C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Select metal compatible with ducts.
- D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 1. Minimum Weight: 26 oz./sq. yd..
 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 3. Service Temperature: Minus 40 to plus 200 deg F.
- E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
 1. Minimum Weight: 24 oz./sq. yd..
 2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
 3. Service Temperature: Minus 50 to plus 250 deg F.

2.13 FLEXIBLE DUCTS

- A. Manufacturers:
 1. Casco Silentflex II.
- B. Insulated Flexible Duct: UL 181, Class 1 with:

1. Non-woven nylon liner.
 2. Steel spring wire helix.
 3. Polyethylene vapor barrier jacket.
 4. Adjustable metal male/female collars.
 5. Pressure rating 1-1/2 in. positive to 1/2 in. negative.
 6. Maximum Air Velocity: 4,000 fpm (continuous).
 7. Temperature Range: 20 deg. F to 200 deg. F.
- C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 through 18 inches to suit duct size.

2.14 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.15 DUCT SILENCERS

- A. Manufacturers:
1. Industrial Acoustics Company (IAC)
 2. Commercial Acoustics.
 3. Vibro-Acoustics.
- B. General Description: Factory-fabricated and -tested, round or rectangular silencers with performance characteristics and physical requirements as indicated.
- C. Fire Performance: Adhesives, sealants, packing materials, and accessory materials shall have fire ratings not exceeding 25 for flame-spread index and 50 for smoke-developed index when tested according to ASTM E 84.
- D. Rectangular Units: Fabricate casings with a minimum of 0.034-inch- thick, solid galvanized sheet metal for outer casing and 0.022-inch- thick, ASTM A 653/A 653M, G60, perforated galvanized sheet metal for inner casing.
- E. Round Units:
1. Outer Casings:
 - a. ASTM A 653/A 653M, G60, galvanized sheet steel.
 - b. Up to 24 Inches in Diameter: 0.034 inch thick.
 - c. 26 through 40 Inches in Diameter: 0.040 inch thick.
 - d. 42 through 52 Inches in Diameter: 0.052 inch thick.
 - e. 54 through 60 Inches in Diameter: 0.064 inch thick.
 - f. Casings fabricated of spiral lock-seam duct may be one size thinner than that indicated.
 2. Interior Casing, Partitions, and Baffles:
 - a. ASTM A 653/A 653M, G60, galvanized sheet steel.
 - b. At least 0.034 inch thick and designed for minimum aerodynamic losses.
- F. Sheet Metal Perforations: 1/8-inch diameter for inner casing and baffle sheet metal.
- G. Fill Material: Inert and vermin-proof fibrous material, packed under not less than 5 percent compression.
1. Erosion Barrier: Polymer bag enclosing fill and heat-sealed before assembly.
- H. Fabricate silencers to form rigid units that will not pulsate, vibrate, rattle, or otherwise react to system pressure variations.
1. Do not use nuts, bolts, or sheet metal screws for unit assemblies.
 2. Lock form and seal or continuously weld joints.
 3. Suspended Units: Factory-installed suspension hooks or lugs attached to frame in quantities and spaced to prevent deflection or distortion.

4. Reinforcement: Cross or trapeze angles for rigid suspension.
- I. Source Quality Control:
 1. Acoustic Performance: Test according to ASTM E 477.
 2. Record acoustic ratings, including dynamic insertion loss and self-noise power levels with an airflow of at least 2000-fpm face velocity.
 3. Leak Test: Test units for airtightness at 200 percent of associated fan static pressure or 6-inch wg static pressure, whichever is greater.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- D. Install volume dampers in ducts with liner; avoid damage to and erosion of duct liner.
- E. Provide balancing dampers at points on supply, return, and exhaust systems where branches lead from larger ducts as required for air balancing. Coordinate requirements with TAB contractor. Install at a minimum of two duct widths from branch takeoff.
- F. Where volume damper adjustment is not readily accessible through finished ceilings, provide volume damper remote control cable adjustment. Locate concealed ceiling regulators in coordination with Architect.
- G. Provide test holes at fan inlets and outlets and elsewhere as indicated.
- H. Install fire and smoke dampers, according to manufacturer's UL-approved written instructions.
- I. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:
 1. On both sides of duct coils.
 2. Downstream from volume dampers and equipment.
 3. Adjacent to fire or smoke dampers, providing access to reset or reinstall fusible links.
 4. To interior of ducts for cleaning; before and after each change in direction, at maximum 50-foot spacing.
 5. On sides of ducts where adequate clearance is available.
- J. Install the following sizes for duct-mounting, rectangular access doors:
 1. One-Hand or Inspection Access: 8 by 5 inches.
 2. Two-Hand Access: 12 by 6 inches.
 3. Head and Hand Access: 18 by 10 inches.
 4. Head and Shoulders Access: 21 by 14 inches.
 5. Body Access: 25 by 14 inches.
 6. Body Plus Ladder Access: 25 by 17 inches.
- K. Install the following sizes for duct-mounting, round access doors:
 1. One-Hand or Inspection Access: 8 inches in diameter.
 2. Two-Hand Access: 10 inches in diameter.
 3. Head and Hand Access: 12 inches in diameter.
 4. Head and Shoulders Access: 18 inches in diameter.
 5. Body Access: 24 inches in diameter.
- L. Install the following sizes for duct-mounting, pressure relief access doors:
 1. One-Hand or Inspection Access: 5 inches in diameter.

2. Two-Hand Access: 10 inches in diameter.
 3. Head and Hand Access: 13 inches in diameter.
 4. Head and Shoulders Access: 19 inches in diameter.
- M. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment".
- N. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
- O. For fans developing static pressures of 5-inch wg and higher, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- P. Connect diffusers or light troffer boots to low pressure ducts directly or with minimum 60-inch lengths of flexible duct clamped or strapped in place.
- Q. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- R. Install duct test holes where indicated and required for testing and balancing purposes.
- 3.2 ADJUSTING
- A. Adjust duct accessories for proper settings.
 - B. Adjust fire and smoke dampers for proper action.
 - C. Final positioning of manual-volume dampers is specified in Division 23 Section "Commissioning of HVAC".

END OF SECTION

**SECTION 233713
DIFFUSERS, REGISTERS, AND GRILLES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes ceiling- and wall-mounted diffusers, registers, and grilles. (Refer to Sheet M002 "HVAC Equipment Schedules" if needed for additional clarification.)
- B. Related Sections include the following:
1. Division 8 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
 2. Division 23 Section "Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.
 3. Section "Acoustics".

1.3 SUBMITTALS

- A. Product Data: For each product indicated, include the following:
1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 2. Diffuser, Register, and Grille Schedule: Indicate Drawing designation, room location, quantity, model number, size, and accessories furnished.
- B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Ceiling suspension assembly members.
 2. Method of attaching hangers to building structure.
 3. Size and location of initial access modules for acoustical tile.
 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 5. Duct access panels.
- C. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.
- D. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Products: Subject to compliance with requirements, provide one of the products specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 GRILLES AND REGISTERS

- A. Adjustable Sidewall Supply:
1. Product: Titus 300RL (Type CD-M)

2. Manufacturers:
 - a. Anemostat; a Mestek Company.
 - b. Krueger.
 - c. METALAIRE, Inc.; Metal Industries Inc.
 - d. Price Industries.
 - e. Titus.
- B. Steel supply grilles shall be of the sizes and mounting types shown on the plans and outlet schedule. The deflection blades shall be available parallel to the long or short dimension of the grille. Construction shall be of steel with a 1-1/4 inch wide border on all sides. Screw holes shall be countersunk for a neat appearance. Corner shall be welded with full penetration resistance welds.
- C. Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be spaced on 3/4-inch centers. Blades shall have steel friction pivots on both ends to allow individual blade adjustment without loosening or rattling. Plastic blade pivots are not acceptable.
- D. Optional opposed-blade volume damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the grille. The grille finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
- E. The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.
- F. Adjustable Sidewall Return and Exhaust Register:
 1. Product: Titus 350RL (Type CD-N)
 2. Manufacturers:
 - a. Anemostat; a Mestek Company.
 - b. Krueger.
 - c. METALAIRE, Inc.; Metal Industries Inc.
 - d. Price Industries.
 - e. Titus.
 3. The fixed deflection blades shall be available parallel to the long or short dimension of the grille. Construction shall be of steel with a 1 1/4-inch wide border on all sides. Screw holes shall be countersunk for a neat appearance. Corners shall be welded with full penetration resistance welds.
 4. Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be firmly held in place by mullions from behind the grille and fixed to the grille by welding in place. Blade deflection angle shall be available at 35°.
 5. Optional opposed-blade volume damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the grille.
 6. The grille finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315° F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
 7. The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

2.3 LINEAR SLOT OUTLETS

- A. Linear Diffuser:
1. Product: Titus Flowbar with border type 66 (Type CD-C); Titus Flowbar with border type 22 (Type CD-F, CD-J)
 2. Manufacturers:
 - a. Anemostat; a Mestek Company.
 - b. Krueger.
 - c. METALAIR, Inc.; Metal Industries Inc.
 - d. Price Industries.
 - e. Titus.
- B. Provide all materials and equipment required for a complete installation of all linear and modular slot air distribution systems as shown on the architectural and mechanical drawings and/or indicated in the architectural or mechanical specifications. The systems shall be complete in every respect and shall include all required appurtenances. Mechanical contractor shall furnish and install all plenums, hoods, blank-offs, and associated sheet metal components including all duct connections thereto.
- C. Provide all continuous linear slot and modular slot diffusers as shown on the drawings. The slot diffusers shall integrate into the ceiling system. Where curved linear slot diffusers are indicated, they shall be stretched formed to the exact radii required. Rolled or segmented linear slot diffusers will not be accepted.
- D. The linear slot diffusers shall have a single slot unless shown otherwise and shall be capable of being used for supply air, return air, exhaust air, or any combination thereof.
- E. The linear slot diffusers shall be capable of supporting the ceiling system. Linear diffusers supported by screws in the flanges or from air plenums are unacceptable. For lay-in ceiling, provide hanger wire support clips that are integral with the linear slot diffusers allowing the linear slot diffusers to be supported from the building structure with ceiling wire. For hard ceilings, provide clips that are integral with the linear slot diffusers allowing the diffusers to be secured directly to the ceiling framing without the requirement for hanger supports. Provide spline clips to secure joints and ceiling tees to the diffusers.
1. Provide ends and corners as required. Ends shall be butt type, field installed, or mitered picture frame type factory installed, as indicated herein or shown on the drawings. Corners shall be mitered one piece unit.
 2. Pattern controllers shall be one piece extruded aluminum, 24" long maximum, positioned between spring loaded spacers. Pattern controllers shall allow the airstream to be directed flat against the ceiling in either direction or downward as well as allowing throw reduction every two feet along the entire length of the linear slot diffusers. The airstream shall be maintained at the ceiling plane and shall not dump when volume is reduced. Only extruded aluminum pattern controllers are acceptable. Where shown or noted pattern controllers shall be designed to allow the airstream to be jetted into the occupied space and be adjustable to vector the airstream as required.
 3. Material shall be minimum wall thickness .062 extruded aluminum. Spring steel retainers shall be used under the spacers to hold the slot diffusers assembly tightly together and allow the slot diffusers to be disassembled easily for field trimming. Materials other than extruded aluminum and spring steel will not be accepted.
 4. Flanges exposed to view shall be painted factory standard white. All other surfaces shall be painted flat black. Provide paint samples if requested.
 5. Model numbers are indicated on the plan schedules.
 6. All slot diffusers shall be manufactured by the same manufacturer of the plenums and hoods. No exceptions will be allowed. Plenum lengths and entry collar sizes shall be as indicated on the plan schedules.
 7. Plenums shall be minimum 24 gauge galvanized steel and lined inside with black matte fiberglass insulation. Hoods shall be 51% free area and constructed of 24 gauge perforated sheet metal painted flat black.

8. Provide a friction type volume damper located in the entry collar of the supply air plenum, accessible through the slot diffuser.
9. Air test and balance of linear and modular slot diffusers systems shall be by this section and be in accordance with the testing and balancing portion section of the specifications. Position all FlowBar pattern controllers in their normal operation positions and perform all air testing and balancing of all slot diffuser systems in full accordance with manufacturer's recommendations.
10. All slot diffusers shall be performance tested with air plenums as a composite assembly in full accordance with ASHRAE, ARI, and/or ADC standards. If requested, this contractor shall provide for a visit by the mechanical consulting engineer to the product testing laboratory to verify performance data and testing procedures. All cost associated thereto shall be provided at the expense of this contractor.
11. Diffusers shall be selected to achieve a throw to room length ratio which meets the requirements of the ASHRAE 1993 Fundamentals Handbook, Chapter 31, Table 2, at both maximum design flow rate, and for VAV systems, at the minimum flow rate expected during partial occupancy. Diffusers shall be selected to achieve a minimum of 70% ADPI over the range of expected loads in the space. The diffusers' reported performance shall be based on tests conducted in accordance with ASHRAE Standard 70-91. ADPI performance on at least one unit size of the selected diffuser shall have been tested in accordance with ASHRAE Standard 113-90, to validate conformance and applicability to the ASHRAE table.
12. TITUS FlowBar system is the basis of the specification. Comparable products may be submitted as a substitution provided they are in full compliance with all sections of this specification and meet performance requirement. This contractor should note that if the substitution adds costs to any other sections of this specification, or causes the architect and/or engineer to incur redesign costs, this contractor shall be fully responsible for the reimbursement of all these costs.

2.4 CEILING DIFFUSER OUTLETS & INLETS

A. Perforated Ceiling Diffuser:

1. Product: Titus PCS (Type CD-A, CD-D, CD-H).
2. Manufacturers:
 - a. Anemostat; a Mestek Company.
 - b. Krueger.
 - c. METALAIR, Inc.; Metal Industries Inc.
 - d. Price Industries.
 - e. Titus.
3. Diffusers shall have a perforated face with 3/16-inch diameter holes on 1/4-inch staggered centers and no less than 51 percent free area. Perforated face shall be steel or aluminum according to the model selected. The back pan shall be heavy gauge steel of the sizes and mounting types shown on the plans and outlet schedule. The diffuser neck shall have at least 1 inch depth for easy duct connection.
4. Individually adjustable curved deflectors shall be mounted in the neck of the diffuser and must allow the discharged air to enter the room in either vertical or one-, two-, three-, four-way horizontal jets. The perforated face must be easily unlatchable from the back pan to facilitate opening of the face for pattern controller adjustment or to access an optional damper.
5. The finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315° F for 30 minutes. The pencil hardness must be HB to H.
6. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
7. Optional damper shall be constructed of heavy gauge steel. Damper must be operable from

the face of the diffuser by unlatching the diffuser face. The diffuser must be designed such that complete removal of the face is not required during damper adjustment.

8. The manufacturer shall provide published performance data for the perforated diffuser. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

B. Louver Face Diffuser:

1. Product: Titus TDCA (Type CD-O, CD-L)
2. Manufacturers:
 - a. Anemostat; a Mestek Company.
 - b. Krueger.
 - c. METALAIRE, Inc.; Metal Industries Inc.
 - d. Price Industries.
 - e. Titus.
3. Ceiling diffusers shall be for adjustable discharge pattern. These diffusers shall consist of an outer frame assembly of the sizes and mounting types shown on the plans and outlet schedule. A square or rectangular inlet shall be an integral part of the frame assembly and a transition piece shall be available to facilitate attachment of round duct. An inner core assembly consisting of fixed deflection louvers shall be available in one-, two-, three-, or four-way horizontal discharge patterns. Diffusers shall include adjustable vanes to provide full vertical projection as well as horizontal projection. The inner core assembly must be removable in the field without tools for easy installation, cleaning, or damper adjustment.
4. The finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315° F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
5. Optional damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the diffuser by removing the spring loaded inner core assembly.
6. The manufacturer shall provide published performance data for the diffuser. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

C. Perforated Ceiling Return/Exhaust Grille:

1. Product: Titus PAR (Type CD-b, CD-E, CD-I).
2. Manufacturers:
 - a. Anemostat; a Mestek Company.
 - b. Krueger.
 - c. METALAIRE, Inc.; Metal Industries Inc.
 - d. Price Industries.
 - e. Titus.
3. The return models shall have the same face and border construction as the supply models for harmonious appearance in the room. Diffusers shall have a perforated face with 3/16-inch diameter holes on 1/4-inch staggered centers and no less than 51 percent free area. Perforated face shall be steel or aluminum according to the model selected. The back pan shall be one piece stamped heavy gauge steel of the sizes and mounting types shown on the plans and outlet schedule. The diffuser neck shall have 11/8-inch depth for easy duct connection.
4. Diffusers must discharge a uniform horizontal blanket of air into the room and protect ceiling against smudging. Pattern controllers in the supply models shall be mounted on the back of the perforated face and must be field adjustable to allow the discharged air to enter the room in either vertical or one-, two-, three-, or four-way horizontal jets. The perforated face must be easily unlatchable from the back pan to facilitate option of the face for pattern controller adjustment or to access an optional damper.
5. The finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315° F for

- 30 minutes. The pencil hardness must be HB to H.
6. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
 7. Optional damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the diffuser by unlatching the diffuser face. The diffuser must be designed such that complete removal of the face is not required during damper adjustment.
 8. The manufacturer shall provide published performance data for the perforated diffuser. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

D. Louver Face Return/Exhaust Grille:

1. Product: Titus TDC (Type CD-G, CD-K).
2. Manufacturers:
 - a. Anemostat; a Mestek Company.
 - b. Kruger.
 - c. METALAIRE, Inc.; Metal Industries Inc.
 - d. Price Industries.
 - e. Titus.
3. Ceiling diffusers shall be (aluminum with miscellaneous steel components) for fixed, horizontal discharge pattern and TDCA (steel) or TDCA-AA (aluminum with miscellaneous steel components) for adjustable discharge pattern.
4. These diffusers shall consist of an outer frame assembly of the sizes and mounting types shown on the plans and outlet schedule.
5. A square or rectangular inlet shall be an integral part of the frame assembly and a transition piece shall be available to facilitate attachment of round duct.
6. An inner core assembly consisting of fixed deflection louvers shall be available in one-, two-, three-, or four-way horizontal discharge patterns.
7. The inner core assembly must be removable in the field without tools for easy installation, cleaning, or damper adjustment.
8. The finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315° F for 30 minutes.
9. The pencil hardness must be HB to H.
10. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
11. Optional damper shall be constructed of heavy gauge steel (aluminum also available). Damper must be operable from the face of the diffuser by removing the spring loaded inner core assembly.
12. The manufacturer shall provide published performance data for the diffuser. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.
13. Provide module size 12 x 12 for installation at hard ceiling areas. Provide factory furnished opposed blade damper accessible from diffuser face.

2.5 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 INSTALLATION
- A. Install diffusers, registers, and grilles level and plumb.
 - B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
 - C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.
- 3.3 ADJUSTING
- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION

SECTION 260100 BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 WORK INCLUDED

- A. The specifications and drawings are intended to cover a complete installation of systems. The omission of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the Contractor from providing such additional labor and materials.
- B. All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of electrical system, complete, as shown on the drawings and/or specified herein. Work includes but is not necessarily limited to the following:
 - 1. Telephone service conduits.
 - 2. Main Telephone Terminal Backboard.
 - 3. Conduits for all wiring systems, unless otherwise specifically noted.
 - 4. All electrical wiring and connections to equipment furnished under other sections of Specifications.
 - 5. All electrical wiring and connections to Owner furnished equipment.
 - 6. All wiring and conduit for Air Conditioning and Heating and Ventilating systems, and electrical equipment in Plumbing Section of work.
 - 7. Time clocks and contactors for control of lighting and air conditioning.
 - 8. Pull wires in conduit runs indicated as conduit only (CO).
 - 9. Lighting panelboards.
 - 10. Building electrical wiring, conduits, outlet boxes, junction boxes, convenience outlets, switches, plates and all miscellaneous items of electrical equipment, apparatus and material specified and/or shown on Drawings.
 - 11. Disconnect switches, magnetic motor starters and manual motor starters.
 - 12. All required grounds.
 - 13. Parking lot poles, luminaries and lamps.

14. All anchors, chases, sleeves and supports for electrical equipment.
15. Excavation necessary for execution and completion of electrical work.
16. Required backing, supports and blocking for lighting fixtures.
17. Complete Fire Alarm and Detection System.
18. Telephone System.
19. CCTV System.
20. Computer Network Wiring System.
21. Tests of entire system.
22. Lighting fixtures complete with lamps and required accessories.
23. Guarantees.
24. Temporary power for building construction.
25. Temporary lighting during construction.
26. Complete connections to all motors, apparatus, electrically operated devices, etc., as shown on Drawings.
27. Circuits, switches, starters and connections for all exhaust fans, blowers and heaters.
28. Flashing of conduits through roof.
29. Shop Drawings.
30. Include an allowance of \$500.00 for the material cost of any lighting fixture where an outlet is shown on drawings without a fixture type designation.
31. In these specifications, Fire Alarm, CCTV, Television, Intrusion Alarm, etc. are referred to as Auxiliary Systems or Signal Systems.

1.03 GUARANTEE

- A. In addition to guarantee required in Division 1 or specifically specified elsewhere, all materials and equipment provided and installed under this Division of Specifications shall be guaranteed by Contractor in writing for a period of one year from date of acceptance of work by Owner. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall furnish all necessary labor and materials to correct the trouble without costs to Owner.
- B. Guarantee complete and perfect operation of entire system and that all apparatus will perform in accordance with detailed drawings and Specifications.
- C. Guarantee that all equipment will be supported in such a way as to be free from objectionable vibration and noise.

- D. Guarantee that all licenses and royalties for use of any patented feature of system will be paid before acceptance of system.

1.04 GENERAL REQUIREMENTS

- A. Codes: Construct project in accordance with following codes and regulations.
 - 1. 2013 California Electrical Code, Title 24 C.C.R.
(2011 National Electrical Code of the National Fire Protection Association, NFPA)
 - 2. 2013 California Mechanical Code, Title 24 C.C.R.
(2012 Uniform Mechanical Code of the International Association of Plumbing and Mechanical Officials, IAPMO)
 - 3. 2013 California Plumbing Code, Title 24 C.C.R.
(2012 Uniform Plumbing Code of the International Association of Plumbing and Mechanical Officials, IAPMO)
 - 4. 2013 California Energy Code, Title 24 C.C.R.
 - 5. 2013 California Historical Building Code, Title 24 C.C.R.
 - 6. 2013 California Fire Code, Title 24 C.C.R.
(2012 International Fire Code of the International Code Council)
 - 7. 2013 California Existing Building Code, Title 24 C.C.R.
(2012 International Existing Building Code of the International Code Council, with amendments)
 - 8. 2013 California Green Building Standards Code (CALGreen Code), Title 24 C.C.R.
 - 9. 2013 California Referenced Standards Code, Title 24 C.C.R.
 - 10. Local codes and ordinances.

Keep a copy of applicable code available at Site while performing work of this Section. Nothing in these Drawings and Specifications to be construed as authority to violate codes and ordinances. Conflict with applicable regulations to be resolved at Contractor's expense before installation.

- B. Permits, Fees and Inspections: Obtain and pay for all necessary permits and fees required by any constituted authority having jurisdiction including utilities. Arrange and pay for all required inspections or examinations and deliver certificates of inspection to Architect.
- C. Record Drawings:
 - 1. Provide record drawings for work of this Section.
 - 2. Keep up-to-date a complete "As-Built" record set of blue-line prints corrected daily and showing every change from original Drawings and Specifications and exact "As-Built" locations, sizes, and kinds of equipment.

3. Prints for this purpose may be obtained from Architect at cost of printing. Keep this set of Drawings on job and use only as a record set.
 4. Drawings to serve as work progress sheets. Make neat and legible notations in red ink thereon daily as work proceeds, showing work as actually installed. Drawings to be available at all times for inspection, and kept at a location designated by Architect.
 5. On completion of work, obtain one set of prints from Architect at cost of printing, and note neatly in scale all changes on record set. Deliver complete set of prints together with one set of blueline prints to Architect together with Contractor's name, address and phone number. Incorrect, non-legible or non-reproducible drawings will not be accepted.
- D. Selection and Ordering of Equipment and Materials: Within two weeks after award of Contract, arrange for purchase and delivery of all light fixtures, equipment and materials required in ample quantities and at proper time. Inform Architect immediately of any inability to obtain suitable delivery of any equipment or material. Send copy of letter verifying date of purchases to Architect.
- E. Shop Drawings and Material Lists:
1. Submit material lists and shop drawings as called for in Division 1, and as supplemented by this Division, and with sufficient promptness to ensure that overall work of project will not be delayed.
 2. Submit six copies of a list of materials and equipment manufacturers that Contractor intends to use.
 3. Provide shop drawings for following:
 - a. Panelboards.
 - b. Parking lot poles and luminaries.
 - c. Lighting fixtures, lamps and necessary accessories.
 - d. Time switches.
 - e. Emergency Power System – Inverter Unit.
 - f. Fuses.
 - g. Disconnect switches.
 - h. Wall dimmers.
 4. Do not fabricate work until reviewed shop drawings for work have been received from Architect. Work fabricated or erected in advance of reviewed shop drawings will be at risk of Contractor.
 5. Architect's or Engineer's review of shop drawings does not relieve Contractor of responsibility for errors including details, dimensions, or materials, as well as conformance with requirements of Drawings and Specifications.

6. Shop drawings will be checked by Architect and Engineer for conformance to design as a convenience to Contractor. Dimensions will not be checked. Should interferences become evident, notify Architect immediately so that matter may be resolved prior to proceeding with fabrication.
7. No reimbursement based on a claim that work was placed in accordance with dimensions shown on a reviewed shop drawing will be allowed for removing or replacing work already in place.
8. Make available a copy of every reviewed shop drawing at Project Site.
9. Submit shop drawings in coherent groups; e.g., all lighting fixtures at one time.
10. Submit actual samples of specified equipment or material to Architect for review when requested.

F. Substitution and Approval of Material:

1. Base all bids and proposals only upon materials, construction and equipment named or described in specification and/or shown on drawing. Should a Contractor wish to use other equipment than that specified, he shall submit proposed substitution by fully describing equipment he prefers to use and by listing credit or additional cost to his bid as a separate item should substitution be acceptable.
2. All equipment and materials proposed for substitution shall be similar in design and equal in quality and function to those specified herein or on drawings. Contractor (not sales vendor) shall demonstrate his proposed substitution and shall specifically note all differences between item specified and proposed substitution. Actual samples and test data, certified by an independent testing laboratory, shall be submitted when requested.
3. Each substitution will be given consideration, but without any obligation expressed or implied on part of Architect to change named requirements of specification. Only one substitution for each item of equipment will be permitted. Contractor assumes sole responsibility for performance and space requirements for substitute equipment. Decision of Architect shall be final as to whether or not substitution is acceptable.

G. Terminology:

1. Term "provide" used on Drawings and elsewhere in the Specifications shall be considered to mean "furnish and install".
2. Term "UL" means Underwriters Laboratories Inc.

H. Workmanship: See supplementary Conditions, Architect is sole judge of whether execution is in a workmanlike manner.

I. Safety Conditions: Be responsible in preventing energized switches, circuit breakers or circuits from being turned to "On" position during construction period. Be responsible for damages to personnel and/or property resulting from contact with energized circuits, switches, circuit breakers, busses or other electrical apparatus. Construct all electrical work with electrical system de-energized in area. At no time permit work on equipment or apparatus with energized circuits.

- J. Verification of Dimensions: All scaled and figured dimensions are approximate and are given for estimating purposes only. Before proceeding with work carefully check and verify all dimensions and sizes and assume all responsibility for fitting of materials and equipment to other parts of equipment and to structure. Where apparatus and equipment have been indicated on drawings, dimensions have been taken from typical equipment of class indicated. Carefully check drawings and see that equipment will fit into spaces provided.
- K. Locations:
1. Locations of conduits, outlets, apparatus and equipment indicated on drawings are approximate only and shall be changed to meet architectural and structural conditions as required.
 2. Install conduit and equipment in a manner and in locations avoiding all obstructions, preserving headroom, keeping openings and passageways clear and readily accessible for maintenance and repairs. Make changes in locations of conduit or equipment which may be necessary to accomplish this. Drawings are essentially diagrammatic to extent that many offsets, bends, special fittings and exact locations are not indicated. Examine all drawings prepared by manufacturers, suppliers and installers of all equipment including air conditioning and plumbing fixture shelving, for requirements and locations of equipment and outlets.
 3. Should any structural interferences prevent installation of outlets, setting of cabinets for lighting panelboards, running of conduits, or installation of other electrical equipment at locations shown on Drawings, necessary minor deviations therefore as determined by Engineer may be permitted. In event changes in indicated locations or arrangements are necessary due to developed conditions in building's construction or rearrangement of furnishings or equipment, Owner shall be permitted to move any junction box or utility outlet a distance of 10' and such changes shall be made without extra cost providing change is ordered before work is installed. Submit an estimate of cost or credit for other changes and proceed only upon written authority of Architect.
 4. Be cautioned that diagrams showing electrical connections are diagrammatic only and must not be used for obtaining lineal runs of wiring or conduit. Wiring diagrams do not necessarily show exact physical arrangement of equipment.
 5. Locations of outlets, lighting fixtures, cabinets, panelboards, apparatus, motors, mechanical equipment, etc., shown on Electrical Drawings is only approximate. Do not scale them from Electrical Drawings.
 6. Verify locations of outlets, lighting fixtures, equipment etc., with Architectural Drawings of interior and exterior details and finish, and coordinate location of electrical work with mechanical and other equipment.
 7. Locate lighting fixtures as per reflected ceiling plans prepared by Architect.
- L. These Specifications and attendant Drawings are intended to cover a complete and operable electrical system. Follow Drawings and Specifications and execute all work according to true intent and meaning. Should any error or omission exist in either or both of these Drawings and Specifications, or conflict one with another, have same explained and adjusted by Engineer before submitting bid price for electrical work; otherwise at own

expense, supply proper materials and labor to completely install same, make good any damage to or defect in work of results obtained therefore caused by such error, omission or conflict. Most restrictive, greater quantity or size, better quality or other superior condition of all representations shall prevail. It is intended that outlets be located symmetrical with Architectural elements notwithstanding fact that locations indicated on Drawings may be distorted for clarity.

- M. Omission of expressed reference in Drawings or Specifications to any item of labor or material necessary for proper execution of work in accordance with present good practice of trade will not relieve Contractor from providing such additional labor and materials.
- N. Job Visits by Engineer: Periodic visits to job by Engineer is for express purpose of verifying compliance by Contractor with contract documents. Such visits by Engineer shall not be construed as construction supervision. Neither shall such visits be construed to make Engineer responsible for providing a safe place for performance of work by Contractor or Contractor's employees or safety of supplies of Contractor or his subcontractors.
- O. Cooperation with Others: Organize work that will harmonize with work of all trades so that all work may proceed as expeditiously as possible. Be responsible for correct placement of work and connection of work to all related trades.
- P. Protection of Finish: Provide adequate means for protecting all finished parts of materials and equipment against damage from any cause during progress of work and until acceptance by Architect. Cover all material and equipment in storage and during construction in such a manner that no finished surfaces will be damaged, marred or splattered with paint. Keep moving parts perfectly clean and dry. No paint spraying will be permitted in building. Replace or refinish damaged material or equipment including face plates or panels without additional costs to Owner.
- Q. Cleaning Equipment and Premises: Thoroughly clean all parts of materials, equipment and exposed parts such as receptacles and panelboards, of cement, plaster and other materials. Remove all oil and grease spots with a non-inflammable cleaning solvent. Brush exposed metal work with steel brushes to remove rust and other spots and leave smooth and clean. During progress of work, carefully clean up and leave premises and all portions of building free from debris. At completion of work, remove all waste materials and debris resulting, leaving everything in a complete and satisfactory condition.
- R. Cutting and Patching: Include all cutting and patching in bid. Do not cut any structural members without first having received written permission from Architect. Cutting of round openings which can be done by use of a rotary drill shall be done by Contractor requiring same. Cutting and patching finish work shall be performed by workmen of the respective trade.
- S. Conditions at Site: Visit Job Site and become familiar with all existing conditions within scope of work and include in Bid Proposal allowance for these conditions. Verify exact locations of services prior to construction. Notify all other Contractors of these utility locations.
- T. Documents: Read all relevant documents, become familiar with job, scope of work, type of general construction, Architectural, Structural, Mechanical and Electrical Drawings and Specifications. Also become familiar with purpose for which these Drawings have been prepared and become cognizant of all details involved.

- U. Acceptance: Before work will be accepted, demonstrate to Owner and Architect that entire installation is complete and in proper operating condition and Contract has been fully and properly executed. Following items shall be prepared and submitted to Architect:
 - 1. Two copies of all test results required under this Division.
 - 2. Two copies of local and/or state code enforcing authorities final inspection certificates.
 - 3. Copies of as-built record drawings as required.
 - 4. Notify Architect in writing when installation is complete and that a final inspection of this work can be performed. In event defects or deficiencies are found during this final inspection they shall be corrected to satisfaction of Architect before final acceptance can be issued.
 - 5. Two Maintenance and Operating Manuals as required.
- V. Field Inspections: Provide proper facilities for access of Owner or Owner's representative to conveniently examine and inspect all portions of work covered in this Contract at any and all reasonable hours.
- W. Completing Work: At completion of work, remove all waste materials and debris resulting from work, leaving everything in a complete and satisfactory condition.
- X. Electrical Superintendent: Include services of a qualified electrical foreman capable of interpreting intent of Drawings and Specifications, to study Plans, Specifications and references, and coordinate all requirements with other trades, authorized to make decisions and issue instructions; be constantly in charge of work and available at job site at all times and at final inspection. Instruct Owner's representative for proper operation and recommend maintenance of all systems.
- Y. Maintenance and Operating Manuals:
 - 1. Before completion and acceptance of work, furnish Owner with two complete sets of operating and maintenance instruction manuals. Bind each set in durable hardboard binder and index.
 - 2. Compile data for manuals upon approval of material list and sketches so as not to delay final approval of work installed. Operating manuals to contain all pertinent data relating to electrical installation such as fixture cuts, manufacturer's approval, shop drawings, sketches, wiring diagrams and equipment operating instructions.
 - 3. Instruct Owner's operating personnel with electrical operating procedures before work is considered complete.
- Z. Extra Work or Costs to This Contractor Due to Other Contractors or Trades: Adjusted between this Contractor and offending Contractor at no extra cost to Owner. Notify Architect before such extra work is done.
- AA. Tests:

1. Upon completion of work and adjustment of all equipment, all systems shall be tested under direction of Owner's representative to demonstrate that all equipment furnished and installed and/or connected under provision of these Specifications shall function electrically in manner required. All tests shall be completed prior to final inspection of project.
2. All systems shall test free from short circuits and grounds and shall be free from mechanical and electrical defects. All circuits shall be tested for proper neutral connection.
3. All instrumentation and personnel required for testing shall be furnished by Contractor.

BB. Noise Control:

1. Perform electrical work to a manner in minimize transmission of noise and preserve acoustical properties of building structure.
2. Where equipment is mounted on vibration isolators, use flexible connections to reduce transmission of noise.
3. Where conduits pass through sleeves in interior walls, floors, or ceilings, completely fill space between each conduit and its sleeve to provide an airtight seal.
4. Use glass fiber material, "Duxseal" compound, for acoustic seals.

CC. Seismic Bracing Standards: All pipes, cable trays, conduits, etc. shall be supported and braced in accordance with SMACNA "Seismic Restraint Manual, Guidelines for Mechanical Systems", including Appendix B, "Additional Requirements for OSHPD" and "Addendum no. 1, September 2000". Comply with CBC, where requirements are more stringent than SMACNA, including, but not limited to the following:

1. Pipes and conduit shall be braced to resist the forces prescribed in California Building Code.
2. Where possible, pipes, conduit and their connections shall be constructed of ductile materials (copper, ductile iron, steel or aluminum and brazed, welded, or screwed connections.) Pipes, conduits and their connections, constructed of nonductile materials (e.g., cast iron, no-hub pipe and plastic), shall have the brace spacing reduced to one-half of the spacing allowed for ductile material in accordance with California Building Code or SMACNA Seismic Restraint Manual.
3. Seismic restraints may be omitted for the following conditions:
 - a. All piping suspended by individual hangers 12 inches or less in length from the top of the pipe to the bottom of the structural support for the hanger.
 - b. All electrical conduit less than 2.5 inches trade size.
4. For rigidly supported, electrical conduit, or cable trays, the product of C_{alp} need not to exceed 1.2 for any value of I_p .

5. All Trapeze assemblies supporting, cable trays and conduit shall be braced to resist the forces and relative displacements per ASCE 7 Chapter 13, considering the total weight of the elements on the trapeze.
 6. Conduit supported by a trapeze where none of these elements would individually be braced need not be braced if connection to the pipe/conduit of directional changes do not restrict movement of the trapeze. If this flexibility is not provided, bracing will be required when the aggregate weight of the pipes and conduit exceed 10 pounds/foot. The weight shall be determined assuming all pipes and conduits are filled with water.
- DD. Bracing Standards Application: Comply with bracing standards by evaluating the complete installation of all utilities and equipment, and providing a comprehensive solution based on Contractor's layout, coordination with other trades, and with the structural design and all other provisions for incorporating systems into the buildings. Show bracing products and layout in shop drawing submittals. The following criteria apply to the bracing of all systems:
1. The design parameters for determining the Total Design Lateral Force shall be as designated on the structural drawing.
 2. Seismic Hazard Levels (SHL) shall be as designated on structural drawings.
 3. Contractor shall submit documentation for each condition, which is not specifically covered in the SMACNA manual, including piping configurations and conditions, structural systems, structural connection methods, and other issues regarding the application of the standards.
 4. Provide expansion anchors, sized per SMACNA guidelines, for use in concrete.
 5. For connections to structural steel, wood framing, etc. provide bolted or welded connections, sized per SMACNA guidelines.
 6. Seismic bracing components consisting of structural shapes.
 7. Seismic bracing cable shall be galvanized steel, conforming to ASTM A603, zinc-coated with minimum 0.4 ounces/sf, pre-stretched, 7 x 19 strand, sized per SMACNA guidelines.
- EE. In hard ceiling space where access to j-boxes, detectors, etc is required, provide ceiling access panel, fire-rated typical.

END OF SECTION

SECTION 260190 SUPPORTING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Conduit and equipment supports.
 - 2. Fastening hardware.
- B. Related Work:
 - 1. Division 3 - Concrete.
 - 2. Section 260100 - Basic Materials and Methods.
 - 3. Section 260533 - Conduit.
 - 4. Section 260519 - Wire and Cable.
 - 5. Section 260534 - Boxes.
 - 6. Section 262416- Panelboards.
 - 7. Section 265100 - Lighting Fixtures.

1.03 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

1.04 COORDINATION

- A. Coordinate size, shape and location of concrete pads, concrete work - Section 03300.

PART 2 - PRODUCTS

2.01 MATERIAL

- A. Support Channel: Galvanized or painted steel.
- B. Hardware: Corrosion resistant.
- C. Concrete: See Division 3.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using beam clamps, or spring steel clips.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit, or to any vibrating equipment.
- D. Do not use powder-actuated anchors.
- E. Do not drill structural steel members without Structural Engineers approval.
- F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- G. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- H. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

END OF SECTION

**SECTION 260519
WIRE AND CABLE-RATED 600 VOLT**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Building wire.
 - 2. Ground Conductors.
 - 3. Wiring connections and terminations.
 - 4. Conductor Identification.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 260533 - Conduit.
 - 3. Section 260553 - Electrical Identification.
 - 4. Section 260526 - Grounding.

PART 2 - PRODUCTS

2.01 BUILDING WIRE

- A. Wires shall be single conductor type THHN or THWN insulated with polyvinyl chloride and covered with a protective sheath of nylon, rated at 600 volts. Wires may be operated at 90 degrees C. maximum continuous conductor temperature in dry locations, and 75 degrees C. in wet locations and shall be listed by UL Standard 83 for thermoplastic insulated wires, listed by Underwriter's Laboratories (UL) for installation in accordance with Article 310 of the California Electrical Code (CEC). Conductors shall be solid copper for 12 AWG and smaller conductors, and stranded copper for 10 AWG and larger conductors. Conductors shall be insulated with PVC and sheathed with nylon. Wires shall be identified by surface markings indicating manufacturer's identification, conductor size and metal, voltage rating, UL symbol, type designations and optional rating. Indentations for lettering are not permitted. Wires shall be tested in accordance with the requirements of UL standard for types THWN, or THHN.
- B. Conductors shall be solid Class B or stranded Class C, annealed uncoated copper in accordance with UL standards, or another Nationally Recognized Testing Laboratory (NRTL).
- C. Control Circuits: Copper, stranded conductor 600 volt insulation, THWN/THHN.

- D. Minimum branch circuit wiring: No. 12 AWG copper, 600 volt insulation.
- E. Minimum wire size except for control wiring: No. 14 AWG copper, 600 volt insulation.
- F. Wiring for fluorescent lighting fixtures mounted end-to-End: Type "THHN".

2.02 GROUND CONDUCTORS

- A. Equipment ground: Insulated conductor green in color.
- B. Isolated circuit ground: Insulated conductor green in color.
- C. Ground Wires: Bare copper or with green colored insulation.

2.03 CONDUCTOR ARRANGEMENT AND IDENTIFICATION

- A. Ties: T & B "Ty-rap" or 3M Company.
- B. Lacing: Nylon twine.
- C. Markers: Adhesive type, Brady.

2.04 CONDUCTORS

- A. All Wire: New and delivered to job site in unbroken packages.
- B. Each package shall bear Underwriter's and Manufacturer's labels and seals indicating date of manufacture and maximum allowable voltage.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Wires shall not be installed until debris and moisture is removed from conduits, boxes, and cabinets. Wires stored at site shall be protected from physical damage until they are installed and walls are completed.
- B. Wire-pulling compounds furnished as lubricants for installation of conductors in raceways shall be compounds approved and listed by UL, NRTL, or equal. Oil, grease, graphite, or similar substances are not permitted. Pulling of 2 AWG or larger conductors shall be performed with a cable pull machine. Any runs shorter than 50 feet are exempt. When pulling conductors, do not exceed manufacturer's recommended values
- C. At outlets for light, power, and signal equipment, pigtail splices with 8-inch circuit conductor leads for connection to fixtures, equipment, and devices.
- D. Pressure cable connectors, pre-insulated 3M Scotchlok, Hubbell Power, O-Z/Gedney or equal, Y, R or B spring-loaded twist-on type, may be furnished in splicing number 8 AWG or smaller wires for wiring systems; except public address and telephone systems.
- E. Joints, splices, taps, and connections to switchboard neutral, bonding or grounding conductors, conductors to ground busses, and transformer connections for wires 6 gage and larger shall be performed with high-pressure cable connectors approved for installation with copper conductors. Connectors shall be insulated with heavy wall heat shrink WCSM, or cold-applied roll-on sleeve RVS. Insulation level shall be a minimum of 600V and joints,

splices, and taps shall be qualified to ANSI C 119.1, UL, NRTL, or equal listed mechanical pressure connections.

- F. Connections to any bussing and high-pressure cable connectors shall be securely bolted together with corrosion-resistant plated carbon steel, minimum grade five machine screws secured with constant pressure-type locking devices.
- G. Connection of any bonding or grounding conductors shall be securely bolted together with corrosion-resistant plated carbon steel, minimum grade five machine screws secured with constant pressure-type locking devices.
- H. Wire switchboards, panel cabinets, pull boxes, and other cabinets except public address, shall be neatly grouped and tied in bundles with nylon ties at 10-inch intervals. In switchboards, panels and terminal blocks, wires shall be fanned out to terminals. If bundles are longer than 24 inches, a maximum of nine current carrying conductors may be bundled together.
- I. Install conductor lengths with a minimum length within the wiring space. Conductors must be long enough to reach the terminal location in a manner that avoids strain on the connecting lug.
- J. Maintain the conductor required bending radius.
- K. Neutral conductors larger than 6 gage, which are not color identified throughout their entire length, shall be taped, painted white or natural gray, or taped white where they appear in switchboards, cabinet, gutters or pull boxes. Neutral conductors 6 gage and smaller shall be white color identified throughout their entire length.
- L. Fire alarm and clock wiring shall be continuous from terminal cabinets or from equipment to each device. Splices are not permitted between devices and/or terminal cabinets at junction and pull boxes. Wiring shall be terminated at terminal blocks or devices only.
- M. Wiring systems shall be free from short circuits and grounds, other than required grounds. The contractor shall be responsible for the testing of feeder and branch circuit conductor's insulation resistance. The insulation of the conductors shall be tested prior to connections to any panelboards, switchboards, variable frequency drives, lighting control systems, ballasts, and wiring devices such as but not limited to GFI receptacles, TVSS receptacles, or equipment. Insulation testing of panelboards and switchboards shall be independently performed from the insulation testing of any conductors as specified in other sections of this specification.
 - 1. Utilize the services of an approved independent testing laboratory to perform megger time-resistance insulation testing of feeder conductors. Tests must be conducted with wires disconnected at both ends.
 - a. Provide calibration program records to assure the testing instrument to be within rated accuracy. The test equipment accuracy shall be in accord with the requirements stated by the National Institute of Standards and Technology (NIST).
 - b. Test equipment shall be provided with a label stating the date of last calibration. As a minimum the equipment shall have been calibrated within the past 12 months.
 - c. Test reports shall include the following:

- 1) Identification of the testing organization.
- 2) Equipment identification.
- 3) Ambient conditions.
- 4) Identification of the testing technician.
- 5) Summary of project.
- 6) Description of equipment being tested.
- 7) Description of tests.
- 8) Test results.
- 9) Analysis, interpretation and recommendations.

3.02 COLOR CODES

A. General Wiring:

1. Color code conductor insulation as follows:

SYSTEM VOLTAGE		
Conductor	208Y/120	480Y/277
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Natural Gray

Neutrals shall be colored-distinguished if circuits of two voltage systems are used in the same raceway.

2. For phase and neutral conductors 6 gage or larger, permanent plastic-colored tape may be furnished to mark conductor end instead of coded insulation. Tape shall cover not less than 2 inches of conductor insulation within enclosure.

B. Signal Systems: Wires for signal systems shall be color-coded. Except where otherwise specified, color-coding shall be as follows:

SYSTEM	COLOR CODE
Fire Alarm Horns	Pink (+) and Gray (-)
Fire Alarm Strobes	Orange (+) and Blue (-)
Un-Interruptible 24 Volt Power (Annunciator, Water Flow, and Audible Device)	Yellow (+) and White (-) Note: A single white wire may be common to both
Interruptible 24 Volt Power (4 wire smoke detectors, duct detectors)	Brown (+) and White (-) Note: A single white wire may be common to both
Switch-Leg Sprinkler Bell (Between water flow and audible device)	Violet (+) and White (-)
Door Holding Magnets (Non Power Limited)	Black (+) and White (-)

3.03 FEEDER IDENTIFICATION

- A. Feeder wires and cables shall be identified at each point the conduit run is broken by a cabinet, box, gutter, etc. Where terminal ends are available, identification shall be by means of heat shrink wire markers, which provide terminal strain relief. Markers shall be by Tyco Electronics, Panduit, Brady Perma-Sleeve, or equal. Identification in other areas shall be by means of wrap-around tape markers from Tyco Electronics, Panduit, Brady Perma-Code or equal. Markers shall include feeder designation, size, and description.

3.04 TAPE AND SPLICE KITS

- A. Splices, joints, and connectors joining conductors in dry and wet locations shall be covered with insulation equivalent to that provided on conductors. Free ends of conductors connected to energized sources shall be taped. Voids in irregular connectors shall be filled with insulating compound before taping. Thermoplastic insulating tape approved by UL, NRTL, or equal for installation as sole insulation of splices shall be furnished and shall be installed according to manufacturer's printed specifications.

3.05 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.06 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 260526 GROUNDING

PART 1 - GENERAL

1.01 Provide required grounding.

1.02 SYSTEM DESCRIPTION

- A. All metallic objects on the premises that enclose electrical conductors or that are likely to be energized by electrical currents shall be effectively grounded.
- B. All metal equipment parts such as enclosures, raceways, and equipment grounding conductors and all earth grounding electrodes shall be solidly joined together into a continuous electrically conductive system.
- C. All metallic systems shall be solidly interconnected to the electrical system as provided by the service entrance and for each grounded separately derived system that is installed.
- D. A separately derived A.C. source shall be grounded to the equipment grounding conductor and to a separate made electrode.
- E. Electrical continuity to ground metal raceways and enclosures, isolated from equipment ground by use of non-metallic conduit or fittings, shall be provided by a green insulated grounding conductor of approved size within each raceway connected to isolated metallic raceways, or enclosures at each end. Each flexible conduit shall be provided with a green insulated grounding conductor of approved size. In addition to using metallic conduits as ground, provide a ground wire sized per code in every conduit.
- F. Cold water or other utility piping systems shall not be used as the only source of grounding electrodes. Grounding electrodes shall be "made electrodes" specified as follows:
 - 1. Grounding electrodes as specified in Part 2 of this Specification.
 - 2. Concrete enclosed electrode, which is made up of at least 20'-0" of #4 AWG, minimum size, copper conductor, encased by at least 2" of concrete, located within or near bottom of a concrete foundation, or footing, which is in direct contact with earth. Footing rebar must be connected to copper wire using approved connections. An external electrode as specified in Article 2.01, Paragraph B of this Specification Section must be installed and connected to foundation or footing rebar.
- G. Non-current-carrying metal parts of high voltage equipment enclosure, signal and power conduits, switchboard and panelboard enclosures, motor frames, equipment cabinets, and metal frames of buildings shall be permanently and effectively grounded.
- H. Metallic or semi-conducting shields, and lead sheaths of cables operating at high voltage, shall be permanently and effectively grounded at each splice and termination.
- I. Neutral of service conductors shall be grounded as follows:
 - 1. Neutral shall be grounded at only one point within school site for that particular service. Preferable location of grounding point shall be at service switchboard, or main switch.

2. Equipment and conduit grounding conductors shall be bonded to that grounding point.
 3. If other buildings on campus are served from a switchboard or panelboard in another building, power supply is classified as a feeder and not as a service.
 4. Equipment grounding conductor is carried from switchboard to each individual building. At building, grounding conductor is bonded with power equipment enclosures, metal frames of building, etc., to "made electrode" for that building.
 5. Neutral of feeder shall not be grounded.
- J. If there is a distribution transformer at a building, secondary neutral conductor shall be grounded to "made electrode" serving building.
- K. Within every building, main switchboard or panel, shall be bonded to a 1" or larger cold water line with a 1" conduit with one #6 wire. Metallic piping systems (gas, fire sprinkler, etc.) shall be bonded to cold water line with 3/4" conduit with one #8 wire.

PART 2 - PRODUCTS

2.01 YARD BOXES

- A. Yard boxes shall be precast concrete and shall be approximately 14" wide, 19" long, and 12" deep (outside dimensions), or larger, if necessary, to obtain required clearances. Boxes shall be equipped with bolt-down, checkered, cast iron covers and a cast iron frame cast into box. Yard boxes shall be Brooks 36 or approved equal.

2.02 ELECTRODES

- A. "Made" electrodes shall be approved copper-clad steel ground rods, minimum 3/4" diameter, 10'-0" long.

2.03 GROUND ENHANCEMENT MATERIAL

- A. Ground enhancement material as manufactured by Erico Electrical Products shall be used packed inside a 3" diameter hole around ground rod. Manufacturer's installation instructions must be followed for each ground rod installation.

PART 3 - EXECUTION

3.01 ELECTRICAL DEVICES

- A. Grounding electrodes shall be located in nearest usable planting area, where not otherwise indicated on Drawings, and each electrode shall terminate within a concrete yard box installed flush with finish grade. In planting areas, concrete yard box shall be 2" above planting surfaces.
- B. If concrete enclosed electrode is used, grounding wire shall terminate to a suitable copper plate with grounding lugs.
- C. Grounding rods shall be driven to a depth of not less than 8'-0". A permanent ground enhancement material as manufactured by Erico Electrical Products shall be used at each ground rod to improve grounding effectiveness. The manufacture's guidelines shall be used for each installation.

- D. Grounding electrodes shall have a resistance to ground of not more than 5 ohms.
- E. When using grounding rods, if resistance to ground exceeds 5 ohms, 2 or more rods connected in parallel shall be provided to meet grounding resistance requirement.
- F. Ground rods shall be separated from one another by not less than 10'-0"
- G. Parallel grounding rods shall be connected together with approved fittings and approved grounding conductors in galvanized rigid steel conduit, buried not less than 12" below finish grade.
- H. Electrical Contractor shall include in his bid, cost of services of an approved independent testing laboratory, to test grounding resistance of all made electrodes, ground rods, and bonding of building steel, water pipes, gas pipes and other utility piping. Tests to be performed are as follows:
 - 1. Visually and mechanically examine ground system connections for completeness and adequacy.
 - 2. Perform "fall of potential" tests on each ground rod or ground electrode where suitable locations are available per IEEE Standard No. 81, Section 8.2.1.2. Where suitable locations are not available, measurements will be referenced to a known dead earth or reference ground.
 - 3. Perform the two point method test per IEEE No. 81, Section 8.2.1.1 to determine ground resistance between ground rod and building steel, and utility piping - such as water, gas and panelboard grounds. Metal railings at building entrances and at handicapped ramps shall also be tested.
 - 4. Test shall be conducted in presence of the District Electrical Inspector.
- I. Three copies of test results shall be submitted to the District Electrical Inspector. Test results shall be submitted on an official form from the independent testing laboratory showing project location, test engineer, test conditions, test equipment data, ground system layout or diagram, and final test results.

END OF SECTION

SECTION 260533 CONDUIT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Rigid metal conduit and fittings.
 - 2. Intermediate metal conduit and fittings.
 - 3. Electrical metallic tubing and fittings.
 - 4. Flexible metal conduit and fittings.
 - 5. Liquidtight flexible metal conduit and fittings.
 - 6. Non-metallic conduit and fittings.

PART 2 - PRODUCTS

2.01 RIGID STEEL CONDUIT AND FITTINGS

- A. Rigid Steel Conduit: Hot dipped galvanized inside and out, galvanized threads, mild steel, zinc coated, inside and outside protective coating. Standard lengths: 10'-0".
- B. Bushings: Threaded insulated metallic type except sizes 1" and smaller may be non-metallic type. Setscrew bushings are not acceptable.
- C. Couplings, elbows, bends and other fittings: Same material and finish as rigid steel conduit. All shall be threaded type.

2.02 INTERMEDIATE METAL CONDUIT (IMC) AND FITTINGS

- A. Conduit: Galvanized steel, zinc coated, protective coating inside and out.
- B. Fittings and Conduit Bodies: Use fittings and conduit bodies specified above for rigid steel conduit.
- C. Conduit: May be used in lieu of rigid steel conduit where permitted by code, except in concrete, underground, runs longer than 100 feet for all power feeders with conduit greater than 2 inches.

2.03 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. Conduit: Hot dipped galvanized or sherardized inside and out, zinc coated with protective enamel coating inside. Provide bushings at ends of conduits.
- B. Connectors: Steel, insulated, bused tap-on or wrench tightened compression type. (Couplings similar) Indentor or screw type not acceptable.
- C. Conduit: May be used in lieu of rigid steel conduit where permitted by code, except exposed, in concrete and for runs more than 100' for all power feeders with conduit greater than 2 inches.

2.04 FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: Steel single strip, hot dipped galvanized on all 4 sides prior to fabrication. Flexible aluminum conduit will not be allowed.
- B. Connectors: Die cast with ridges that thread into conduit. (Binding screw type connectors are not acceptable.)
- C. Conduit: May be used in lieu of rigid steel conduit where specifically indicated; at connections to vibrating equipment; at drops to light fixtures from J-boxes; at locations judged by Architect impractical to use rigid conduit. Maximum length for any application shall be 6 feet.

2.05 LIQUIDTIGHT FLEXIBLE CONDUIT AND FITTINGS

- A. Conduit: Steel, single strip, hot dipped galvanized on 4 sides prior to fabrication.
- B. Connectors: Insulated, special Appleton "STN" Series.
- C. Jacket: Liquidtight, polyvinyl chloride plastic.
- D. Conduit: Use for final connection to motor terminal boxes and transformers. Use at exterior locations, damp locations, wet locations and for flex connections in kitchen, restrooms and similar areas.

2.06 PLASTIC CONDUIT AND FITTINGS

- A. Conduit: Extruded, virgin polyvinyl chloride compound, Schedule 40, heavy wall, in 10'-0" lengths with couplings.
- B. Fittings: Non-threaded type couplings.
- C. Conduit: May be used underground only. Vertical elbows and risers of all sizes shall be rigid steel with 20 mil bonded PVC coating.

2.07 CONDUIT SUPPORTS

- A. Conduit Clamps, Straps, and Supports: Steel or malleable iron. Clamps: Unistrut Nos. P111 thru P1124, Kindorf No. C105. Straps: One or two hole as required.
- B. Conduit hangers, racks and trapezes: Steel, threaded rods, channel iron "U" shaped racks equal to "Unistrut".
- C. Individual conduit hangers: Steel, threaded rods with malleable iron split rings.

- D. Hanger rods: 3/8" minimum diameter for 2" and smaller conduit, factory made. 1/2" minimum for 2-1/2" and larger conduit.
- E. Wire supports: 12 gauge zinc coated iron tie wire, or 16 gauge galvanized double annealed steel tie wire.

2.08 CONDUIT ROOF JACKS AND FLASHING

- A. Roof Jacks:
 - 1. For Single Conduits Through Roof: Stonemen Stormtite Series #1100-4; seamless 4 pound lead flashing assembly, 8" skirt, steel reinforced varipitch boot; caulk type cast iron counterflashing sleeve, with vandalproof set screws, and Perma-seal waterproofing compound.
 - 2. Sleeves for Conduits: Sleeves shall be adjustable type, of 26 gage galvanized iron, Adjust-to Crete Co. Adjust-to-Crete, or Jet Line Products Inc. Jet-Line, or equal.
 - 3. Where conduit enters a building through a concrete foundation below grade, or ground water level, or where it is necessary to seal around a conduit where it passes through a concrete floor or wall, provide O-Z/Gedney Type FSK Thru Wall and Floor Seal, or equal.

2.09 CONDUIT PULLING CORDS

- A. Pull Wire: No. 12 galvanized iron or nylon pull wire rated 250 pounds tensile strength.

2.10 CONDUIT FITTINGS, ELLS AND BUSHINGS

- A. Special conduit fittings: Crouse-Hinds "Condulets" or Appleton "Unilets".
- B. Ells: Same quality, same finish and same make as conduit.
- C. Bushings: Thomas & Betts or approved equal.
- D. Seismic separations and expansion joints: OZ type "AX" complete with bonding strap and clamps. At exterior locations use OZ type "EX".

2.11 CONDUIT SEALS AND SEALING COMPOUND

- A. Vertical seals: Crouse Hinds type "EYD" or Appleton type "SF".
- B. Horizontal Seals: Crouse Hinds type "EYS" or Appleton type "ESU".
- C. Sealing compound: Crouse Hinds "CHICO" or Appleton "APELCO".
- D. Fireproofing Compound: Dow Corning No. 3-6548 RTV or equal by 3M Company or Nelson.

2.12 UNDERGROUND SPACERS FOR PVC CONDUIT

- A. Spacers: PVC, interlocking type, intermediate and base styles.
- B. Sizes: For 2" to 4" conduit.

C. Manufacturer: Carlon or approved equal.

2.13 SPECIAL UNDERGROUND COUPLINGS FOR PVC CONDUIT

A. Expansion couplings: PVC type to expand up to 4".

B. Couplings: Socket type for joining PVC conduit.

C. Adapters: Socket type at one end for PVC conduit and threaded female type at other end for metallic connection.

2.14 PLASTIC CONDUIT CEMENT

A. Solvent weld cement: Fast drying, brush-on type.

2.15 MC CABLE

A. Metal Clad (MC) cable system is not allowed.

PART 3 - EXECUTION

3.01 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

A. Arrange conduit to maintain headroom and present a neat appearance.

B. Unless indicated otherwise, conceal conduit within or behind finished walls and ceiling.

C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.

D. Maintain minimum 6 inch clearance between conduit and piping. Maintain 12 inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.

E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.

F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

H. Do not support conduit from any equipment subject to vibration. Support from structural members only.

I. Structural Considerations for Conduit Routing:

1. Where conduits are to pass through or will interfere with any Structural member, or where notching, boring or cutting of the structure is necessary, or where special openings are required through walls, floors, footings, or other buildings elements, to accommodate the electrical work, such work shall conform to State Building Code.

2. Where conduits are terminated in groups at panelboards, switchboards and signal cabinets, etc., provide templates or spacers to hold conduits in proper position and to preserve alignment. Conduits terminating at signal cabinets shall enter cabinets in following approved locations only: Conduits entering top, side, and bottom of cabinets shall be aligned in a single row, centered 2" from rear of cabinet; conduits entering back of cabinet shall be aligned in a single row centered 2" from top of cabinet. Conduits shall not be spaced closer than 3" on centers.
3. 1" and smaller conduits above metal lath ceilings shall be tied to ceiling channels. 1-1/4" conduits above metal lath ceilings shall be rigidly suspended with pipe hangers or pipe racks or shall be secured to superstructure with factory made pipe straps. Conduits in metal lath or steel stud partitions, shall be tied to furring channels or studs. In ceiling spaces and in partitions, tie wires shall be spaced not more than 5'-0" apart, shall hold conduit tight against channels and studs at point of tie and shall not bear any of weight of conduit. Tie wire shall be #16 gage galvanized double annealed steel tie wire.
4. Where auxiliary supports, saddles, brackets,, etc., are required to meet special conditions they shall be made rigid and secure before conduit is attached thereto.
5. Conduit in ceiling spaces, in stud walls and under floors shall be supported with factory made pipe straps or shall be suspended with pipe hangers or pipe racks. Pipe straps shall be attached to and shall hold conduit tight at point of support against ceiling and floor joists, rafters, and wall studs, or 2" x 4" headers fitted between joists or wall studs.
6. Conduits installed on exposed steel trusses and rafters shall be fastened with factory made conduit straps or clamps which shall hold conduit tight against supporting member at point of support.
7. Conduits under buildings shall be strapped with factory made conduit straps to underside of concrete floor or joists, or wood floor joists, or shall be suspended with pipe hangers or pipe racks. Conduits under building shall not rest on ground but shall be suspended from building or shall be buried below surface of ground. 1" and larger conduits under buildings shall be suspended with conduit hangers or racks.
8. Pipe hangers for individual conduits shall be factory made, consisting of a pipe ring and threaded suspension rod. Pipe ring shall be malleable iron, split and hinged, and shall securely hold conduit, or shall be springable wrought steel. Rings shall be bolted to or interlocked with suspension rod socket. Rods shall be 3/8" for 2" conduit hangers and smaller and shall be 1/2" for 2-1/2" conduit hangers and larger.
9. Pipe racks for groups of parallel conduits and for supporting total weights not exceeding 500 pounds shall be trapezed type and shall consist of a cross channel, Steel City Kindorf #B-900, Unistrut #P-1000 suspended with a 3/8" minimum diameter steel rod at each end. Each rod shall be fastened with nuts, top and bottom to cross channel and with a square washer on top of channel. Each conduit shall be clamped to top of cross channel with conduit clamps, Steel City Kindorf #C-105 or Unistrut Nos. P-1111 through P-1124. Conduits shall not be stacked one on top of another, but a maximum of 2 tiers maybe on same rack providing an additional cross channel is installed. Where a pipe rack is to be longer than 18", or if weight it is to support exceeds 500 pounds, submit details of installation to the Architect for approval.

10. Factory-made pipe straps shall be one or 2-hole formed galvanized clamps, heavy duty type, except where otherwise specified.
11. Hangers straps, rods, or pipe supports under concrete shall be attached to inserts set at time concrete is poured. Under wood use bolts, lag bolts, or lag screws; under steel joists or trusses use beam clamps.

3.02 CONDUIT INSTALLATION

- A. Cut conduit square using a saw or pipe cutter; de-burr cut ends.
- B. Bring conduit to the shoulder of fittings and couplings and fasten securely.
- C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.
- D. Install no more than equivalent of two 90- degree bends between boxes for conduits 2" diameter and larger, three for conduit under 2" diameter. Locate pull boxes as required.
- E. Use conduit bodies to make sharp changes in direction, as around beams.
- F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inch size.
- G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.
- H. Support rigid, intermediate and thin wall conduit at 8'-0" maximum on centers and 3'-0" from junction boxes.
- I. Support flexible and liquidtight flexible conduit at 4'-0" maximum on centers and 12" from junction boxes.
- J. PVC conduit: Use underground only. Encase in 3" concrete (2000 psi) envelope except under building.
- K. Provide No. 12 AWG insulated conductor or suitable pull string in empty conduit, except sleeves and nipples.
- L. Install expansion-deflection joints where conduit crosses building expansion or seismic joints.
- M. Where conduit penetrates fire-rated walls and floors, seal opening around conduit with UL listed fire barrier, "3M" caulk or equal.
- N. Route conduit to roof mounted devices and equipment through roof jacks. Provide flashing/roof jacks for all new and existing conduits which penetrate roof to appropriate Roofing Section(s) for installation.
- O. Run conduit to equipment on roof concealed in attic space. Penetrate roof at equipment locations only.
- P. For conduits to roof mounted HVAC equipment, penetrate roof with roof jacks outside footprint of HVAC units. Do not penetrate roof inside HVAC units.

- Q. Conduit underground may be rigid conduit and in these conditions shall be given two heavy coatings of a suitable primer and a single half lapped layer of protective plastic tape. Primer and tape shall be "Scotchrap" No. 50 tape. Primer and tape shall be "Scotchrap" Primer or Trantex V-10 tape and Dutch Brand Primer. Primer and tape shall be in strict accordance with manufacturer's instructions. As an alternate, conduit and fittings shall have a PVC bonded coating (40 mil thickness minimum) by Occidental Coating Company.
- R. Where conduit is installed underground, under slabs on grade, exposed to weather or in wet locations, make joints liquidtight and gastight.
- S. For underground or underslab conduit, apply a heavy coat of Pabco P & B No. 2 paint to all surfaces within 6" each side of fittings and to areas where wrenches or other tools have been applied. On exposed conduit, repair scratches and other defects with galvanizing repair stick, Enterprise Galvanizing "Galvabar".
- T. Cut threads on rigid conduit to standard taper and to a length such that all bare metal exposed by threading operation will be completely covered by couplings or fittings used. In addition, cut lengths of thread such that all joints will become secure and wrench tight just preceding point where conduit ends would butt together in couplings and where conduit ends would butt into ends or shoulders of other fittings. Securely tighten all threaded connections.
- U. Encase all underground primary and secondary electric service conduits in concrete envelopes with a minimum 3" cover all around from end-to-end. Provide concrete with a compressive strength of not less than 2,000 psi at 28 days of age. Provide red concrete encasement for systems over 600-volt. Space multiple conduit not less than 3" apart. Use factory made conduit spacers to stagger connections or couplings for neater installation. Tie conduit to spacers and anchor system to prevent dislodgement. Provide personnel to inspect during pouring to prevent displacement of conduit.
- V. Make joints in rigid conduit installed in concrete or masonry liquid-and-gas-tight, with red lead and oil, or other approved joint compound and engage not less than five threads.
- W. Keep bends and offsets in conduit runs to an absolute minimum. Replace all deformed, flattened or kinked conduit. Provide large radius factory made bends or power bend rigid metal conduit of 1-1/4" trade size or larger.
- X. Place sleeves for electrical conduit passing through walls, beams or slabs before concrete is poured (exception-floor slabs on earth). Where conduit passes through suspended floor slabs, outside of chases, sleeves shall be standard weight black steel pipe extending 1-1/2" above the finished floor level. Sleeves at other locations shall be either lightweight galvanized steel tube, or galvanized sheet steel, with a minimum thickness of 24 USSG. Clearance between conduit and sleeves shall be not less than 1/2". Sleeves through outside walls below grade shall be caulked tight. Caulk with oakum and mastic to obtain watertight joint.
- Y. Penetration Membrane: Where penetration cannot be avoided, cut and re-seal membrane at point of penetration.
- Z. Provide minimum 3/4" conduit size underground.
- AA. Run exposed conduit parallel with or at right angles to building line, beams, or ceilings. Place symmetrical bends or metal boxes at changes in direction or taps.

- BB. Stub from each panel which is flush mounted in a wall, from top of panel a minimum of 3-3/4" conduits to nearest ceiling space or other accessible locations and cap for future use. Tag to indicate panel origination.
- CC. Independently support conduit rising from floor for motor connections if over 24" above floor. Support shall not be a motor or duct work which may transmit vibrations.
- DD. Provide pull wire in all conduit runs indicated as conduit only (C.O.).
- EE. Do not run conduit closer than 12" to any hot water pipe, steam pipe, heater flue or vent.
- FF. Terminate conduit stub-ups through floor for connection to equipment of junction boxes in couplings flush with top of concrete slab floor.
- GG. Within building, bury underground conduit a minimum of 6" below bottom of slab.
- HH. Use rigid metal conduit where legally required, where exposed to weather, where located in unheated areas, or where subject to mechanical injury, here defined as exposed conduit less than 7'-6" above floor in areas accessible to anyone other than authorized operating or maintenance personnel.
- II. Where a conduit from one structure crosses to another structure, e.g., from a building to an arcade or from one arcade to another arcade, use a section of liquid-tight flex conduit at the crossing with sufficient slack to allow the two structures to move during an earthquake without breaking the conduit. For stub up to relocatable buildings, provide liquid-tite flex from stub up to first box on back of building.
- JJ. Provide PVC deflection - expansion joint fittings where underground run passes through expansion joint or is necessary for seismic conditions.
- KK. Provide a green insulated ground wire in all flexible conduit runs regardless of length.
- LL. Wipe plastic conduit (PVC) clean before joining. Apply even coat of cement to entire area to be inserted into fitting. Let joint cure for 20 minutes minimum. Use approved solvent-weld cement specifically manufactured for purpose. Threading of PVC conduit is prohibited.
- MM. Install an equipment ground (green) insulated conductor in each non-metallic conduit.
- NN. Do not install PVC conduit above grade for any reason. Seal both ends of all PVC conduit runs at each junction box or conduit interruption with sealant. Seal steel conduit risers to panelboards, switchboards, or pullboxes from underground PVC conduit runs.
- OO. Flash and counterflash all conduit runs passing through roof.
- PP. Use electrical metallic tubing above grade in dry locations only and where not subject to mechanical injury or otherwise prohibited. Concrete and masonry in contact with earth are not considered dry locations.
- QQ. Use liquid tight flexible conduit for final connections to motors and vibrating equipment. Use flexible conduit where required for equipment servicing for connections to recessed lighting fixtures from nearby accessible junction boxes, and for concealed runs in dry locations where structural conditions prevent use of other types of conduit.

RR. For conduits for computer cables and coax cables, use large radius bends. Do not use j-box or pull box to change direction. Install boxes at straight conduit sections only and sweep conduit to make turns. Do not use conduit fittings to change directions.

SS. Minimum radius for conduits designated for computer LAN wiring, coax cable wiring, data wiring, fibre-optics wiring, and TV cable wiring shall be as follows:

3/4"C	-	12"
1"C	-	12"
1-1/4"C	-	18"
2"C	-	24"
2-1/2"C	-	24"
3"C	-	30"
3-1/2"C	-	30"
4"C	-	30"
5"C	-	36"
6"C	-	42"

TT. Size all conduits as legally required or larger where indicated or preferred. Where portions of a conduit run are increased in size, for whatever reason, make all remaining portions in that run same size.

UU. Mark all underground conduit stub-outs with a 6 inch square by 2 foot deep concrete block with an embedded brass nameplate indicating the origin of conduit.

VV. Do not cut concrete, masonry or structural members except where approved by Architect.

WW. Underground Requirements:

1. Except for branch circuit conduits and auxiliary system branch circuits within a building, all conduits installed underground shall be entirely encased in concrete (2000 psi), 3" thick on all sides with multiple conduits spaced not less than 3" apart, except where otherwise specified. Provide approved conduit spacers as required to prevent any deflection of conduits when concrete is placed and to preserve position and alignment of conduits in concrete. Conduits shall be tied to spacers. Anchors shall be installed to prevent floating of conduits during pouring of concrete. Red concrete shall be used to encase conduits of systems operating above 600 volts. To protect conduits from underground to surface wall mounted panels, terminal cabinets, etc., encase conduits in 3" high concrete curb.
2. Assemble sections of conduit with approved fittings and stagger all joints. Cut ends of conduit shall be reamed to remove all rough edges. Joints in all conduits shall be made liquid-tight. All bends at risers shall be completely below surface where possible.
3. Two or more conduit runs in a common trench shall be separated by at least 3" of concrete. Conduit runs installed in a common trench with other utility lines and water, gas, sew lines, shall be separated from such lines by at least 12" horizontally. Power conduits shall be separated from low voltage signal conduits by 6" of concrete.
4. Slope underground conduits between two pull boxes towards one of the boxes to avoid water and moisture trap. For underground conduits coming out of a building, slope conduits towards the first pull boxes. Take care to install underground conduits such that water cannot travel through underground pull

boxes and conduits back into a building. Prevention method shall include but not limited to installing pull boxes with draining provision where conduits enter building, sealing both ends of each conduit water tight, etc.

5. Provide electronic markers to identify conduit stub locations at property lines, as required by electric service utility company.
6. All underground conduit systems for use by service utility company shall meet all requirements of utility company.

3.03 EXCAVATION AND BACKFILL

- A. Include all excavation and backfilling required for work under this Section.
 1. Bury underground conduit at least 27 inches below finished grade to top of conduit encasement.
 2. Underground branch circuit conduit, within building limits, 6" below bottom of slab unless specifically indicated otherwise in these specifications.
 3. After installation of work has been inspected and approved, backfill trenches with clean earth, moistened and layer tamped to same compaction density as specified for both building and site locations under "Earthwork".
- B. Locate existing underground pipes by use of electronic locating devices and exercise utmost care in excavation work. Contractor is responsible for satisfactory repair of any underground utility line damaged as result of his excavation.
- C. Trenches or any other excavation required for installation of electrical work, which are outside of barricaded working area, shall be barricaded at all times with continuous portable barricades. At completion of work, remove barricades from site. Backfill trenches and excavations outside of barricaded working area immediately after approval of conduit work by Inspector.
- D. Where asphalt concrete has been cut, backfill up to existing grade.
- E. Do not start excavations until approval is obtained from Inspector.

END OF SECTION

SECTION 260534 BOXES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Wall and ceiling outlet boxes.
 - 2. Pull and junction boxes.
 - 3. Sealant.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 260533 - Conduit
 - 3. Section 262726 - Wiring Devices.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS-OUTLET BOXES

- A. Raco
- B. Steel City
- C. Bowers

2.02 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: One piece galvanized, pressed steel, knockout type, 4-11/16" sq. by 2-1/8" deep in all locations unless otherwise indicated or required.
- B. Cast Boxes: Aluminum, or Cast ferrous alloy, deep type, gasketed cover, threaded hubs.
- C. Where Wiremold type box have to be used, e.g., on existing concrete wall, provide proper box such that the total depth of a box including the device mounted on the box, will not exceed 4 inches.

2.03 ACCEPTABLE MANUFACTURERS-FLOOR BOXES

- A. Hubbell
- B. Walker Parkersburg

C. Steel City

2.04 PULL AND JUNCTION BOXES

- A. Interior and non-weatherproof boxes shall be constructed of blue or galvanized steel with ample laps, spot welded, and shall be rigid under torsional and deflecting forces. Boxes shall have auxiliary angle iron framing where necessary to ensure rigidity. Covers shall be fastened to box with a sufficient number of brass machine screws to ensure continuous contact all around. Flush type boxes shall be drilled and tapped for cover screws at Site if boxes are not installed plumb. All surfaces of pull and junction boxes and covers shall be given one coat of metal primer, and one coat of aluminum paint.
- B. Weatherproof pull and junction boxes shall conform to foregoing for interior boxes with following modifications: Cover of flush mounting boxes shall have a weather-tight gasket cemented to and trimmed even with cover all around. Surface or semi-flush mounting pull and junction boxes shall be UL approved as rain-tight and shall be complete with threaded conduit hubs. All exposed portions of boxes shall be galvanized and finished with a prime coat and coat of baked-on gray enamel.
- C. All junction and pull-boxes shall be rigidly fastened to the structure and shall not depend on conduits for support.
- D. Underground Concrete Pull Boxes:
1. Precast Concrete Pull Boxes. Concrete pull boxes shall be traffic type, reinforced for HS20-44 Traffic bridge loading, precast concrete. Pull boxes with inside dimensions 2'-0"x 3'-0" x 3'-0"D shall consist of a base section, top ring and cover. Base section shall have a minimum of two 10"x10" knockouts in each 3'-0" side, and one 20"x20" knockout in each 2'-0" side. Pull boxes with inside dimension 4'-0 x 4'-0"x 4'- 0"D or larger shall consist of a base section, mid section, topping, and cover. Base section shall have a minimum of two 8"x 16" knockouts on each of two opposite sides, and one 20" x 20" knockout on each of the other two opposite sides. All pull boxes shall have a minimum of 6" diameter sump knockout, and 1" diameter ground rod knockout. In each pull box, furnish and install cable racks on walls. Each rack shall be equipped with 3 porcelain cable holders on a vertical steel mounting bar. Each pull box shall have 3/4" diameter pull irons. Covers shall be traffic type consisting of steel safety plate bolted to frame. Covers shall be marked "Electrical", "Power" "Telephone", "Signal" or "Ground", as required. Pull boxes shall be as manufactured by Quickset, or approved equal. Knockout requirements as stated above is minimum requirement. Contractor is responsible for providing pull boxes with the proper knockouts to accept the conduits as shown on the drawings. Depth of pull boxes as shown is the minimum requirement. Provide deeper pull boxes as required to accommodate conduits and minimum conduit cover requirements. All conduits must enter pull boxes in a straight horizontal line.
 2. Provide end bells in all duct entrances. Terminate each metal conduit with insulated bushing having grounding terminal, O.Z. Type "Big"
 3. Place pulling irons on opposite walls and below horizontal centerlines of ducts and bricked-up openings, and in bottom. Install pulling irons with each end hooked around a reinforcing bar.
 4. Remove floor drain knockout and provide a depth of 24 inches of crushed rocks below box extending a minimum of 12 inches beyond all 4 sides.

5. Identify all power and signal cables by tagging in all manholes and pull boxes. Tie securely to cables with nylon cord or insulated type TW wire. Tie so that turns of wires do not form a closed electrical circuit, loop wires all around pull box perimeter at least one time to allow for slack in the wire run. All cables, power or signal must be supported by the cable racks. Cables shall not be resting on the bottom of a pull box.
 6. Top of steel plate shall have a minimum co-efficient of static friction of 0.5 for either wet or dry conditions, when tested for any shoe sole material. Testing and certification of the friction factor shall be conducted by an independent testing laboratory approved by the engineer, under the direction of a registered Civil or Quality Engineer. Testing shall conform to ASTM D1047 or F489 or F609, or other procedure approved by the Engineer.
 7. Where flexible conduits or boxes are used within a concrete pull box to separate systems, such conduits and boxes shall be non-metallic type.
- E. Underground utility boxes shall be reinforced concrete with non-setting shoulders to prevent settlement following installation. Boxes shall be furnished with cast iron cover with finger hole, size as indicated on Drawings. Utility boxes shall be as manufactured by Quickset, or approved equal.
 - F. Manholes, vaults and pull-boxes required by utility company, and installed by Electrical Contractor, shall meet all requirements of utility company.
 - G. Cast Metal Boxes for Outdoor and Wet Location Installations: Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as rain-tight. Galvanized cast iron OR Cast aluminum box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

2.05 ACCEPTABLE MANUFACTURERS-SEALANT

- A. Crouse Hinds "CHICO"
- B. Permacel
- C. Ductseal

2.06 ACCEPTABLE MANUFACTURERS - FIRE PROOFING SEALANT

- A. Dow Corning
- B. 3M Company
- C. Nelson

PART 3 - EXECUTION

3.01 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.

- B. Electrical box locations shown on Contract Drawings are approximate unless dimensioned. Verify exact location of floor boxes and outlets in offices and work areas with Owner's representative prior to rough-in.
- C. Locate and install boxes to allow access.
- D. Locate and install to maintain headroom and to present a neat appearance.

3.02 OUTLET BOX INSTALLATION

- A. Unless otherwise noted on plan or specifically allowed by the Engineer, conceal all boxes flush in wall or in ceiling space above drop ceiling. In finished areas and where it is not possible to conceal conduits and boxes, for example, on existing concrete wall, provide Wiremold type metallic surface raceways and boxes.
- B. Do not install boxes back-to-back in walls. Provide minimum 6 inch separation, except provide minimum 24 inch separation in acoustic-rated walls.
- C. Provide knockout closures for unused openings.
- D. Support boxes independently of conduit except for cast box that is connected to two rigid metal conduits, both supported within 12 inches of box.
- E. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
- F. Install boxes in walls without damaging wall insulation.
- G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- H. Position outlets to locate lighting fixtures as shown on reflected ceiling plans.
- I. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed lighting fixture, to be accessible through lighting fixture ceiling opening.
- J. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs. Accurately position to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes. Install plaster rings to interface with equipment to be mounted thereon.
- K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- L. Provide cast outlet boxes in exterior locations and wet locations. Provide cast bell-boxes at interior locations where box is exposed to view. (do not use regular 4/s or handy box with exposed knockouts and unfinished appearances for these interior exposed applications).
- M. Where boxes are installed in fire rated ceiling or walls, be responsible for preserving integrity of fire rating as required.
- N. In fire-rated wall, use 4" square deep boxes. Do not aggregate more than 100 square inches of boxes for any 100 square feet of wall or partitions. Separate outlet boxes on opposite sides of walls or partition by a minimum horizontal distance of 24 inches. Where

the separation cannot be achieved due to site condition, provide 2-hour rated fire-proof material behind boxes to maintain fire rating of walls.

3.03 PULL AND JUNCTION BOX INSTALLATION

- A. Locate pull boxes and junction boxes above accessible ceilings or in unfinished areas.
- B. Support pull and junction boxes independent of conduit.

END OF SECTION

SECTION 260553 ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Nameplates.
 - 2. Wire and cable markers.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 260533 - Conduit.
 - 3. Section 260519 - Wire and Cable -Rated 600 Volt.
 - 4. Section 260534 - Boxes.
 - 5. Section 260923 - Contactors and Time Switches.
 - 7. Section 262816 - Disconnect Switches.
 - 8. Section 260526 - Grounding.
 - 9. Section 262416 - Panelboards.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background.
- B. Wire Markers: Cloth markers, split sleeve or tubing type.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.

- C. Secure nameplates to equipment fronts using screws or rivets. Secure nameplate to outside face of panelboard doors.
- D. Embossed tape will not be permitted for any application.

3.02 WIRE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboard gutters, pull boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings for control wiring.

3.03 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
- B. Panelboards, Switchboards, and Distribution Sections: 1/4 inch identifying equipment designation; 1/8 inch identifying voltage rating and source. Provide nameplates on load centers furnished with relocatable buildings. Nameplates for relocatable buildings shall match description on circuit breakers or switches at switchboards or panelboards feeding the buildings.
- C. Individual Circuit Breakers, Switches, Motor Starters in Panelboards, and Distribution Sections: 1/8 inch identifying circuit and load served, including location.
- D. Individual Circuit Breakers, fused and non-fused disconnect Switches, and Motor Starters: 1/8 inch identifying load served.
- E. Emergency Power Units: 1/4 inch identifying equipment designation; 1/8 inch identifying incoming and outgoing voltages.
- F. Exterior metal pull boxes: 1/4 inch identifying systems in boxes.
- G. Terminal Cabinets: 1/4 inch identifying systems.

3.04 MARK CONDUCTOR RUNS

- A. Apply markers after conductors installed in conduits.
- B. Apply in panelboards and in junction boxes.
- C. Mark feeders in panelboards, switchboards and distribution sections.

3.05 MARK JUNCTION BOXES

- A. Mark covers of junction boxes with non-erasable marker to indicate circuit numbers or systems contained within boxes.
- B. Mark fire alarm boxes with red marker and identifying as "FA".
- C. Paint fire alarm conduits red at intervals such that conduits can be clearly identified for fire alarm system.

END OF SECTION

**SECTION 260921
ELECTRICAL-HVAC-PLUMBING COORDINATION**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
1. Coordination with HVAC and Plumbing Sections of work.
 2. Electrical components, wiring and connections to electrical HVAC and Plumbing equipment.
- B. Related Work:
1. Section 260100 - Basic Materials and Methods.
 2. Section 260533 - Conduit.
 3. Section 260519 - Wire and Cable.
 4. Section 260534 - Boxes.
 5. Section 262813 - Fuses.
 6. Section 260190 - Supporting Devices.
 7. Section 260553 - Electrical Identification.
 8. Section 262816 - Disconnect Switches.

1.03 QUALITY ASSURANCE

- A. Size fuses in accordance with manufacturer's published data and equipment nameplate information.
- B. Confirm with Mechanical Contractor correct sizes of all starter heater sizes.

1.04 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Section 01720 and Section 01600.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Air Conditioning and Heating & Ventilating equipment will be furnished and installed by HVAC Contractor. Plumbing equipment will be furnished and installed by Plumbing Contractor.
- B. Electrical components for these systems will be a part of work of this section.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Furnish, install and connect all required electrical components for air conditioning and heating systems and for plumbing system.
- B. Secure a control wiring diagram from Air Conditioning Equipment Supplier at time of receipt of Contract and determine all control and protective apparatus and devices necessary for correct and proper operation of air conditioning equipment and furnish such apparatus and devices. Be responsible for proper wiring and connecting of air conditioning equipment and plumbing equipment.
- C. Refer to mechanical plans, check all locations of mechanical equipment that may or may not show on electrical plans and include in bid sum sufficient to cover total cost of mechanical installation. Coordinate with Air Conditioning Equipment Supplier to ensure that all equipment is covered in Contract.
- D. Unless specifically noted on drawings, run conduit in attic or ceiling space to equipment on roof so that no conduit runs or lays on roof. Penetrate roof at equipment location only.

END OF SECTION

SECTION 262726 WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Wall Switches
 - 2. Receptacles.
 - 3. Device plates and box covers.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 260534 - Boxes.
 - 3. Section 260553 - Electrical Identification.
 - 4. Section 260526 - Grounding.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS – WALL SWITCHES

- A. Harvey Hubbell Company.
- B. Pass and Seymour.
- C. Leviton.

2.02 WALL SWITCHES

- A. Wall switches for Lighting Circuit AC general use snap switch with toggle handle, rated 20 amperes and 120/277 volts AC. Handle: White or color as selected by Architect, plastic. Decorator spec grade.

2.03 ACCEPTABLE MANUFACTURERS - RECEPTACLES

- A. Harvey Hubbell Company.
- B. Pass and Seymour.
- C. Leviton.

2.04 RECEPTACLES

- A. Convenience and Straight-blade Receptacles: NEMA Configuration 5-15R: Decorator Spec Grade, White.
- B. Convenience and Straight-Blade Receptacles: NEMA configuration 5-20R: Decorator Spec Grade, White.
- C. GFI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter, NEMA 5-20R, Decorator Spec Grade, White. Unit shall comply with UL 2003 GFCI requirements including lockout action.
- D. Receptacles: Highest specification grade.
- E. Split wired half controlled receptacle: NEMA 5-20R, 20 amp, Pass & Seymour 26352CH-W or equal.

2.05 ACCEPTABLE MANUFACTURERS - WALL PLATES (Match manufacturer of Device)

- A. Harvey Hubbell Company.
- B. Pass and Seymour.
- C. Leviton.
- D. TayMac.
- E. Match manufacturer of switches and receptacles.

2.06 WALL PLATES

- A. Interior Device Plates: Sierra Electric .040 stainless steel to suit device; multi-gang where required; blank plates at junction boxes and capped outlets.
- B. Weatherproof Cover Plates: Receptacles in wet locations shall be installed with an outlet enclosure clearly marked "Suitable for Wet Locations While In Use". There must be a gasket between the enclosure and the mounting surface, and between the cover and base to assure a proper seal. The enclosure must employ stainless steel mounting hardware and enclosure shall be recessed where possible and by TayMac Corporation or equal.
- C. Highest specification grade.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install wall switches 48 inches above floor to top of wall box, "OFF" position down. Verify mounting height with Architect prior to installation.
- B. Install convenience receptacles 18 inches above floor, or as noted on drawings, grounding pole on bottom.
- C. Install specific-use receptacles at heights shown on Contract Drawings.
- D. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets in non-public places.

- E. Install devices and wall plates flush and level.
- F. Provide etched plates with 3/16" high black letters for:
 - 1. Outlets where voltage is other than 120 volt.
 - 2. When switch controls device other than lighting fixture.
 - 3. When switch is located out of sight of unit being controlled.
 - 4. Lock switches.
 - 5. Where more than one switch occurs under a common plate.
 - 6. Air Distribution System control switches.
- G. Install plates with all four edges in continuous contact with finished wall surfaces without use of mats or similar devices.
- H. Provide blank cover plates for all boxes as required.
- I. In Kitchen, all 15A and 20A 115V receptacles shall be GFI type.

END OF SECTION

SECTION 262813 FUSES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Fuses.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 262816 - Disconnect Switches.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - FUSES

- A. Bussmann
- B. Gould-Chase Shawmut

2.02 FUSES

- A. Fuses, 600 amperes or less: Dual-element with a minimum time delay of 10 seconds at 500% rating; current limiting; interrupting capacity of 200,000 amperes RMS symmetrical.
- B. Fuses: Of same manufacturer, of sizes shown on Drawings, of required size for proper operation of equipment protected.
- C. Fuses, 250 volt: LPN-RK, Class "RK".
- D. Fuses, 600 volt: LPS-RK, class "RK".

2.03 SPARE FUSES

- A. Furnish 3 spare fuses of each type and each size.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fuses in switches and other equipment requiring fuses.
- B. Do not ship equipment from factory with fuses installed.

- C. Verify that correct size fuses are installed in switch. Verify that all three fuses in a three-pole switch and two fuses in a two-pole switch are exactly of same amperage and voltage ratings.

3.02 TESTS

- A. Operate system with fuses in place after approval by inspecting authority.
- B. Replace immediately any defective fuse and/or correct any and all deficiencies discovered through blown fuses.

END OF SECTION

**SECTION 262816
DISCONNECT SWITCHES**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Disconnect switches.
 - 2. Enclosures.
- B. Related Work
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 262813 - Fuses.
 - 3. Section 260553 - Electrical Identification.

1.03 SUBMITTALS

- A. Include outline drawings with dimensions, and equipment ratings for voltage, capacity and horsepower.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - DISCONNECT SWITCHES

- A. General Electric.
- B. Cutler Hammer.
- C. Square "D" Company.

2.02 DISCONNECT SWITCHES

- A. Fusible Switch Assemblies: Heavy duty, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in "ON" position. Handle lockable in "OFF" position. Fuse Clips: Designed to accommodate Class R fuses, current limiting, 200,000 A.I.C.
- B. Nonfusible Switch Assemblies: Heavy duty quick-make, quick-break, load interrupter enclosed knife switch with externally operable hand interlocked to prevent opening front cover with switch in "ON" position. Handle lockable in "OFF" position.
- C. Enclosures: NEMA Type 1 or NEMA Type 3R as indicated on Drawings.

- D. Fusible and Nonfusible Switch Enclosures: Assembled with defeatable door interlocks that prevent door from opening when operating handle is in "ON" position.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install disconnect switches where indicated on Drawings.
- B. Install fuses in fusible disconnect switches.
- C. Install "Caution" sticker on inside of switch door indicating exact type of fuses to be installed therein.
- D. Verify that size, type and rating of fuses installed in each switch is correct and that all fuses in any one individual switch are the exactly same.

3.02 IDENTIFICATION

- A. Provide screwed-on bakelite nameplate.
- B. See Section 260553 for nameplate data.

END OF SECTION

SECTION 265100 LIGHTING FIXTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Addenda, Alternates, Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications collectively apply to work of this Section.

1.02 DESCRIPTION

- A. Work includes but is not limited to the following:
 - 1. Lighting fixtures and accessories.
 - 2. Lamps.
 - 3. Ballasts.
 - 4. Parking Lot Poles.
- B. Related Work:
 - 1. Section 260100 - Basic Materials and Methods.
 - 2. Section 260533 - Conduit.
 - 3. Section 260519 - Wire and Cable.
 - 4. Section 260534 - Boxes.
 - 5. Section 260190 - Supporting Devices.
 - 6. Section 260526 - Grounding.

1.03 SUBMITTALS

- A. Submit Shop Drawings.
- B. Include outline drawings, lamp and ballast data, support points, weights, and accessory information for each lighting fixture type.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - LIGHTING FIXTURES

- A. See Lighting Fixture Schedule on drawings.

2.02 SWITCHING AND DIMMING CONTROLS

- A. General
 - 1. All devices color per architect.

2. Observe manufacturers installation instructions with particular attention to derating requirements for multiple gang installations.
3. Use factory made multiple gang faceplates matching device color.
4. Daylight Controls may be integrated into luminaires Performance shall equal or exceed specification for individual devices.

B. Switches

1. Standard snap style
2. 120/277 volt, 20A
3. Listed
4. Specification grade
5. Color per architect

C. Automatic control switch

1. Automatic control switch shall be a push button wall switch capable of on/off manual operation and shall also be capable of receiving automatic control signals through interrupting power to the switch and load.
2. Control switch shall mount in a standard single gang or multi-gang wall box and shall fit behind a decorator style face plate.
3. Control switch shall use an air gap relay rated for 15 Amp ballast, tungsten, general use and shall be compatible with all electronic ballasts and HID loads.
4. The control switch when used with an occupancy sensor shall provide manual on/off control from the push button and automatic shut off based on occupancy. When occupancy is not detected and the sensor's time delay has expired, the lights shall turn off. If occupancy is detected within 15 seconds of this shut off, the switch shall turn the lights back on. Otherwise, lights will remain off until the switch is manually turned on.
5. Control switch shall be capable of 3-way, 4-way, or multi-way switching.
6. Control switch shall be The Watt Shopper AS-100 or Sentry Switch or approved equal.

D. Motion sensors

1. Provide a dual technology sensor that detects presence in the control area by detecting Doppler shifts in transmitted ultrasound and passive infrared heat changes. Detection verification of both technologies must occur in order to activate lighting systems. Upon verification, detection by either shall hold lighting on.
2. Sensor shall have a retrigger feature in which detection by either technology shall retrigger the lighting system on within 5 seconds of being switched off.

3. Sensor shall be mounted and adjusted in order to eliminate detection through open doorways and outside of controlled area. To provide small motion detection and immediate activation upon entry, coverage of both technologies must be complete and overlapping throughout the controlled area.
4. The PIR technology shall utilize a temperature compensated, dual element sensor and a multi-element Fresnel lens. The lens shall be Poly IR4 material. The lens shall cover up to 2000 square feet for walking motion when mounted at 10 feet and 1000 square feet of desktop motion.
5. Ceiling or high wall mounted. Coordinate location for best detection when used with suspended lighting.
6. Ultrasonic sensing shall be volumetric in coverage with a frequency of 40 KHz. It shall automatically adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
7. Sensors shall have a time delay that is adjusted automatically or shall have a fixed time delay of 5 to 30 minutes, set by DIP switches.

E. Automatic daylighting switches

1. Provide an ON/OFF daylight controller to reduce the controlled lighting as the daylight level increases. Where two stages of reduction are specified, provide a two stage controller providing a sequence reduction. As an alternate, two single stage controllers may be provided to provide two stages of reduction as long as these two devices may be adjusted to provide the desired sequencing of the lighting reduction and maintain this sequencing when switching the lights off and again when switching the lights on.
2. Ceiling mounted or luminaire mounted. The function of the automatic daylighting switches shall not be provided by a wall switch or a device mounted at wall switch height. If the device is powered by line voltage then it must be enclosed in an enclosure rated a minimum of NEMA 1 with a tamper proof cover or locking cover.
3. Independently adjustable setpoint and deadband. Setpoint shall be adjustable from at least 10 footcandles up to 100 footcandles. Deadband shall be adjustable up to at least 100% setpoint.
4. Adjustable time delay. Lighting level must be above the off setpoint continuously for the length of the time delay before the lights will switch off. The device shall not have a length of the time delay shorter than 3 minutes. Time delay shall be adjustable to up to 20 minutes.
5. Low voltage device to be connected by low voltage wiring to a power pack. If control sequence can be met, one power pack may be used with multiple control devices.
6. Daylight switch shall provide visible indicator of the current status of the control output. Indicator shall be an LED.
7. Daylight switch to provide a test mode that temporarily bypasses the time delays. If left in test mode, the daylight switch will automatically resume normal time delays at the end of a period no longer than 60 minutes. (This item is a requirement of the 2005 Title 24 standard).

F. Automatic daylighting dimming systems

1. Provide a daylighting controller to continuously dim the fluorescent lights. Daylighting controller may be a self contained photosensor or a controller with a remote photocell. Photocell or photosensor are to be ceiling mounted or attached to a pendant fixture.
 2. Photosensor to provide 0 – 10 V dimming signal to continuously dim the ballasts proprietary methods of signaling dimming ballasts shall be acceptable.
3. Daylighting controller may be open or closed loop type. Closed loop devices may not be used in applications where there are adjoining dimming zones such that the luminaires from one dimming zone can be viewed by the daylighting controls in another zone. All daylighting controllers shall provide proportional control. An open loop device may accomplish this with one adjustment. All closed loop devices shall have at least two adjustments to provide an adjustable response. Any device which attempts to maintain a constant photocell signal shall not be acceptable.
4. All adjustments shall be adjustable from the photocell.
5. Provide an occupant adjustment or override wall switch to allow the teacher to adjust the light levels.
6. Approved sensor/control manufacturers: Wattstopper, Lutron, Leviton, Lithonia, Novitas, Douglas.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install lamps in lighting fixtures and lampholders.
- B. Support surface-mounted lighting fixtures directly from building structure. Provide additional blocking, unistruts, steel channels, etc. as required.
- C. Install recessed lighting fixtures with attached accessible junctions boxes to permit removal and access from below. Use plaster frames in plaster , gypsum wallboard or acoustic ceilings. In grid ceiling rated for light fixture support, support recessed fluorescent light fixtures directly from T-bar using approved earthquake clips and in addition, 2 No. 12 wires (slack wires), one at each diagonal end of fixture attached directly to a structural member. If two opposite ends of a fixture do not rest on ceiling main runners, provide 4 No. 12 wires (support wires) to structural member. In grid ceiling not rated for fixture support, attach fixture to grid using approved earthquake clips and in addition 4 No. 12 support wires directly to structural member.
- D. Provide safety chain between fixture and structure for recessed light fixtures. Mount hanger channels to span structural and/or T-bar ceilings.
- E. Provide required backing for all lighting fixtures.
- F. Join continuously mounted fixtures by use of chase nipples.
- G. Provide spacers where required.

- H. Mount light fixtures so that fixture labels are not visible when viewed from below.
- I. For recessed fixtures in fire rated ceiling, provide fireproofing enclosure equal to rating of ceiling.
- J. Mount Parking Lot Poles complete with luminaires and lamps on concrete base.
- K. In each pendant of a pendant mounted light fixture, provide a safety wire or cable attached to the fixture and structure at each support capable of supporting four times the supported load. Provide swivel mounts at ceiling and longitudinal sway mounts at fixtures to allow fixtures to swing freely a minimum of 45 degrees from vertical.
- L. Test motion sensors and daylighting controls.
- M. For all dimming systems, contractor is responsible for burning in all lamps for 100 hours. Lamps are to operate at full output for this period.
- N. Contractor is responsible for setting up and adjusting all control devices per the manufacturer's adjustments and resulting performance.

3.02 TESTS

- A. Immediately before turning completed job over to Owner, clean all light fixtures inside and out, including plastics and glassware, adjust and tighten all trim, replace broken or damaged parts, lamp and test fixtures for electrical and mechanical operation. Replace all inoperative lamps, ballasts and other inoperative equipment.
- B. Replace noisy ballasts immediately.
- C. **Include in bid the service of a California Registered Professional Engineer or a Professional recognized by the State of California to review and certify the final installed lighting control system as required by the California Energy Code (Title-24). The Professional shall sign the required documents, submit to the proper agency and be responsible for certifying the installed lighting control system.**

END OF SECTION

SECTION 312319

EXCAVATION AND FILL FOR STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Excavating, backfilling, and compacting for buildings and structures.
2. Fill materials.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 014524 - Environmental Import/Export Material Testing.
3. Section 311000 - Site Clearing.
4. Section 312200 - Grading.
5. Section 312616 - Excavation and Fill for Paving.
6. Section 312323 - Excavation and Fill for Utilities.

1.02 PROJECT REQUIREMENTS

A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

1.03 SUBMITTALS

- A. Imported Soils: A geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain initial product Sample for testing in accordance with the terms of Article 3.05 of this section.
- B. Shoring calculations as required in Article 3.03 of this section.

1.04 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition, except as modified herein.

- B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 014524 - Environmental Import/Export Material Testing.

1.05 PROJECT CONDITIONS

- A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.
- B. A copy of the foundation investigation and soils report is available for examination at the Architect's office during regular office hours of Architect.

PART 2 - PRODUCTS

2.01 FILL AND BACKFILL MATERIALS

- A. Fill and backfill materials shall be a granular material previously removed from excavation, or imported fill material, free of large clods and stones larger than 3 inches, foreign materials, vegetable growths, sod, expansive soils, rubbish and debris. Material shall conform to these specified requirements and related sections.
- B. Fill material exhibiting a wide variation in consistency and or moisture content shall be blended and/or aerated to stabilize and upgrade the material.
- C. Imported Fill Material:
 - 1. Provide suitable materials obtained from Project site excavations for earthwork and fill materials. If excavated materials are not of suitable quality or sufficient quantity, import additional materials as necessary.
 - 2. Imported fill shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing 200 mesh sieve. Material shall have a coefficient of expansion of not more than two percent from air dry to optimum moisture content and not more than six percent from air dry to saturation. Imported material shall be clean and free of rubbish, debris and toxic or hazardous contaminants. Adobe or clay soils are not permitted.
- D. Other Fill Materials: Brick rubble and broken concrete originating from the Project site may be legally disposed of off the Project site, or incorporated in fill, if reviewed by the geotechnical engineer, retained by the Owner as an Owner Consultant. Unless otherwise provided, no such materials may be imported from outside the Project site.
- E. Permeable Backfill:
 - 1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations:

<u>Sieve Size</u>	<u>Percentage Passing</u>
3/4 inch	100

3/8 inch	80 to 100
No. 100	0 to 8
No. 200	0 to 3

2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.
3. Provided backing for weep-holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.
4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system, Miradrain by Mirafi, Inc., or equal, may be provided if reviewed by the Architect.

PART 3 - EXECUTION

3.01 SITE PREPARATION

- A. Clear the Project site as required in Section 312200 - Site Clearing.

3.02 PROTECTION

- A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, Cal-OSHA regulations.
- B. Protect adjacent existing improvements including landscaping against damage.
- C. Shore, crib, or lag excavations and earthen banks as necessary to prevent caving-in, erosion or gullyng of sides.
- D. Divert or de-water excavations until concrete is placed, forms are removed, and backfilling is complete.

3.03 SHORING

- A. Provide shoring as necessary to properly and safely support earth sides of excavations, curbs, sidewalks, gutter, drives and stairs, against movement and collapse.
- B. Design and Calculations: Provide in accordance with requirement of Cal-OHSA. Remove shoring upon completion of Work, or when no longer needed.

3.04 EXCAVATION

- A. Form sides of footings, pads, grade beams, and slab foundations, unless otherwise indicated. Provide excavations of sufficient size to permit installation and removal of forms and other Work as required.
- B. Machine-drill excavation for round footings to size and depth indicated. Provide a collar or casing, or other adequate protection, to exclude dirt and debris. Protect excavations with plank covers until concrete is placed.
- C. Provide excavation bottoms level and free from loose material. Excavate to indicated or required elevations of undisturbed earth.
- D. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. If soil becomes soft, soggy, or saturated, excavate to firm undisturbed soil and fill as required. Slope adjacent grades away from excavations to minimize entry of water.
- E. Calculate excavation quantities based on elevations or depths indicated on Drawings.
- F. Provide 2,000 psi concrete for backfill of over-excavated areas to indicated or required elevations.
- G. Special preparation of bottom of excavated planes areas: Excavate areas designated on Drawings as bottom of excavated planes (B.E.P.), by excavating and filling to indicated grades and elevations.

3.05 IMPORT/EXPORT OF MATERIALS

- A. Provide fill materials as specified in Part 2- Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
- B. In addition to the requirements of this section, import and/or exported materials shall comply with the requirements of Section 014524 - Environmental Import/Export Material Testing.
- C. Imported fill materials shall be sampled by the geotechnical engineer, retained by the Owner as an Owner Consultant, for compliance with the requirements of Part 2 of this section.
- D. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall submit all samples to a DSA approved independent testing laboratory for testing.
- E. Initial sampling shall be performed by a geotechnical engineer, retained by the Owner as an Owner Consultant, before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain both the initial sample and additional samples from the identified site and shall submit samples to the approved independent testing laboratory for testing.
- F. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is

determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.

- G. The independent approved testing laboratory shall perform the required tests and report results of tests noting if the tested material passed or failed such tests and shall furnish copies to the Project Inspector, Architect, OAR, DSA, Contractor, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC and the DSA. Upon completion of the Work of this section, the independent testing laboratory and geotechnical engineer shall submit a verified report to the DSA as required by CBC.
- H. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.
- I. Upon completion of import operations, provide the OAR a certification statement attesting that all imported material has been obtained from the identified source site.

3.06 BACKFILLING

- A. After concrete has been placed, forms removed and concrete Work inspected, backfill excavations to indicated or required grades. Backfill simultaneously on each side of walls or grade beams. Remove rubbish, debris, and other waste materials from excavations before placing backfill.
- B. Before installing any backfill, adequately cure concrete and provide bracing to stabilize structures. Protect waterproofing or dampproofing against damage during backfilling operations with required protection board. Remove bracing as backfill operation progresses.
- C. Do not furnish or install expansive soils for below grade building walls.
- D. Install each layer of material in a not to exceed thickness of 6 inches, unless otherwise required.
- E. Rigidly control the amount of water to be installed to provide optimum moisture content for type of fill material furnished. Do not over-saturate or compact by flooding or jetting.
- F. Install wall backfill before installing railings and fences on walls.
- G. Impervious backfill materials shall be installed in layers along with and by the same methods specified for structure backfill. Impervious backfill materials shall be at the approximate grade and elevation and where exposed to erosion, shall be covered with at least a 12-inch layer of fill material as reviewed by the geotechnical engineer, retained by the Owner as an Owner Consultant.
- H. Install weep hole drainage at the backside of walls so the backing completely covers the weep holes, is horizontally centered and extends at least 12 inches above the bottom of the weep opening. Provide an 8-inch square section of 1/4 inch galvanized or aluminum screen, with a minimum wire diameter of 0.03 inch, and install at the backside of each weep hole before installing the backfill material.

- I. Where a reviewed drainage matting system is provided instead of permeable backfill for retaining structures, install in accordance with the manufacturer recommendations.

3.07 COMPACTING

- A. Compact each layer of fill material by tamping, sheepsfoot rollers or pneumatic-tired rollers, to such extent as to provide specified relative compaction. At inaccessible locations, compact to specified requirements with hand-held, operated and directed compaction equipment.
- B. Unless otherwise indicated, compact each layer of fill material to a relative compaction of at least 95 percent.
- C. Do not compact by flooding or jetting.
- D. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each layer of compacted fill before installing the next succeeding layer.

3.08 INSPECTION AND TESTING

- A. The geotechnical engineer, retained by the Owner as an Owner Consultant, will inspect and test excavations, sample material quality as required in Part 2, and observe installation and compaction of fill materials.
- B. The geotechnical engineer, retained by the Owner as an Owner Consultant, will sample imported fill materials from their designated source before delivery to the Project site.
- C. Installation of backfill shall be observed by the geotechnical engineer, retained by the Owner as an Owner Consultant.
- D. The geotechnical engineer, retained by the Owner as an Owner Consultant, will inspect and test excavation Work before the installation of fill and/or other materials.
- E. Compaction: Test compaction in accordance with ASTM D1557, Method C.
- F. The Project Inspector will inspect foundation excavations when completed and ready for forms, after forms are in place and before first placement of concrete.

3.09 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.10 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 312323

EXCAVATION AND FILL FOR UTILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Excavating, backfilling, and compacting utility trenches such as water, gas, irrigation, storm drain, sewer lines, concrete-encased conduits, and manholes, vaults, valve boxes, catch basins, underground tanks, thrust blocks, yard boxes, pull boxes and other utility appurtenances.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 014524 - Environmental Import/Export Material Testing.
3. Section 311000 - Site Clearing.
4. Section 312200 - Grading.
5. Section 312316 - Excavation and Fill for Paving.
6. Section 312319 - Excavation and Fill for Structures.
7. Section 320117 - Pavement Repair.
8. Section 321313 - Site Concrete Work.
9. Section 328413 - Potable Water Irrigation.
10. Section 328426 - Reclaimed Water Irrigation.
11. Section 331100 - Site Water Distribution Utilities.
12. Section 333000 - Site Sanitary Sewer Utilities.
13. Section 334000 - Storm Drainage Utilities.
14. Division 22 - Plumbing.
15. Division 26 - Electrical.

1.02 PROJECT REQUIREMENTS

A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

1.03 SUBMITTALS

- A. Imported Soil: A geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain initial product Sample for testing in accordance with the terms of Article 3.05 of this section.

1.04 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement: Standard Specifications for Public Works construction, current edition except as modified herein.
- B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 014524 - Environmental Import/Export Material Testing.

1.05 PROJECT CONDITIONS

- A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.
- B. A copy of the foundation investigation and soils report is available for examination at the Architect's office during regular business hours of Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Bedding material from trench bottom to one foot above the pipe:
 1. Sand, gravel, crushed aggregate or native free-draining granular material providing a sand equivalent of at least 30 or a coefficient of permeability greater than 1.4 inches per hour.
 2. Sand complying with the Specifications for cement concrete aggregates.
- B. Backfill Materials:
 1. Excavated trench material to be installed for backfilling shall be clean, free of large clods, and stones larger than 2 ½-inch in any dimension.
 2. Cement-sand slurry shall be provided with one sack of cement per cubic yard of the mixture.

3. Imported Fill Material: Imported fill material shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing a 200 mesh sieve. Material shall provide a coefficient of expansion of not more than two percent from air dry to optimum moisture content and not more than six percent from air dry to saturation. Imported materials shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.

PART 3 - EXECUTION

3.01 GENERAL

- A. Before excavation, contact the "Underground Service Alert of Southern California" (USASC) for information on buried public utilities and pipelines. For on-site utilities retain an underground locating service.
- B. Barricade trenches, ditches, pits, sumps, and similar Work outside the barricaded working area with chain link fence as specified in Section 015000 - Construction Facilities and Temporary Controls, and in accordance with Cal-OSHA standards and requirements.
- C. Saw-cut concrete or bituminous paving for trench installation.
- D. Trenches over 5 feet in depth shall conform to the Cal-OSHA.
- E. Where indicated and required to excavate in lawn areas, protect adjoining lawn areas outside of the Work area. Replace or install removed sod upon completion of backfill by installing sod level with adjacent lawns. If installation of removed sod fails, furnish sod and install to match existing lawns.
- F. Backfill over excavations to the required elevations with earth, gravel, sand, or concrete and compact as required. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. Slope adjacent grades away from excavations to minimize entry of water.
- G. Do not install piping lengthwise under concrete walks without review by the Architect.
- H. Do not excavate trenches parallel to footings closer than 18 inches from the face of the footing or below a plane having a downward slope of two horizontal to one vertical, from a line 9 inches above bottom of footings.
 1. Unless otherwise indicated on Drawings, depth of excavations outside the buildings shall allow for a minimum coverage above top of pipe, tank, or conduit measured from the lowest adjoining finished grade, as follows:

Steel Pipe	24 inches below finished grade
Copper Water Tube	18 inches below finished grade
Cast-Iron Pressure Pipe	36 inches below finished grade
Plastic Pipe (other than waste)	30 inches below finished grade
Tanks or other structures	36 inches below finished grade

Soil, Sewer & Storm Drain	minimum 18 inches below finished grade, and as required for proper pitch and traffic load. (Install polypropylene sewer pipe with at least 24 inches coverage)
Irrigation Pipe:	nonpressure pipe 12 inches, pressure pipe 24 inches

2. Trench width shall provide ample space for fitting and joining. Excavate for piping bells and fittings, bell and spigot pipe and other fittings.
 - I. Unless indicated otherwise, excavate trenches to the required depths for utilities, such as pipes, conduit and tanks, with minimum allowances of 6 inches at the bottom and 6 inches at the sides for bedding of unprotected piping or as required for concrete encasement of conduits as indicated on Drawings. Grade bottom of trenches to a uniform smooth surface. Remove loose soil from the excavation before installing sand bedding or concrete encasement.
 - J. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. If soil becomes soft, soggy, or saturated, excavate to firm undisturbed soil and fill as required. Slope adjacent grades away from excavations to minimize entry of water.
 - K. Provide a minimum clear dimension of 2 inches from sides of wall excavation to outer surfaces of buried pipes or conduits installed in the same trench or outside surfaces of containers and tanks.
 - L. Do not install backfill until required inspections and testing is completed.
 - M. Backfill electrical or other excavated utility trenches located outside of barricaded installation areas within 24 hours after inspection by the Project Inspector.
 - N. Install backfill materials in layers not exceeding 4 inches in thickness and compact to 95 percent of the maximum density.
 - O. If materials excavated from the Project site are not permitted for trench backfill in paved areas, backfill trenches with a cement-sand slurry mix. Install backfill to an elevation of the existing undisturbed grade plus one inch.
 - P. Install and compact sand bedding to provide a uniform full length bearing under piping and conduits.
 - Q. Where portions of existing structures, walks, paving, or other improvements are removed or cut for piping or conduit installation, replace the material with equal quality, finished to match adjoining existing improvements. Repair pavement as specified in Section 320117 - Pavement Repair.

3.02 IMPORT/EXPORT OF MATERIALS

- A. Provide fill materials as specified in Part 2- Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
- B. In addition to the requirements of this section, import and exported materials shall comply with the requirements of Section 014524 - Environmental Import/Export Material Testing.
- C. Imported fill materials shall be sampled by a geotechnical engineer, retained by the Owner as an Owner Consultant, for compliance with the requirements of Part 2 of this section.
- D. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall perform the tests by utilizing an independent approved testing laboratory.
- E. Initial sampling shall be performed by the geotechnical engineer, retained by the Owner as an Owner Consultant, before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain both the initial sample and additional samples from the identified site and shall submit all samples to the approved independent testing laboratory.
- F. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.
- G. The independent approved testing laboratory shall perform the required tests and report results of all tests noting if the tested material passed or failed such tests and shall furnish copies to the Project Inspector, Architect, OAR, DSA, Contractor, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC and the DSA. Upon completion of the Work of this section, the independent testing laboratory and geotechnical engineer shall submit a verified report to the DSA as required by CBC.
- H. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.
- I. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.03 INSPECTION AND TESTING

- A. The geotechnical engineer, retained by the Owner as an Owner Consultant, will inspect and test excavations, sample material quality as required in Part 2, observe installation and compaction of fill materials.
- B. Compaction test shall be performed in accordance with ASTM D1557, method "C."

3.04 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.05 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 312326
BASE COURSE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Installation of base material.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 311000 - Site Clearing.

3. Section 312200 - Grading.

4. Section 312316 - Excavation and Fill for Paving.

5. Section 321216 - Asphalt Paving.

6. Section 321313 - Site Concrete Work.

1.02 SUBMITTALS

A. Prior to import, submit written certification to OAR that crushed Miscellaneous Base (CMB) does not contain Polychlorinated biphenyls (PCB) above laboratory detection limits when tested in accordance with EPA Method 8082, and obtain written approval from jurisdictional agency prior to import at the subject site, refer to Article 2.02 for sampling frequency.

B. Product Data: Submit material source, technical information and test data for base materials. Gradation and quality certifications shall be dated within 30 days of the submittal.

C. Sample: Submit Sample of proposed base course material.

1.03 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

PART 2 - PRODUCTS

2.01 UNTREATED BASE MATERIALS

A. The following base materials shall conform to the requirements of the Standard Specifications for Public Works Construction: Section 200 - Rock Materials.

1. Crushed Miscellaneous Base.
 - a. CMB meeting requirements of Article 1.02, A, may be used on-site for pavement base only.
 - b. CMB may be used off-site when in accordance to the Greenbook.
- B. Materials generated on site shall not be used as a base course material.

2.02 SOURCE QUALITY CONTROL

- A. Sampling and testing of imported and/or exported crushed miscellaneous base (CMB) shall be performed in accordance with the following Table 1 schedule:

TABLE 1: MINIMUM SAMPLING FREQUENCY	
Volume (CY)	Sampling Frequency
0 to 500	1 per 100 Cubic Yards
501 to 1,000	1 per 250 Cubic Yards
1,001 to 5,000	1 per 250 Cubic Yards for first 1,000 Cubic Yards 1 per 500 CY thereafter
5,001 to 20,000	12 samples for first 5,000 Cubic Yards 1 per 1,000 Cubic Yards thereafter
over 20,000	1 per 2,000 Cubic Yards for first 20,000 Cubic Yards 1 per 2,500 CY thereafter

2.03 MATERIAL APPROVAL

- A. Base material shall be inspected by the Project Inspector for gradation and material content prior to installation. The owner may choose to have additional tests performed by a geotechnical engineer, retained by the Owner, before installation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install base course material in layers not exceeding 4 inches in thickness, unless required otherwise. Grade and compact to indicated levels or grades, cut and fill, water and roll until the surface is hard and true to line, grade and required section. Provide a relative compaction of at least 95 percent, unless otherwise required.
- B. Grade base course to elevations indicated on Drawings, ready to receive surfacing, in accordance with Section 312200 - Grading.

3.02 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.03 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 321313
SITE CONCRETE WORK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Portland cement concrete pavement, cement walks, curbs, gutters, trash pick-up area, ramps, mowing strips, fence post footings, sliding gate concrete tracks, catch basins, pipe bedding and encasements, thrust blocks, transition structures, flagpoles and light standard bases and footings, athletic equipment footings and equipment pads.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 032000 - Concrete Reinforcement.
3. Division 23 - HVAC.
4. Division 26 - Electrical.
5. Section 312200 - Grading.
6. Section 312316 - Excavation and Fill for Pavement.
7. Section 312326 - Base Course.
8. Section 320117 - Asphalt Pavement Repair.
9. Section 321216 - Asphalt Paving
10. Section 331100 - Site Water Distribution Utilities.
11. Section 333000 - Site Sanitary Sewer Utilities.
12. Section 334000 - Storm Drainage Utilities.

1.02 SUBMITTALS

- A. Shop Drawings: Submit plans, elevations and details of concrete site Work.
- B. Product Data: Submit mix designs and manufacturer's technical data for materials and products. Submit 3-inch by 3-inch concrete Sample of each specified color.
- C. Material Sample: Submit one concrete bumper to the Project Inspector for destructive testing.

1.03 QUALITY ASSURANCE

- A. Comply with Standard Specifications For Public Works Construction.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete, Mortar and Related Materials: Comply with applicable provisions of Standard Specifications for Public Works Construction, Section 201 - Concrete, Mortar and Related Materials:

1. Concrete: 28-day compressive strength 2,500 psi, unless specified otherwise.
2. Reinforcing Mesh: ASTM A185, 4 by 4/W1.4 by W1.4 welded wire mesh.
3. Expansion Joint Filler: Preformed expansion joint filler, bituminous type, complying with ASTM D994.

- B. Form Materials:

1. Side forms: Douglas fir, Construction Grade or Better or metal forms.
2. Stakes: Douglas fir, Construction Grade or Better or metal stakes.

- C. Concrete Parking Bumpers:

1. Precast concrete, smooth and free of pits and rock pockets, providing a minimum 28-day compressive strength of 3,500 psi. Size at least 7 ½-inch wide, 5 ½-inch high and 6-foot long. Reinforce with two #5 reinforcing bars. Provide 2 ¾-inch diameter pre-drilled holes for anchor installation.
2. Bumper Anchors: Provide ½ inch diameter by 18-inch long galvanized steel pipe.
3. Bumper Adhesive: Provide adhesive recommended by bumper manufacturer/installer for fastening bumpers to concrete pavement.

PART 3 - EXECUTION

3.01 CONSTRUCTION OF FORMS FOR CAST-IN-PLACE STRUCTURES

- A. Concrete Pavement: Install Portland cement concrete pavement in compliance with the Standard Specifications for Public Works Construction, Section 302- Roadway Surfacing.
- B. Miscellaneous Exposed Concrete: Install concrete curbs, walks, gutters, cross gutters, access ramps, driveways, catch basins, yard boxes, vaults and similar structures, in

compliance with the Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction.

- C. Exposed Concrete Bases: Install bases, such as for post, flagpole, light standards and similar bases, in compliance with the Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction.
- D. Post, flagpole, light standard footings below grade, underground conduit bedding, encasements, thrust blocks and similar structures may be placed directly in excavations conforming to the required sizes.
- E. Reinforcement installation and concrete placement, surface finishes, curing and removal of forms shall be performed in compliance with applicable provisions of Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction. Provide heavy broom finish at slopes exceeding six percent and medium broom finish at slopes up to six percent.

3.02 INSTALLATION OF PARKING BUMPERS

- A. Install bumpers as indicated on the Drawings. On bituminous paving, install anchors through pavement and into the ground a minimum of 12 inches. On concrete pavement, install bumpers in a continuous bed of adhesive.

3.03 CLEAN UP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.04 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

APPENDIX

FOR CONSTRUCTION OF

DEPARTMENT OF RECREATION AND PARKS SOUTH PARK RENOVATION PUBLIC RESTROOM RENOVATION

WORK ORDER NO: E1908366




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COUNTY CLERK'S USE
ORIGINAL FILED

OCT 19 2018

LOS ANGELES, COUNTY CLERK

CITY OF LOS ANGELES
 OFFICE OF THE CITY CLERK
 ROOM 395, CITY HALL
 LOS ANGELES, CALIFORNIA 90012
 CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION
 (Articles II and III – City CEQA Guidelines)

CITY CLERK'S USE
 DOCUMENT FILED
 City Clerk's Office
 NE-18-101-SE
 No. _____
 Certified by 
 Date: 10-19-18

Submission of this form is optional. The form shall be filed with the County Clerk, 12400 E. Imperial Highway, Norwalk, California, 90650, pursuant to Public Resources Code Section 21152(b). Pursuant to Public Resources Code Section 21167(d), the filing of this notice starts a 35-day statute of limitations on court challenges to the approval of the project.

LEAD CITY AGENCY AND ADDRESS: City of Los Angeles c/o Los Angeles City Engineer 1149 S. Broadway, MS 939 Los Angeles, CA 90015	COUNCIL DISTRICT 9
--	------------------------------

PROJECT TITLE: South Park Renovations	CIP No. G881, G882, K355 W.O. E1908367	LOG REFERENCE
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PROJECT LOCATION: The project address is 345 E. 51st St., Los Angeles, CA 90011 and located between E. 49th St. to the north, E. 51st St. to the south, San Pedro St. to the west, and S. Avalon Blvd. to the east. The area is a mix of residential and commercial properties. The project is in the Southeast Los Angeles Community Plan Area. T.G. 674-D4

DESCRIPTION OF NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The project consists of park renovations, upgrades, and improvements. The scope of work includes landscaping and beautification elements including tree removal and planting, expanding parking areas, upgrades to existing turf sports field, relocation and upgrades to basketball courts including new sports field lighting, renovation of the onsite public restrooms and fitness area, and the reconstruction and relocation of the maintenance yard and shed. Refer to the attached narrative for additional detail. Beneficiaries of the project are the local residents and park users. On October 17, 2018, the Board of Recreation and Parks Commission determined this action is exempt from CEQA and approved the Project.


CONTACT PERSON Amanda Amaral	TELEPHONE NUMBER 213-485-5733
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EXEMPT STATUS: (Check One)	CITY CEQA GUIDELINES	STATE CEQA GUIDELINES
<input type="checkbox"/> MINISTERIAL	Art. II, Sec. 2.b	Sec. 15268
<input type="checkbox"/> DECLARED EMERGENCY	Art. II, Sec. 2.a(1)	Sec. 15269(a)
<input type="checkbox"/> EMERGENCY PROJECT	Art. II, Sec. 2.a(2)(3)	Sec. 15269(b)(c)
<input type="checkbox"/> GENERAL EXEMPTION	Art. II, Sec. 1	Sec. 15061(b)(3)
<input checked="" type="checkbox"/> CATEGORICAL EXEMPTION*	Art. III, Sec. 1 Class 1, (2)(3)(12)	Sec. 15301 (d)
	Art. III, Sec. 1 Class 2, (3)	Sec. 15302 (c)
	Art. III, Sec. 1 Class 3, (5)(6)	Sec. 15303 (d)(e)
	Art. III, Sec. 1 Class 4, (3)(12)	Sec. 15304 (b)(f)
<input type="checkbox"/> STATUTORY*	Art. _____	Sec. _____

* See Public Resources Code Sec. 21080 and set forth state and city guidelines provisions.

JUSTIFICATION FOR PROJECT EXEMPTION: This project falls under State CEQA Guidelines Sections 15301 (d), 15302 (c), 15303 (d)(e), and 15304 (b)(f) as well as under *City of Los Angeles CEQA Guidelines* Art. III Class 1 (Cat. 2, 3, and 12), Class 2 (Cat. 3), Class 3 (Cat. 5 and 6), and Class 4 (Cat. 3 and 12) because it involves minor alterations of existing facilities and new construction of small structures with no expansion of existing use. None of the limitations set forth in State CEQA Guidelines 15300.2 apply (See attached narrative).

IF FILED BY APPLICANT, ATTACH CERTIFIED DOCUMENT OF EXEMPTION FINDING

SIGNATURE:  Maria Martin	TITLE: Environmental Affairs Officer Environmental Management Group	DATE: 10/18/18
FEE: \$75.00	RECEIPT NO.	REC'D BY
		DATE

CATEGORICAL EXEMPTION NARRATIVE

I. PROJECT DESCRIPTION

The project has the goal of repairing, renovating, and revitalizing South Park, located in the southeast Los Angeles Community Plan Area. The project scope includes:

Landscaping

Landscaping work will require removal of existing concrete paving, tubular steel security and playground fencing, chain link pool fencing, drinking fountains, picnic tables, turf and irrigation.

New and improved landscaping elements will include concrete walkways, colored concrete picnic and seating areas, interlocking concrete paving stones, decomposed granite fitness path, asphalt parking lots, synthetic turf fields, tubular steel pool/security/planter fencing, and chain link soccer, baseball and basketball court fencing, and outdoor fitness stations with rubber surfacing.

Existing picnic tables, barbecues, and benches will be relocated. New park furniture will be installed including steel picnic tables, steel benches, steel trash can enclosures, barbecues, fitness and playground equipment.

Low Impact Development (LID)

Stormwater impacts will be addressed through Low Impact Development (LID) infiltration designs which are incorporated into the basketball courts and park areas with synthetic turf. LID elements will improve wet and dry weather water infiltration and court drainage. Approximately 20-25% of the original turf in the park area will be replaced with mulch/tree plantings to reduce overall water use and maintenance needs. A new smart irrigation system will be installed to meet the watering needs for the entire site. The system will collect hourly weather station sensor data to calculate an evapotranspiration (ET) value. Based on the ET value, the system will adjust the irrigation to apply only the amount of water needed based on the hydrological zone (water needs) of the planting. The irrigation design eliminates the use of spray irrigation in non-turf areas, and utilizes stream bubblers in shrub planting, thereby increasing irrigation efficiency and reducing overspray and runoff.

Trees and Plants

The City of Los Angeles' Urban Forestry Division has identified approximately 40 dying/dead trees to be removed, in addition to 51 other trees to be removed due to the Project design, many of which are under 3-inch caliper. The iconic palm walkway is not impacted by any tree removals. A total of 277 new trees will be planted; exceeding a 3:1 tree replacement/removal ratio. The proposed tree replacement species and quantities are listed in Table 1 below:

Table 1. Proposed South Park Tree Replacements

Botanical Name	Common Name	Quantity
<i>AFROCARPUS GRACILIOR</i>	AFRICAN FERN PINE	30
<i>ARAUCARIA HETEROPHYLLA</i>	NORFOLK ISLAND PINE	3

Botanical Name	Common Name	Quantity
ARBUS X 'MARINA'	MARINA HYBRID MADRONE	18
CUPRESSUS ARIZONICA 'GLABRA'	ARIZONA CYPRESS	24
EUCALYPTUS CLADOCALYX	SUGAR GUM	13
FICUS RUBIGINOSA	RUSTY LEAF FIG	13
HYDROANTHUS IMPETIGINOSUS	PINK TRUMPET TREE	17
JACARANDA MIMOSIFOLIA	JACARANDA	18
JUBAEA CHILENSIS	CHILEAN WINE PALM	26
LOPHOSTEMON CONFERTUS	BRISBANE BOX	31
PINUS ELDARICA	MONDELL PINE	17
PISTACIA CHINENSIS	CHINESE PISTACHE	29
QUERCUS BUCKLEYI	TEXAS RED OAK	4
TECOMA STANS	YELLOW BELLS	24
TIPUANA TIPU	TIPU TREE	6
VITEX AGNUS- CASTUS	CHASTE TREE	24
Additional trees for future phases	(species not yet determined)	31
Total:		328

Drought-tolerant shrubbery, mulch, and tree plantings will replace approximately 25% of the park's original turf, thus reducing overall water use and maintenance needs.

Lighting

The existing lighting system will be removed and replaced with new lighting including pathway and security lighting.

New sports field lighting will be installed for the synthetic soccer field, relocated basketball courts, and the existing natural turf baseball/soccer field. The scope of work includes:

- Basketball Courts - Installation of two (2) new light poles with Light Emitting Diodes (LED) fixtures. Poles are 40 feet in height with a 12-foot foundation depth. These lights replace previously existing basketball court sports lights.
- Synthetic Soccer Field – Installation of four (4) new light poles. Poles are 70 feet in height with a 14-foot foundation depth.
- Existing Natural Turf Baseball/Soccer Field – One (1) existing 70-foot pole with metal halide lights will be relocated to accommodate new field alignment. Pole foundation

depth is 14 feet. One (1) new sports light will be added to allow for the squaring of the field.

Maintenance Yard and Shed

The existing maintenance yard and shed, asphalt parking lot, turf, and irrigation system will be removed and reconstructed/relocated to the northwestern corner of the park adjacent to the synthetic soccer field. The new maintenance building will house storage, a work shop, maintenance equipment, and offices for park maintenance staff. Yard construction will include a new asphalt paved parking lot, trash enclosures, concrete walkways and maintenance road (including repair of existing sidewalk) and new concrete driveway aprons, security lighting, fencing, site drainage with LID planters, landscaping, and irrigation elements.

Basketball Courts

The location of the existing maintenance yard will be replaced with two (2) side-by-side asphalt basketball courts and fencing. The courts will be equipped with an LID infiltration system to allow for stormwater infiltration.

Baseball/Soccer Field

The existing baseball field located in the southwest corner of the park will be modified to allow for multipurpose field play in the outfield area. The baseball field has existing sports field lighting.

Parking

While 34 public parking spaces will be removed from the new maintenance yard area and replaced with five (5) new employee spaces, a new 50-space public parking lot will be installed on the west side of the park. Additionally, six (6) parking spaces will be added to the existing Recreation Center and pool area parking lot. The existing southwest parking lot with 60 public parking spaces will remain unchanged.

Public Restrooms

The existing multiple occupancy restrooms' interiors will be demolished and completely renovated to include (5) unisex single occupancy restrooms, exterior drinking fountains, and a Janitor's closet.

II. ENVIRONMENTAL REVIEW

Basis for Categorical Exemption

The project involves repairing, renovating, and revitalizing elements throughout South Park including the relocation and reconstruction of the maintenance building and basketball courts, park landscaping and beautification, parking expansion, utility upgrades and utility installation, and sports field lighting improvements. The project falls under the following categorical exemptions included in Guidelines Sections 15301 (d), 15302 (c), 15303 (d), and 15304 (b)(f) of State CEQA Guidelines, as well as under those included in Art. III Class 1 (Cat. 2, 3, and 12), Class 2 (Cat. 3), Class 3 (Cat. 5 and 6), and Class 4 (Cat. 3 and 12) of the *City of Los Angeles CEQA Guidelines*.

Consideration of Potential Exceptions to use of a Categorical Exemption

The State CEQA Guidelines (CCR Sec 15300.2) limit the use of categorical exemptions in the following circumstances:

1. Location. Exemption Classes 3, 4, 5, 6, and 11 are qualified by consideration of where the project is to be located – a project that is ordinarily insignificant in its impact on the environment may be significant in a particularly sensitive environment. Therefore, these classes are considered to apply all instances, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

This project is located in a highly urbanized area and has not been identified as a sensitive environment. As such, this exception does not apply.

2. Cumulative Impact. This exception applies when, although a particular project may not have a significant impact, the cumulative impact of successive projects of the same type in the same place, over time is significant.

Given the nature of the project which includes the repair and revitalization of an existing park through landscaping improvements, utility upgrades, installation of new playground and workout equipment, expanded parking, and given the life expectancy of the equipment, this project is not anticipated to result in a cumulative impact when included with successive projects in the same place and over time.

3. Significant Effect. This exception applies when, although the project may otherwise be exempt, there is a reasonable possibility that the project will have a significant effect due to unusual circumstances.

Air Quality

Standard SCAQMD Handbook and WATCH guidelines would be applicable for staging, construction and post-construction activities. As such, this exception does not apply.

Light/Glare

The existing lighting system will be removed and replaced with new lighting including pathway and security lighting. All sports field lighting fixtures will be focused to minimize light spillage. Field lighting will be operated daily during the evening hours until 10:00 pm. The new lighting systems will be operated to ensure that off-property spillage is contained within the limits set by the Los Angeles Municipal Code Sect. 93.0117, which prohibits the installation of exterior lighting sources that would illuminate residential units and their appurtenances by more than two (2) footcandles of lighting intensity.

Traffic/Transportation

Construction staging areas will occur on the project site and will not interfere with the public right-of-way. Street parking for construction related activities is not anticipated. As such, traffic and parking impacts are not anticipated.

Historical Resources

A historical resources evaluation, including a records search and on-site assessment, was conducted by Historic Resources Group (HRG) Environmental Consultants. Based on their evaluation, no cultural resource impacts were identified or anticipated in the project area. Please see number 6 below for details on how unanticipated discoveries will be treated. The project's intent is to revitalize and repair South Park. As the repairs will be made in areas previously disturbed, no unusual circumstances are anticipated.

4. Scenic Highway. A categorical exemption shall not be used for a project which may result in damage to scenic resources, including but not limited to trees, historic buildings, rock outcroppings, or similar resources, within a highway officially designated as a state scenic highway.

According to the Department of Transportation California Scenic Highway Mapping System for Los Angeles County (http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways) the project area is not within a highway, or within the vicinity of a highway, officially designated as a state scenic highway.

5. Hazardous Waste Site. This exception applies when a project is located on a site listed as a hazardous waste site under Government Code Section 65962.5.

As of August 24, 2018, the State Department of Toxic Substances Control (DTSC) (Envirostor at www.envirostor.dtsc.ca.gov) has not listed any contaminated sites within the project site or the in vicinity of the project.

As of August 24, 2018, the California Regional Water Quality Control Board (RWQCB) website (Geotracker at <https://geotracker.waterboards.ca.gov/>) has not listed any contaminated sites within the project site or in the vicinity of the project.

Based on the above information, this exception does not apply.

6. Historical Resources. This exception applies when a project may cause a substantial adverse change in the significance of a historical resource.

As discussed above, the project is not anticipated to have adverse significant impacts to historical resources.

The project's excavation will not exceed approximately five (5) feet (exception is sports field lighting poles with a foundation depth of between 12-14 feet), and will occur within areas previously disturbed by grading, domestic water main and lateral lines, and other utilities. Therefore, the likelihood of interfering with historical resources is low. However, in case historical artifacts are encountered, City Engineer Standard Specifications, Section 6-3.2, states: "If discovery is made of items of archaeological or paleontological interest, the Contractor shall immediately cease excavation in the area of discovery and shall not continue until ordered by the Engineer." Therefore, during activities in which there will be ground disturbances (i.e., digging, drilling, etc.) if any evidence of archaeological, cultural, or paleontological resources are found, all work within the vicinity of the find shall stop until a qualified archaeologist can assess the finds and make recommendations. No excavation of any finds should be attempted by project personnel unless directed by a qualified archaeologist. Work in other areas may continue.

Since the project includes all these limitations, this exception does not apply.

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AMBIENT ENVIRONMENTAL, INC.
Consulting/Engineering/Remediation
www.ambientenvinc.com

CONFIDENTIAL AND PRIVILEGED

**ASBESTOS/LEAD
SAMPLING REPORT**

For the Property located at:

South Park Restrooms
345 East 51st Street
Los Angeles, California



Prepared for:

Department of Recreation and Parks
Planning, Construction and Maintenance
221 North Figueroa Street, Suite 400
Los Angeles, California 90012
Attn: Ms. Lisa Walldes

Prepared by:

Ambient Environmental Inc.
400 North Princland Court Suite-3
Corona, California 92879

April 2019

Contract Number: 3562

Ambient Project Number: 19-1240

John L. Payne
California Certified
Asbestos Consultant #93-1226
CDPHS #25387

Timothy J. Lane
CDPHS Inspector/Assessor
CDPHS #29861

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY
2.0	SURVEY PROCEDURES
3.0	ASBESTOS BULK SAMPLING PROCEDURES
4.0	X-RAY FLOURESCENCE SAMPLING PROCEDURES FOR LEAD-BASED PAINT
5.0	POSITIVE ASBESTOS SAMPLE RESULTS AND LOCATIONS
6.0	NEGATIVE ASBESTOS SAMPLE RESULTS AND LOCATIONS
7.0	LEAD-BASED PAINT READING RESULTS AND LOCATIONS
8.0	DISCLAIMER

APPENDIX A	CHAIN OF CUSTODY AND BULK SAMPLE LOG
APPENDIX B	LABORATORY CERTIFICATES OF ANALYSIS
APPENDIX C	SITE DRAWING WITH SAMPLE LOCATION (ASBESTOS)
APPENDIX D	PHOTOS
APPENDIX E	CERTIFICATION
APPENDIX F	FORM 8552

1.0 EXECUTIVE SUMMARY

Ambient Environmental Inc. was retained by the City of Los Angeles Department of Recreation and Parks Planning, Construction and Maintenance to perform sampling of the South Park Restrooms located at: 345 East 51st Street in Los Angeles, California. The survey was performed on April 11, 2019 by Mr. John L. Payne a California Certified Asbestos Consultant #93-1226 a United States Environmental Protection Agency (USEPA) certified asbestos building inspector and a California Department of Public Health Services (CDPHS) #25387 Certified Lead Sampling Technician.

The property consists of a one-story restroom building with exterior walls covered with wood, stucco or brick extending up to the roof level. Interior walls and ceiling are covered with plaster. Interior Floors are exposed concrete. Roof is covered with typical roofing with associated mastic. The restrooms are located within the Pool Building.

The purpose of the sampling was to obtain samples and readings from the interior and exterior buildings materials and/or components prior to demolition (Scope of Work) for detectable levels of asbestos and lead. Once the visual inspection was performed for asbestos, representative bulk samples were obtained from each accessible homogeneous building material. Homogeneous building materials are defined as building materials that are uniform in texture, construction or application date and general appearance. Also, each homogeneous building material was divided into three main categories: Surfacing Materials, Thermal System Insulation and Miscellaneous Materials. The sample location, building material type, friability and condition of building materials were also documented.

Asbestos bulk sampling was obtained in accordance with the USEPA established guidelines document, "Guidance for Controlling Asbestos-Containing Materials in Buildings" (USEPA 560/5-85-024, 1985) and USEPA 40 CFR Part 763.86 "Asbestos-Containing Materials in Schools, Final Rule" (AHERA). Each bulk sample was analyzed for asbestos content by Polarized Light Microscopy (PLM) Method EPA - 600/R-93-116 Visual Area Estimation.

Once the lead visual inspection was performed, suspect accessible painted/coated building components were categorized into homogeneous sample areas. Homogeneous sample areas are defined as areas in which suspect painted building components are uniform in color, texture, application date and general appearance. Representative XRF lead readings were obtained from each homogeneous sample area. Each XRF reading and condition of paint was also documented during the survey.

All accessible interior and exterior areas within the scope of work were visually inspected. Any building materials or component not identified in this report may be present within hidden and/or concealed areas or outside the scope of work. Laboratory analysis revealed detectable levels of asbestos above 0.1 % asbestos or assumed asbestos in the following building materials:

- There was no asbestos detected in any of the building materials sampled during the survey

South Park Restrooms
345 East 51st Street
Los Angeles, California

XRF Readings revealed detectable levels of lead greater than 0.06 mg/cm² or 600 parts per million (ppm) of lead in accordance with Title 8 CCR Section 1532.1 in the following building components:

- There was no lead detected above 0.06 mg/cm² or 600 ppm in any of the building components sampled during the survey

Locations and conditions of building materials or components assessed and sampled can be found in the Material Inventory (Tables).

2.0 SURVEY PROCEDURES

Ambient Environmental Inc. performed a survey to locate and identify suspect accessible building materials and components for detectable levels of asbestos and lead prior to the demolition activities within the scope of work. All accessible areas within the scope of work were surveyed for asbestos and lead. Building materials or components not identified in this report may be present within hidden or concealed areas of the building or outside the scope of work.

Building material identification was performed by entering each accessible functional space, assessing all structural/mechanical building materials and architectural finishes. The physical condition, friability, accessibility, activity and damage of suspect building materials were also assessed and documented.

Painted/coated building components were identified by entering each accessible functional space and assessing all structural/mechanical building components and architectural finishes. The physical condition, accessibility, activity and damage of paint/coating were also assessed and documented. The following procedures were performed during the survey:

- A visual assessment to identify the location, type and quantity of building materials and components.
- Obtain representative bulk samples from suspect building materials for asbestos.
- Obtain representative XRF reading from suspected building components for lead.
- Analyzed asbestos samples by an independent accredited laboratory for the presence of asbestos by PLM.
- Present all survey results in a written report including recommendations, locations, quantities and laboratory results.

All findings, recommendations, and analytical data presented in this report are based on the information (assessment, sampling data and readings) obtained by our inspector during the survey.

3.0 ASBESTOS BULK SAMPLING PROCEDURES

Each accessible suspect building material identified during the visual survey was sampled in accordance with sampling guidelines established by the USEPA. The following summarizes the sampling procedures utilized.

- Building materials were categorized into homogeneous building materials¹.
- A random sampling scheme was developed based upon the location and quantities of the various homogeneous building materials².
- Bulk samples were collected by extracting a representative section of each selected building material, placing the selected building material into a sampling container and assigning a unique sample number to each sample. The samples were then placed into a sealed shipping container for delivery to an accredited laboratory for analysis by PLM³.
- Each building materials was also categorized into friable and non-friable materials⁴.
- Personnel performed proper decontamination procedures to prevent the spread of secondary contamination.
- Each bulk sample was recorded on a bulk sample log and possession of the samples was tracked by a chain of custody record.
- The physical condition, friability, accessibility, activity and damage of building materials were also assessed and documented.

The reported laboratory results in this report are a visual estimate by area of asbestos concentration. Results for heterogeneous samples examined by component are reported as a composite. The lower limit of reliable detection for this method is 1%. Samples which contain more than 1% asbestos are reported in 5% ranges. Samples which contain asbestos in a concentration lower than the limit of reliable detection (<1%) are "Trace."

All bulk samples were submitted to Forensic Analytical located at: 2959 Pacific Commerce Drive Rancho Dominguez, California (310) 763-2374. Forensic Analytical is accredited by the American Industrial Hygiene Association (AIHA), National Voluntary Laboratory Accreditation Program (NVLAP #101459-0), National Institute of Standards and Testing (NIST), and is a successful participant in the Proficiency Analytical Testing Program (PAT). All findings, recommendations, and analytical data presented in this report are based on the information (assessment and sampling data) obtained by our inspector during the survey.

¹Homogeneous building materials are defined as building materials that are uniform in texture, construction or application date and general appearance.

²A random sampling grid was utilized for sample collection of each building material as described in the EPA guidance document, Asbestos in Building: Simplified Sampling Scheme for Friable Surfacing Materials (EPA 560/5-85-030a, October 1985 Random Number Diagrams). The minimum numbers of samples were obtained for each identified friable⁴ homogeneous building material based upon the overall square footage of material in table-1.

Sample Table-1

Size of Sampling Area	Number of Samples Collected
Less Than 1,000 sq. ft.	3 – Samples
Between 1,000 & 5,000 sq. ft.	5 – Samples
Greater than 5,000 sq. Ft.	*7 – Samples

*The recommended number of samples for friable⁴ building materials per AHERA is nine for areas greater than 5,000 square feet, or at least one additional sample per additional 1,000 square feet.

³Each sample was analyzed by an independent accredited laboratory for the presence of asbestos by Polarized Light Microscopy (PLM) method in accordance with the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples EPA - 600/R-93-116 dated December 1982 and adopted by the National Voluntary Laboratory Accreditation Program (NVLAP) Title 15, part 7 of the Code of Federal Register as affiliated with the National Institute for Standards and Testing (NIST) and USEPA 40 CFR Part 763.87. Quality Control (QC) program was strictly enforced to assure the accuracy of each sample result.

⁴Friable and Non-friable building materials assessments were conducted for each homogeneous building material by the use of hand pressure as defined in USEPA 40 CFR Part 763 "Asbestos-Containing Materials in Schools, Final Rule" (AHERA). Friable material is defined as any building material that by the means of hand pressure can be crumbled into a powder.

4.0 X-RAY FLUORESCENCE SAMPLING PROCEDURES FOR LEAD-BASED PAINT

The lead survey was accomplished by entering each accessible room equivalent. A room equivalent is an identifiable part of a building such as a room, hallway, staircase, foyer and exterior. Visible color may not be an accurate predictor of painting history and is not included in the definition of a testing location. Each reading locations, physical conditions, accessibility, activity and damage of suspect lead paint/coating were also assessed and documented

Readings were obtained from each building component identified within each room equivalent by the use of a hand-held X-Ray Fluorescence (XRF) lead based paint analyzer. The sample location and condition of paint/coating and component were documented. Department of Health Services standard for the definition of lead containing paint is 1.0 mg/cm² or 5000 parts per million (ppm) and the Los Angeles County is 0.7 mg/cm², however CALOSHA requires that all workers be properly protected when working with building components containing level greater than 0.06 mg/cm² or 600 ppm of lead in accordance with Title 8 CCR Section 1532.1.

For reporting purposes, space designations were assigned each functional space within the facilities using the pre-existing designation on the door or as indicated on the floor plans. Where neither was available, the space was labeled by the inspector and so indicated in the report. The following procedures were performed:

- A visual assessment to identify the location, type and building components suspected of containing lead paint within the scope of work.
- Obtain representative XRF readings from all building components within the scope of work.
- Present all survey results in a written report including recommendation, locations, quantities and XRF reading.

All findings, recommendations and XRF readings data presented in this report are based on the information (assessment and readings) obtained by our inspector during the survey.

South Park Restrooms
345 East 51st Street
Los Angeles, California

5.0 POSITIVE ASBESTOS SAMPLE RESULTS AND LOCATIONS

There was no asbestos detected in any of the building materials sampled during the survey. Other asbestos containing building materials may exist at the property within concealed areas of the property or outside the scope of work. If other building materials that are not identified in this report are discovered during the construction activities, these building materials should be samples prior to their removal.

South Park Restrooms
345 East 51st Street
Los Angeles, California

6.0 NEGATIVE ASBESTOS SAMPLE RESULTS AND LOCATIONS

Material	Sample Number	Location of Material
Interior Plaster	01 02 03	Throughout Interior Walls and Ceiling
Exterior Stucco	04 05 06	Throughout Exterior Walls
Exterior Brick and Mortar	07 08 09	Throughout Exterior Walls
Roofing	10 11 12	Throughout Roof
Roof Mastic	13 14 15	Throughout Roof

7.0 LEAD-BASED PAINT SAMPLE RESULTS AND LOCATIONS

Detection Limit Guidelines for Department of Health Services standard for the definition of lead containing paint is 1.0 mg/cm² or 5000 parts per million (ppm) and the Los Angeles County is 0.7 mg/cm², however CALOSHA requires that all workers be properly protected when working with building components containing level greater than 0.06 mg/cm² or 600 ppm of lead in accordance with Title 8 CCR Section 1532. The following highlighted building components indicate lead containing painted surfaces above these levels.

Location	Sample Number	Component	Substrate	Pbl mg/cm ²	Color	Condition
Calibration	---	---	---	1.0		---
Calibration	---	---	---	1.0		---
Calibration	---	---	---	1.0		---
Exterior	1	Wall	Wood	0.0	Tan	N/A
Exterior	2	Wall	Stucco	0.0	Tan	N/A
Exterior	3	Wall	Stucco	0.0	Tan	N/A
Exterior	4	Wall	Brick	0.0	Tan	N/A
Exterior	5	Wall	Brick	0.0	Tan	N/A
Exterior	6	Wall	Wood	0.0	Tan	N/A
Exterior	7	Facia	Wood	0.0	Brown	N/A
Exterior	8	Facia	Wood	0.0	Brown	N/A
Exterior	9	Door	Metal	0.0	Brown	N/A
Exterior	10	Door Jamb	Metal	0.0	Brown	N/A
Interior	11	Wall	Plaster	0.0	Tan	N/A
Interior	12	Wall	Plaster	0.0	Tan	N/A
Interior	13	Wall	Plaster	0.0	Tan	N/A
Interior	14	Wall	Plaster	0.0	Tan	N/A
Interior	15	Door	Metal	0.0	Brown	N/A
Interior	16	Door Jamb	Metal	0.0	Brown	N/A
Calibration	---	---	---	1.0		---
Calibration	---	---	---	1.0		---
Calibration	---	---	---	1.1		---

This lead containing building components table above is designed to aid the building owner, architect, construction manager, general contractors of potential lead containing building components within the scope of work. Other lead containing building components may exist at the property within concealed areas of the property or outside the scope of work. Any conditions of components identified in the above table were identified during the time of the survey. If other building components that are not identified in this report are discovered during the construction activities, these building components should be samples prior to their removal.

South Park Restrooms
345 East 51st Street
Los Angeles, California

8.0 DISCLAIMER

Any recommendations in this report are professional opinions based solely on visual observations and analytical analyses, as described in this report. Opinions or recommendations presented herein apply to site conditions existing at the time of our investigation and cannot necessarily apply to site changes of which this office is not aware of and/or has not had the opportunity to evaluate.



ASBESTOS BULK SAMPLE LOG Page 1 of 2

Client Name: REC 12 - PARK

Project Location: 345 EAST 51ST ST. L.A

Date: 4-11-19 Field Technician: John Ryan

Project Number: 19-1240 Priority: ASAP 24 HR 7 3-5 Days

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	SQUARE FOOTAGE
01	MKn	Fabric PLASTER	
02	MKn	↓ ↓	
03	womkn	↓ ↓	
04	FRONT	FERTILIZER STUCCO	
05	SIDE	↓ ↓	
06	SIDE	↓ ↓	
07	FRONT	BRICK/MORTAR	
08	SIDE	↓ ↓	
09	SIDE	↓ ↓	
10	ROOF	ROOFING	

Chain of Custody Analytical Method: PLM: TEM: Other:

Sampled By		Date	Time
Relinquished By		Date	Time
Received By	<u>John Ryan</u>	Date <u>04-15-19</u>	Time <u>9:21 am</u>
Relinquished By		Date	Time
Received By		Date	Time



AMBIENT ENVIRONMENTAL INC.
Consulting/Engineering/Remediation

400 North Princland Court Suite-3
Corona, California 92879
951 272-4730 Phone
951 272-4731 Facsimile
www.ambientenvinc.com

ASBESTOS BULK SAMPLE LOG Page 2 of 2

Client Name: RFC & PARK

Project Location: 345 FASEG ST L.A

Date: 4-11-19 Field Technician: John Ryan

Project Number: 191240 Priority: ASAP 24 HR Y 3-5 Days

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	SQUARE FOOTAGE
11	Roof	Roofing	
12	↓ f	↓ f	
13	Roof	MATERIAL	
14	↓ f	↓ f	
15	↓ f	↓ f	

Chain of Custody Analytical Method: PLM: > TEM: Other:

Sampled By		Date	Time
Relinquished By		Date	Time
Received By	<u>J Ryan</u>	Date <u>04-15-19</u>	Time <u>9:21am</u>
Relinquished By		Date	Time
Received By		Date	Time

APPENDIX A

**ASBESTOS CHAIN OF CUSTODY
AND BULK SAMPLE LOG**

Bulk Asbestos Analysis

(EPA Method 40CFR, Part 763, Appendix E to Subpart E and EPA 600/R-93-116, Visual Area Estimation)
NVLAP Lab Code: 101459-1

Ambient Environmental Inc
John Payne
400 N. Princeland Crt.
Ste. 3
Corona, CA 92879

Client ID: 5697
Report Number: B275941
Date Received: 04/15/19
Date Analyzed: 04/16/19
Date Printed: 04/16/19
First Reported: 04/16/19

Job ID/Site: 19-1240; 345 East 51st St., L.A.

FALI Job ID: 5697
Total Samples Submitted: 15
Total Samples Analyzed: 15

Date(s) Collected: 04/11/2019

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
01	51222671						
Layer: Paints			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
02	51222672						
Layer: Paints			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
03	51222673						
Layer: Paints			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
04	51222674						
Layer: Grey Cementitious Material			ND				
Layer: Beige Cementitious Material			ND				
Layer: Paint			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
05	51222675						
Layer: Grey Cementitious Material			ND				
Layer: Beige Cementitious Material			ND				
Layer: Paint			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
06	51222676						
Layer: Grey Cementitious Material			ND				
Layer: Beige Cementitious Material			ND				
Layer: Paint			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							

Client Name: Ambient Environmental Inc

Report Number: B275941

Date Printed: 04/16/19

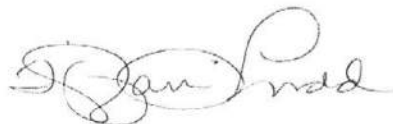
Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
07	51222677						
		Layer: Orange Non-Fibrous Material	ND				
		Layer: Paint	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (Trace)					
08	51222678						
		Layer: Orange Non-Fibrous Material	ND				
		Layer: Paint	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (Trace)					
09	51222679						
		Layer: Orange Non-Fibrous Material	ND				
		Layer: Paint	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (Trace)					
10	51222680						
		Layer: Beige/Brown Roof Shingle	ND				
		Layer: Black Tar	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (15 %)					
11	51222681						
		Layer: Beige/Brown Roof Shingle	ND				
		Layer: Black Tar	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (15 %)					
12	51222682						
		Layer: Beige/Brown Roof Shingle	ND				
		Layer: Black Tar	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (15 %)					
13	51222683						
		Layer: Black Semi-Fibrous Tar	ND				
		Layer: Black Tar	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (5 %)					
14	51222684						
		Layer: Black Semi-Fibrous Tar	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (7 %)					
15	51222685						
		Layer: Black Semi-Fibrous Tar	ND				
		Total Composite Values of Fibrous Components:	Asbestos (ND)				
		Cellulose (7 %)					

Report Number: B275941

Date Printed: 04/16/19

Client Name: Ambient Environmental Inc

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
-----------	------------	---------------	------------------	---------------	------------------	---------------	------------------



Tiffani Ludd, Laboratory Supervisor, Rancho Dominguez Laboratory

Note: Limit of Quantification ('LOQ') = 1%. 'Trace' denotes the presence of asbestos below the LOQ. 'ND' = 'None Detected'.

Analytical results and reports are generated by Forensic Analytical Laboratories Inc. (FALI) at the request of and for the exclusive use of the person or entity (client) named on such report. Results, reports or copies of same will not be released by FALI to any third party without prior written request from client. This report applies only to the sample(s) tested. Supporting laboratory documentation is available upon request. This report must not be reproduced except in full, unless approved by FALI. The client is solely responsible for the use and interpretation of test results and reports requested from FALI. Forensic Analytical Laboratories Inc. is not able to assess the degree of hazard resulting from materials analyzed. FALI reserves the right to dispose of all samples after a period of thirty (30) days, according to all state and federal guidelines, unless otherwise specified. All samples were received in acceptable condition unless otherwise noted.

APPENDIX B

**ASBESTOS LABORATORY
CERTIFICATES OF ANALYSIS**

APPENDIX C

**SITE DRAWING WITH
SAMPLE LOCATION
(ASBESTOS)**

APPENDIX D

PHOTOS



Interior



Roofing



Exterior

APPENDIX E
CERTIFICATIONS

DEPARTMENT OF INDUSTRIAL RELATIONS
Division of Occupational Safety and Health
Asbestos Unit
2424 Arden Way, Suite 495
Sacramento, CA 95825-2417
(916) 574-2993 Office (916) 483-0572 Fax
<http://www.dir.ca.gov/dir/databases.html> actu@dir.ca.gov



310191226C 80 87

Ambient Environmental, Inc.
John Lee Payne
1464 6th Street
Norco CA 92860

June 05, 2018

Dear Certified Asbestos Consultant or Technician:

Enclosed is your certification card. **To maintain your certification, you must abide by the rules printed on the back of the certification card.**

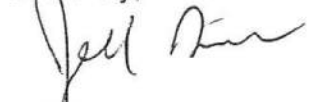
Your certification is valid for a period of one year. If you wish to renew your certification, you must apply for renewal at least 60 days before the expiration date shown on your card. [8 CCR 341.15(h)(1)].

Please hold and do not send copies of your required AHERA refresher renewal certificates to our office until you apply for renewal of your certification.

Certificates must be kept current if you are actively working as a CAC or CSST. The grace period is only for those who are not actively working as an asbestos consultant or site surveillance technician.

Please contact our office at the above address, fax number or email; of any changes in your contact/ mailing information within 15 days of the change.

Sincerely,


Jeff Ferrell
Senior Safety Engineer

Attachment: Certification Card

cc: File

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

John Lee Payne

Name

Certification No. **93-1226**

Expires on **06/24/19**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.



State of California Department of Public Health
Lead-Related Construction Certificate

<u>Certificate Type</u>	<u>Expiration Date</u>
Sampling Technician	10/23/2019



John L. Payne ID #: 25387



www.cdph.ca.gov

10/31/2020

A HAZ

AMBIENT ENVIRONMENTAL INC

CORP

997667



CONTRACTORS
STATE LICENSE BOARD
ACTIVE LICENSE



State of California Department of Public Health

Lead-Related
Construction
Certificate

Certificate
Type
Expiration
Date
Inspector/Assessor: 12/30/2018



Timothy J. Lane

ID# 29861

APPENDIX F

FORM 8552

LEAD HAZARD EVALUATION REPORT

Section 1 – Date of Lead Hazard Evaluation 4/11/2019

Section 2 – Type of Lead Hazard Evaluation (Check one box only)

Lead Inspection Risk assessment Clearance Inspection Other (specify) _____

Section 3 – Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)] 345 East 51st Street		City Los Angeles	County Los Angeles	Zip Code 90011
Construction date (year) of structure unknown	Type of structure <input type="checkbox"/> Multi-unit building <input type="checkbox"/> School or daycare <input type="checkbox"/> Single family dwelling <input checked="" type="checkbox"/> Other <u>Restroom</u>		Children living in structure? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Don't Know	

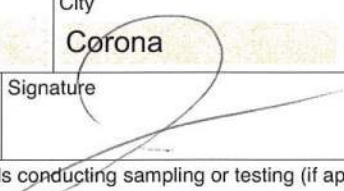
Section 4 – Owner of Structure (if business/agency, list contact person)

Name City of Los Angeles, Dept of Recreation and Parks (Lisa Waldez)		Telephone number 213-202-2664	
Address [number, street, apartment (if applicable)] 221 N. Figueroa St., Suite 400		City Los Angeles	State CA
		Zip Code 90012	

Section 5 – Results of Lead Hazard Evaluation (check all that apply)

No lead-based paint detected Intact lead-based paint detected Deteriorated lead-based paint detected
 No lead hazards detected Lead-contaminated dust found Lead-contaminated soil found Other _____

Section 6 – Individual Conducting Lead Hazard Evaluation

Name Timothy Lane		Telephone number 951-272-4730	
Address [number, street, apartment (if applicable)] 400 N. Princland Ct., Ste 3		City Corona	State CA
		Zip Code 92879	
CDPH certification number 29861	Signature 		Date 4/22/2019

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)
John Payne 25387

Section 7 – Attachments

- A. A foundation diagram or sketch of the structure indicating the specific locations of each lead hazard or presence of lead-based paint;
- B. Each testing method, device, and sampling procedure used;
- C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector
 Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:
 California Department of Public Health
 Childhood Lead Poisoning Prevention Branch Reports
 850 Marina Bay Parkway, Building P, Third Floor
 Richmond, CA 94804-6403
 Fax: (510) 620-5656

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4.0 Protection of Trees During Construction

Introduction

The objective of this section is to reduce the negative affects of construction on trees to a less than significant level.

Land development is a complex process and is even more challenging when trees are involved. Construction is one of the greatest causes of tree decline and death in urban areas.

The long-term goal of the Forestry Division is urban forest sustainability. This describes the maintenance of social, recreational, ecological and economic functions of trees and their benefits over time. Stewardship of naturally occurring and planted trees is a central element in forest sustainability. Concerns about tree health and structure, preservation during development and redevelopment, species and site selection, quality of planting stock, standards of performance, maintenance practices in our parks, and recycling are integral to a sustainable urban forest.

Tree protection should not begin subsequent to construction. If preservation measures are delayed or ignored until construction begins, the trees may be destined to fail. Because in most cases construction affects to trees cannot be completely eliminated, the goal for our parks planners and designers is to keep injury to trees to a minimum and allow building projects to proceed at the same time.

Successful tree preservation occurs when designers, construction personnel, and project managers are committed to tree preservation. All members of the project team must be familiar with the rudimentary aspects of tree growth and development in order to understand the relationship between tree survival and construction practices. Myths about how trees grow.

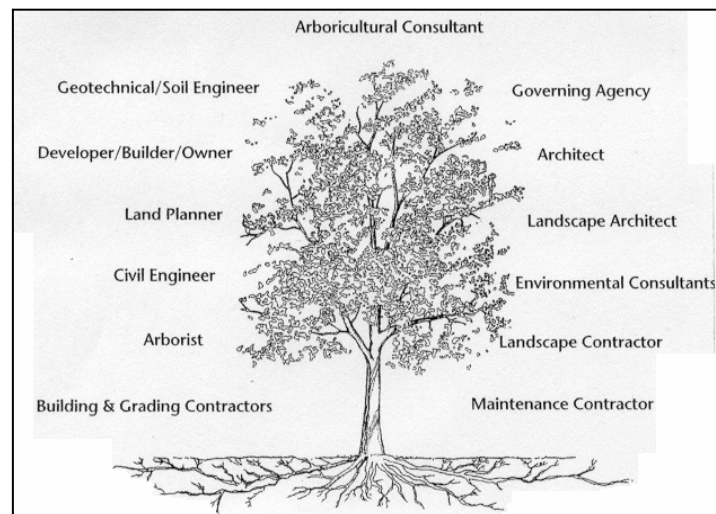
For example, above ground parts of trees is not a “mirror” of what lies below ground. In actuality, typically four to eleven large roots radiate from the base of a tree’s trunk. These “buttress” roots extend from the root crown and sometimes are visible when the trunk flares away from the root crown or collar. These large roots decrease in taper rapidly and branch repeatedly so that at distances of ten feet or more from the trunk they are about ½ inch in diameter or smaller.

These roots grow horizontally through the soil and depending on the tree can extend 40 feet or more beyond the branch tips. These smaller roots are primarily responsible for water and mineral absorption. There can be hundreds of roots in a cubic inch of soil— thus any removal of soil or root severance forces a tree to compromise its physiological processes to sustain the loss.

All trees cannot and should not be preserved. Trees that are structurally unstable, in poor health, or unable to survive effects of construction become a liability to the project and should be removed. A realistic tree preservation program acknowledges that conflicts between trees and development may sometimes result in the removal of some

trees and recognizes the detrimental effect to the project and community when trees die after construction is completed.

Successful tree preservation occurs when construction impacts to trees are minimized or avoided altogether. The challenge is to determine when impacts will be too severe for the tree to survive, not only in the short term, but also in the long term. There are no quantitative methods to calculate this critical level. Determining the optimum tree protection zone provides a guideline, although trees often survive and flourish with smaller protection areas.



Matheny, N.P. and Clark, J.R. 1998. *Trees and Development*

Tree Preservation during development requires the commitment of everyone involved in the project's planning, design, construction, and management.

The following are the three guiding principles for tree preservation:

- The acknowledgement that not all trees are in excellent health or have good structural stability.
- Tree preservation cannot be the responsibility of the Forestry staff alone. Each development participant must understand that his or her activities and decisions influence the success of tree preservation efforts.
- The ability of an arborist to cure construction injury is very limited, so the focus of preservation efforts is the *prevention* of damage.

Following the above principles will increase the chance for success and reduce the possibility that trees will die.

Efforts at preservation must include acknowledgement of the tree and its ecological support system.

4.10 Planning for All Projects

Capital improvement projects, in-house construction projects, sport field renovations, and even the addition of a few sprinkler lines affect trees. Our department considers trees as important assets and requires plotting tree locations on plans for all projects.

4.10.1 Planning and Designing for Capital Improvement Projects

Projects are designed by in-house design staff and by outside design firms. Either design team should be given set of guidelines defining the Department's *Tree Preservation Policy* (Appendix A) and *Tree Protection Guidelines* (Appendix G and Appendix I), to assure that trees are accounted for from project initiation forward.

A) Survey before Planning

The survey must accurately plot the trunk locations within the project site. Include construction staging areas and delivery routes.

B) Plan and Design with Knowledge of Trees

The health and structural confirmation of the surveyed trees must be evaluated in order to anticipate how well they will respond to development. The evaluation must describe the character of trees and their suitability for preservation at a level of detail appropriate for the project and phase of planning. An arboricultural or forestry consultant must be obtained for this evaluation.

C) Plan with a Vision

Disruption of any tree by construction activities may negatively affect its physiological processes, and cause depletion of energy reserves and decline in vigor, often resulting in tree death. Typically this does not manifest until many years after the tree is disrupted. Preservation of mature trees during construction has limitless benefits to the success of a project.

When new trees are planted, consideration should be given to species diversity and appropriateness of location. To prevent destructive clearance pruning in future years, keep in mind the ultimate canopy and root spread.

D) Plan for all Aspects and Entire Duration of Project

Construction projects are multi-level and often require participation of various construction trades and subcontractors. It is important to plan for tree protection with an understanding of construction dynamics. Trees must be protected in the staging area, construction employee parking area, adjacent properties, as well as on the actual construction site.

4.10.2 Managing In-House Construction Projects

The in-house Construction team should be given set of guidelines that define the Department's *Tree Preservation Policy* (Appendix A) and *Tree Protection Guidelines* (Appendix G and Appendix I), and to assure that trees are accounted for from project initiation forward.

A) Survey before Planning

For all in-house projects, contact the Forestry Division for an accurate survey of trees on the job site.

B) Plan and Design with Knowledge of Trees

In order to better understand the condition of the affected trees, the Forestry Division will make available the results of the tree evaluation. This evaluation will provide you with knowledge of the resources and the anticipated construction tolerance of the affected trees.

C) Plan with a Vision

Obtain information about trees and minimize negative impacts on the urban forest. Conduct all projects with tree preservation in mind.

D) Plan for all Aspects and for the Entire Duration of the Project

Trees must be protected in the staging area, construction employee parking area, and during demolition and grading. Arrange with the Sr. Park Maintenance Supervisor for trees to be watered and for the soil to be protected from compaction.

4.20 Pre-Construction Requirements - Tree protection and Preservation Plan

Prior to the commencement of a development project, the R&P Project Manager, and/or City-Wide Construction Supervisor, and/or Regional Head must be assured that if any activity of the project is within the dripline of *Protected Trees*, a site specific tree protection plan is prepared. The following six steps shall be incorporated as part of the Tree Protection and Preservation Plan:

4.20.1 Site Plan

For all projects, site plans must indicate accurately plotted trunk locations and *the dripline* areas of all trees or group of trees to be preserved within the development area. Additionally, for all *Protected Trees* the plans shall accurately show the trunk diameter, dripline and clearly identified *tree protection zones*. The type of protective fencing shall be specified and indicated with a bold dashed line.

4.20.2 Protective tree fencing for all categories of *Protected Trees*

Fenced enclosures shall be erected around trees to be protected. This will achieve three primary goals, (1) to keep crowns and branching structure clear from contact by equipment, materials, and activities; (2) to preserve roots and soil condition in an intact and non-compacted state and; (3) to identify the *Tree Protection Zone* in which no soil disturbance is permitted and activities are restricted, unless otherwise approved by the DRP Arborist.

All trees to be preserved shall be protected with five to six (5 to 6) foot high chain link fences. Fences are to be mounted on two-inch galvanized iron posts, driven into the ground to a depth of at least two feet and at no more than ten-foot centers. Install a two-foot wide access gate for tree maintenance. Tree fences shall be erected before demolition, grading, or construction begins and remain until final inspection of the

project. The ‘Warning’ sign shall be prominently displayed on each protective fence. The sign shall be a minimum of 8.5 inches x 11 inches and clearly state the following:

TREE PROTECTION ZONE
This Fence Shall Not be Removed

All work within the *Tree Protection Zone* requires approval of the DRP Arborist.

- A) Type I Tree Protection Fence is for trees to be preserved throughout the duration of the project. The fences shall enclose the entire area under the canopy dripline or *Tree Protection Zone*, if specified by the DRP Arborist. If fencing must be located on paving or concrete that will not be demolished, an appropriate grade level concrete base may support the posts.
- B) Type II Tree Protection Fence is for trees situated in small planting areas, where only the planting area is enclosed with the required chain link protective fencing. The walkways and traffic areas are left open to the public.
- C) Type III Tree Protection Fence is for trees in small tree wells, building site planters or sidewalk planters. Trees shall be wrapped with 2 inches of orange plastic fencing from the ground to the first branch and overlaid with 2-inch thick wooden slats that are bound securely (slats shall not be allowed to dig into the bark). During installation of the plastic fencing, caution shall be used to avoid damaging branches. Major scaffold limbs may also require plastic fencing as directed by the DRP Arborist.

No storage of material, topsoil, vehicles, or equipment shall be permitted within the fenced area throughout the entire duration of the construction project.

4.20.3 Verification of tree protection

The project contractor or construction supervisor shall verify in writing that all pre-construction tree preservation conditions have been met as follows:

- A) Tree fencing installed
- B) Erosion control secured
- C) Tree pruning completed
- D) Soil compaction preventive measures installed
- E) Tree maintenance schedule established

The Planning and Construction Project Manager, City-wide Construction Supervisor, or Region Head Superintendent and Head of Recreation and Parks Urban Forest must sign this verification.

4.20.4 Pre-construction meeting

The DRP Arborist shall attend all pre-construction meetings to assure that everyone fully understands previously reviewed procedures and tree protective measures concerning the project site, staging areas, hauling routes, watering, contacts, etc.

4.20.5 Tree Protection Zone

Each tree to be retained shall have a designated *Tree Protection Zone* identifying the area sufficiently large enough to protect it and its roots from disturbance. The *Tree Protection Zone* shall be shown on all site plans: Demolition, Grading, Irrigation, Electrical, Landscape, etc. Improvements or activities such as paving, utility and irrigation trenching including other ancillary activities shall occur outside the *Tree Protection Zone*, unless otherwise specified. The protection fence shall serve as the *Tree Protection Zone*.

A) Activities prohibited within the *Tree Protection Zone* include:

- Parking vehicles or equipment, storage of building materials, refuse, or excavated soils, or dumping poisonous material on or around trees and roots. Poisonous materials include, but are not limited to paint, petroleum products, concrete, stucco mix, dirty water or any material that may be harmful to tree health
- The use of tree trunks as a backstop, winch support, anchorage, as a temporary power pole, signpost or other similar function
- Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches, or other miscellaneous excavations without prior approval of the DRP Arborist
- Soil disturbance or grade change
- Drainage changes

B) Activities permitted or required within the *Tree Protective Zone* include:

- **Mulch:** During construction, wood chips may be spread within the *Tree Protection Zone* to a four to six inch depth, leaving the trunk clear of mulch. This will aid in inadvertent soil compaction and moisture loss. Mulch shall be 2-inch unpainted, untreated shredded wood or approved material.
- **Root Buffer:** When areas under the tree canopy cannot be fenced, a temporary buffer is required and shall cover the root zone and remain in place at the specified thickness until the final grading stage. The protective buffer shall consist of shredded wood chips spread over the roots at a minimum of 6-inches in depth (keeping the trunk clear of chips), and layered by ¾-inch quarry gravel to stabilize the 3/4-inch plywood sheets laid on top. Steel plates can also be used.
- **Irrigation, Aeration, fertilization, Mycorrhizae** treatments or other beneficial practices that have been specifically approved for use within the *Tree Protection Zone*.

C) Erosion Control:

If a tree is adjacent to or in the immediate proximity to a grade slope of 8% (23 degrees) or more, approved erosion control or silt barriers shall be installed outside the Tree Protection Zone to prevent siltation and/or erosion within the zone.

4.20.6 Tree Pruning and Removal

Prior to construction, various trees may need to be pruned away from structures or proposed construction activity. **Construction or contractor personnel shall not attempt pruning.** Only personnel approved by the DRP Arborist can perform pruning operations.

Removal of trees adjacent to trees that are to remain requires a great amount of finesse. Only personnel approved by the DRP Arborist shall engage in tree removal. Removal of trees that extend into branches or roots of protected trees shall not be attempted by the demolition or construction crew, or by grading or other heavy equipment. Before removing tree stumps, the project manager shall determine if roots are entangled with trees that are to remain. If so, these stumps shall have their roots severed before extracting them.

4.30 Activities During Construction and Demolition Near Trees

Soil disturbance or other damaging activities within the Tree Protection Zone is prohibited unless approved by the DRP Arborist and mitigation for specific injuries is implemented. **No encroachment within 10 feet of a trunk will be permitted under any circumstances.**

4.30.1 Soil Compaction

Soil compaction is the largest single factor responsible for the decline of trees on construction sites. The degree of compaction depends on several factors: amount and type of pressure applied, presence and depth of surface organic litter, soil texture and structure, and soil moisture level.

The greatest increase in soil density occurs during the first few equipment passes over the soil, which underscores the importance of implementing protective measures before the project begins and equipment arrives at the site. To dispense traffic weight mulch and temporarily root buffers can be used.

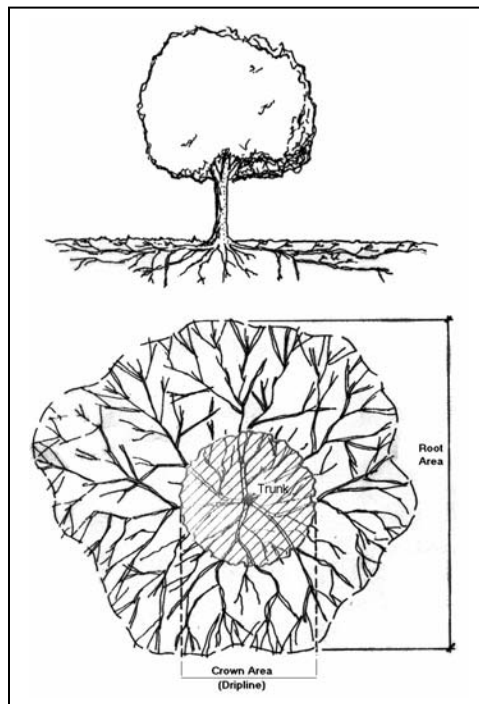
The following techniques can lessen compaction: vertical mulching, soil fracturing, core venting, and radial trenching. Do not compact soil to higher density than needed: to 95% Proctor density (moisture – density) in improved areas for asphalt or concrete pavements, and not to exceed 85% in unimproved open landscape areas that use water jet compaction.

4.30.2 Grading Limitations within the Tree Protection Zone

Lowering the grade around trees can have an immediate and long-term effect on trees. Typically, most roots are within the top 3 feet of soil, and most of the fine roots active in water and nutrient absorption are in the top 12 inches.

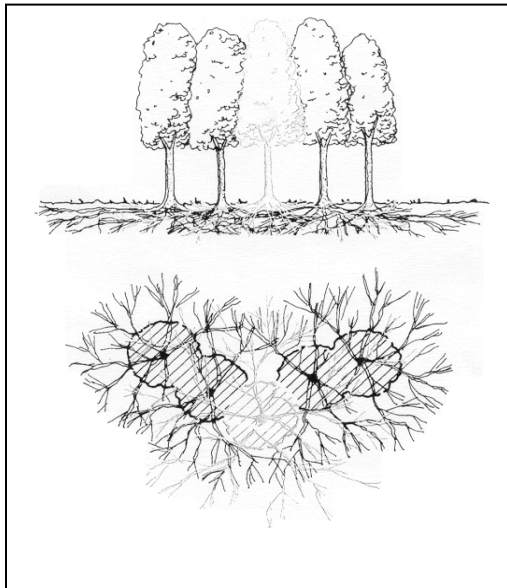
- A) Grade changes within the *Tree Protection Zone* are not permitted.
- B) Grade changes outside the *Tree Protection Zone* shall not significantly alter drainage.
- C) Grade changes under specifically approved circumstances shall not allow more than 6 inches of fill soil or allow more than 4 inches of existing soil to be removed from natural grade, unless mitigated.
- D) Grade fills over 6 inches or impervious overlay shall incorporate an approved permanent aeration system, permeable material, or other approved mitigation.
- E) Grade cuts exceeding 4 inches shall incorporate retaining walls or an appropriate transition equivalent.

The pictures on the next pages illustrate the pattern of tree root development and areas where encroachments may have an adverse effect on tree health. See Training Leaflets (Appendix P) for a list of information offered by the Forestry Division. The video, *Guide for Excavating Near Trees, Tunneling and Trenching* (International Society of Arboriculture) can be borrowed from the Forestry Office.



Matheny, N.P. and Clark, J.R. 1998. *Trees and Development*

Tree root system of a tree can be described as shallow and widespread, extending far beyond the edge of the canopy.



Matheny, N.P. and Clark, J.R. 1998. *Trees and Development*

In many parks where trees grow closely together, root systems of individual trees overlap and intertwine, forming a dense mat of roots.

4.30.3 Trenching, Excavation and Equipment Use

Trenching, excavation or boring within the *Tree Protection Zone* shall be limited to activities approved by the DRP Arborist. Explore alternatives for trenching outside the root zone. Avoid exposing roots during hot, dry weather. Backfill trenches as soon as possible with soil and soak with water the same day. Small roots can die in 10 to 15 minutes and large roots may not survive an hour of exposure. If the trench must be left open all roots must be kept moist by wrapping them in peat moss and burlap.

If trenching is unavoidable, the following distances should be maintained:

TRUNK DIAMETER (measured at 4.5 feet above natural grade)	DISTANCE FROM BOTH SIDES OF THE TRUNK
Up to 6 inches	Past dripline
6-9 inches	5 feet
10-14 inches	10 feet
15-19 inches	12 feet
over 19 inches	15 feet

A) **Root Severance.** No roots greater than 2 inches in diameter shall be cut without approval of the DRP Arborist. Tunneling under roots is the approved alternative. Prior to excavation for foundation/footing/walls, or grading or trenching within the *Tree Protection Zone*, roots shall be severed cleanly one-foot outside the *Tree Protection Zone* to the depth of the planned excavation. When roots must be cut, they shall be cut cleanly with a sharp saw to sound wood and flush with the trench site.

B) Excavation. Any approved excavation, demolition, or extraction of material shall be performed with equipment that is placed outside the *Tree Protection Zone*. Hand digging, hydraulic, or pneumatic excavation are permitted methods for excavation within the *Tree Protection Zone*.

C) Heavy Equipment. Use of backhoes, Ditch-Witches, steel tread tractors or other heavy vehicles within the *Tree Protection Zone* is prohibited unless approved by the DRP Arborist. If allowed, a protective root buffer is required.

4.30.4 Tunneling and Directional Drilling

Approved trenching or pipe installation within the *Tree Protection Zone* shall be either cut by hand, air-spade, or by mechanically boring a tunnel under the roots with a horizontal directional drill using hydraulic or pneumatic air excavation technology. In all cases, install the utility pipe immediately, backfill with soil and soak with water within the same day. Tunneling under the root system can greatly reduce both damage to the tree and the cost to repair landscape and other features destroyed in the trenching process. There are times, such as when working in rocky soils and slopes, when tunneling is not a reasonable alternative.

The following recommendations for tunneling depths should be observed:

TRUNK DIAMETER (DBH)	MINIMUM TUNNEL DEPTH
Less than 12 inches	24 inches
12 inches or more	36 inches

4.30.5 Alternative Methods for Hardscape to Prevent Root Cutting

The following remedies should be considered as an alternative to severing tree roots:

- A) Grinding a raised walkway or concrete pad
- B) Ramping the walkway surface over the roots or lifted slab with pliable paving.
- C) Routing the walkway around tree roots
- D) Permeable paving materials (e.g., decomposed granite), interlocking pavers, or flagstone walkways on sand foundations

4.30.6 Using Alternative Base Course Materials

Engineered structural soil mix is an alternative material for hardscape areas near trees. More information can be found at www.amereq.com.

4.40 Tree Maintenance During Construction

Providing adequate maintenance can mitigate stressful changes that occur to a tree's environment during construction. To remain vigorous the tree needs to maintain stored carbohydrates and preserve the effectiveness of its growth regulators. It is recommended that large projects provide:

4.40.1 Irrigation

Providing supplemental irrigation for trees under water stress may be the single most important treatment. Irrigation should be designed to wet the soil within the *Tree Protection Zone* to the depth of the root zone and to replace that water once it is depleted. Light, frequent irrigation should be avoided. Create a six-inch berm around trees at the edge of the *Tree Protection Zone* and fill with no more than six inches of mulch. Fill the basin with water. Irrigation should wet the top two to three feet of soil to replicate similar volumes and normal seasonal distribution.

4.40.2 Soil Compaction Mitigation

To prevent negligent encroachment into the *Tree Protection Zone*, trees to be preserved during construction must have the specified type of protection fences in place at all times. Removal of fences, even temporarily, to allow deliveries or equipment access is not allowed unless approved by the DRP Arborist and a root buffer is installed. The root buffer components: mulch, gravel and plywood, must be maintained continually to assure its effectiveness against soil compaction.

4.40.3 Dust Control

During periods of extended drought, wind or grading, trunks, limbs and foliage should be sprayed with water to remove accumulated construction dust.

4.50 Damage to Trees

4.50.1 Reporting Injury to Trees

Any damage or injury to trees shall be reported as soon as possible to the Project Manager or Construction Supervisor, and always to the Park Maintenance Supervisor. The Park Maintenance Supervisor needs to be aware of an injured tree in order to monitor its recovery or progress. Injuries to roots and branches must be repaired immediately.

4.50.2 Contractor Subject to Penalties.

If a tree designated to remain is removed or irreversibly damaged as determined by the Recreation and Parks Arborist, a contractor may be required to install a replacement tree matching in size, quality and variety, using a contractor designated by the Recreation and Parks Arborist. If an acceptable replacement tree is not available, the contractor may be required to pay damages to the City for the value of the damaged tree in accordance with the guidelines set forth in the Guide for Plant Appraisal, 9th Edition, using the Trunk Formula Method.

4.50.3 Employees Subject to Discipline

In the event of damage to above- or below-ground parts of park trees, the Construction Supervisor or Park Maintenance Supervisor shall conduct an investigation to determine the cause of the damage. If it is found that damage was caused due to the error, negligence, or willfulness of a Department employee, then that employee may be subject to appropriate disciplinary action.

4.60 Documents to be Included in all Projects

4.60.1 Model Tree Protection Specifications for Designers and Project Managers (Appendix G)

This document should be distributed to the Planning and Construction Designers, Project Managers, City Inspectors, bidding contractors, and contracted designing firms.

4.60.2 Tree Protection Summary and Instructions on How to Prevent Damage to Trees During Construction (Appendix I)

This document should be distributed to the Construction and Maintenance staff for implementation during all in-house projects.

4.70 Right Of Entry Permits and Documents to be included with every permit

Carnivals and festivals that are celebrated in our parks provide exceptional and enriching opportunities that bring our communities together. These activities can potentially affect the park environment. Filming crews, food concessions, permitted vendors, and special events activities affect the physical properties of our parks and trees.


In order to sustain a healthy urban forest, it is imperative that all Department staff understands the need to protect park trees. Every individual, organization or agency given a Right of Entry, permit or agreement to enter Department property, should be in compliance with Department policies protecting park trees and be given documentation the will help to ensure tree protection during the permitted activity. The document titled Instructions on How to Prevent Damage to Trees During Construction (Appendix I) shall be distributed to every permittee and the permittee shall comply with these instructions.

COUNTY CLERK'S USE
ORIGINAL FILED

OCT 19 2018

LOS ANGELES, COUNTY CLERK

CITY OF LOS ANGELES
 OFFICE OF THE CITY CLERK
 ROOM 395, CITY HALL
 LOS ANGELES, CALIFORNIA 90012
 CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION
 (Articles II and III – City CEQA Guidelines)

CITY CLERK'S USE
 DOCUMENT FILED
 City Clerk's Office
 NE-18-101-SE
 No. _____
 Certified by 
 Date: 10-19-18

Submission of this form is optional. The form shall be filed with the County Clerk, 12400 E. Imperial Highway, Norwalk, California, 90650, pursuant to Public Resources Code Section 21152(b). Pursuant to Public Resources Code Section 21167(d), the filing of this notice starts a 35-day statute of limitations on court challenges to the approval of the project.

LEAD CITY AGENCY AND ADDRESS: City of Los Angeles c/o Los Angeles City Engineer 1149 S. Broadway, MS 939 Los Angeles, CA 90015	COUNCIL DISTRICT 9
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PROJECT TITLE: South Park Renovations	CIP No. G881, G882, K355 W.O. E1908367	LOG REFERENCE
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PROJECT LOCATION: The project address is 345 E. 51st St., Los Angeles, CA 90011 and located between E. 49th St. to the north, E. 51st St. to the south, San Pedro St. to the west, and S. Avalon Blvd. to the east. The area is a mix of residential and commercial properties. The project is in the Southeast Los Angeles Community Plan Area. T.G. 674-D4

DESCRIPTION OF NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The project consists of park renovations, upgrades, and improvements. The scope of work includes landscaping and beautification elements including tree removal and planting, expanding parking areas, upgrades to existing turf sports field, relocation and upgrades to basketball courts including new sports field lighting, renovation of the onsite public restrooms and fitness area, and the reconstruction and relocation of the maintenance yard and shed. Refer to the attached narrative for additional detail. Beneficiaries of the project are the local residents and park users. On October 17, 2018, the Board of Recreation and Parks Commission determined this action is exempt from CEQA and approved the Project.


CONTACT PERSON Amanda Amaral	TELEPHONE NUMBER 213-485-5733
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EXEMPT STATUS: (Check One)	CITY CEQA GUIDELINES	STATE CEQA GUIDELINES
<input type="checkbox"/> MINISTERIAL	Art. II, Sec. 2.b	Sec. 15268
<input type="checkbox"/> DECLARED EMERGENCY	Art. II, Sec. 2.a(1)	Sec. 15269(a)
<input type="checkbox"/> EMERGENCY PROJECT	Art. II, Sec. 2.a(2)(3)	Sec. 15269(b)(c)
<input type="checkbox"/> GENERAL EXEMPTION	Art. II, Sec. 1	Sec. 15061(b)(3)
<input checked="" type="checkbox"/> CATEGORICAL EXEMPTION*	Art. III, Sec. 1 Class 1, (2)(3)(12)	Sec. 15301 (d)
	Art. III, Sec. 1 Class 2, (3)	Sec. 15302 (c)
	Art. III, Sec. 1 Class 3, (5)(6)	Sec. 15303 (d)(e)
	Art. III, Sec. 1 Class 4, (3)(12)	Sec. 15304 (b)(f)
<input type="checkbox"/> STATUTORY*	Art. _____	Sec. _____

* See Public Resources Code Sec. 21080 and set forth state and city guidelines provisions.

JUSTIFICATION FOR PROJECT EXEMPTION: This project falls under State CEQA Guidelines Sections 15301 (d), 15302 (c), 15303 (d)(e), and 15304 (b)(f) as well as under *City of Los Angeles CEQA Guidelines* Art. III Class 1 (Cat. 2, 3, and 12), Class 2 (Cat. 3), Class 3 (Cat. 5 and 6), and Class 4 (Cat. 3 and 12) because it involves minor alterations of existing facilities and new construction of small structures with no expansion of existing use. None of the limitations set forth in State CEQA Guidelines 15300.2 apply (See attached narrative).

IF FILED BY APPLICANT, ATTACH CERTIFIED DOCUMENT OF EXEMPTION FINDING

SIGNATURE:  Maria Martin	TITLE: Environmental Affairs Officer Environmental Management Group	DATE: 10/18/18
FEE: \$75.00	RECEIPT NO.	REC'D BY
		DATE

CATEGORICAL EXEMPTION NARRATIVE

I. PROJECT DESCRIPTION

The project has the goal of repairing, renovating, and revitalizing South Park, located in the southeast Los Angeles Community Plan Area. The project scope includes:

Landscaping

Landscaping work will require removal of existing concrete paving, tubular steel security and playground fencing, chain link pool fencing, drinking fountains, picnic tables, turf and irrigation.

New and improved landscaping elements will include concrete walkways, colored concrete picnic and seating areas, interlocking concrete paving stones, decomposed granite fitness path, asphalt parking lots, synthetic turf fields, tubular steel pool/security/planter fencing, and chain link soccer, baseball and basketball court fencing, and outdoor fitness stations with rubber surfacing.

Existing picnic tables, barbecues, and benches will be relocated. New park furniture will be installed including steel picnic tables, steel benches, steel trash can enclosures, barbecues, fitness and playground equipment.

Low Impact Development (LID)

Stormwater impacts will be addressed through Low Impact Development (LID) infiltration designs which are incorporated into the basketball courts and park areas with synthetic turf. LID elements will improve wet and dry weather water infiltration and court drainage. Approximately 20-25% of the original turf in the park area will be replaced with mulch/tree plantings to reduce overall water use and maintenance needs. A new smart irrigation system will be installed to meet the watering needs for the entire site. The system will collect hourly weather station sensor data to calculate an evapotranspiration (ET) value. Based on the ET value, the system will adjust the irrigation to apply only the amount of water needed based on the hydrological zone (water needs) of the planting. The irrigation design eliminates the use of spray irrigation in non-turf areas, and utilizes stream bubblers in shrub planting, thereby increasing irrigation efficiency and reducing overspray and runoff.

Trees and Plants

The City of Los Angeles' Urban Forestry Division has identified approximately 40 dying/dead trees to be removed, in addition to 51 other trees to be removed due to the Project design, many of which are under 3-inch caliper. The iconic palm walkway is not impacted by any tree removals. A total of 277 new trees will be planted; exceeding a 3:1 tree replacement/removal ratio. The proposed tree replacement species and quantities are listed in Table 1 below:

Table 1. Proposed South Park Tree Replacements

Botanical Name	Common Name	Quantity
AFROCARPUS GRACILIOR	AFRICAN FERN PINE	30
ARAUCARIA HETEROPHYLLA	NORFOLK ISLAND PINE	3

Botanical Name	Common Name	Quantity
ARBUS X 'MARINA'	MARINA HYBRID MADRONE	18
CUPRESSUS ARIZONICA 'GLABRA'	ARIZONA CYPRESS	24
EUCALYPTUS CLADOCALYX	SUGAR GUM	13
FICUS RUBIGINOSA	RUSTY LEAF FIG	13
HYDROANTHUS IMPETIGINOSUS	PINK TRUMPET TREE	17
JACARANDA MIMOSIFOLIA	JACARANDA	18
JUBAEA CHILENSIS	CHILEAN WINE PALM	26
LOPHOSTEMON CONFERTUS	BRISBANE BOX	31
PINUS ELDARICA	MONDELL PINE	17
PISTACIA CHINENSIS	CHINESE PISTACHE	29
QUERCUS BUCKLEYI	TEXAS RED OAK	4
TECOMA STANS	YELLOW BELLS	24
TIPUANA TIPU	TIPU TREE	6
VITEX AGNUS- CASTUS	CHASTE TREE	24
Additional trees for future phases	(species not yet determined)	31
Total:		328

Drought-tolerant shrubbery, mulch, and tree plantings will replace approximately 25% of the park's original turf, thus reducing overall water use and maintenance needs.

Lighting

The existing lighting system will be removed and replaced with new lighting including pathway and security lighting.

New sports field lighting will be installed for the synthetic soccer field, relocated basketball courts, and the existing natural turf baseball/soccer field. The scope of work includes:

- Basketball Courts - Installation of two (2) new light poles with Light Emitting Diodes (LED) fixtures. Poles are 40 feet in height with a 12-foot foundation depth. These lights replace previously existing basketball court sports lights.
- Synthetic Soccer Field – Installation of four (4) new light poles. Poles are 70 feet in height with a 14-foot foundation depth.
- Existing Natural Turf Baseball/Soccer Field – One (1) existing 70-foot pole with metal halide lights will be relocated to accommodate new field alignment. Pole foundation

depth is 14 feet. One (1) new sports light will be added to allow for the squaring of the field.

Maintenance Yard and Shed

The existing maintenance yard and shed, asphalt parking lot, turf, and irrigation system will be removed and reconstructed/relocated to the northwestern corner of the park adjacent to the synthetic soccer field. The new maintenance building will house storage, a work shop, maintenance equipment, and offices for park maintenance staff. Yard construction will include a new asphalt paved parking lot, trash enclosures, concrete walkways and maintenance road (including repair of existing sidewalk) and new concrete driveway aprons, security lighting, fencing, site drainage with LID planters, landscaping, and irrigation elements.

Basketball Courts

The location of the existing maintenance yard will be replaced with two (2) side-by-side asphalt basketball courts and fencing. The courts will be equipped with an LID infiltration system to allow for stormwater infiltration.

Baseball/Soccer Field

The existing baseball field located in the southwest corner of the park will be modified to allow for multipurpose field play in the outfield area. The baseball field has existing sports field lighting.

Parking

While 34 public parking spaces will be removed from the new maintenance yard area and replaced with five (5) new employee spaces, a new 50-space public parking lot will be installed on the west side of the park. Additionally, six (6) parking spaces will be added to the existing Recreation Center and pool area parking lot. The existing southwest parking lot with 60 public parking spaces will remain unchanged.

Public Restrooms

The existing multiple occupancy restrooms' interiors will be demolished and completely renovated to include (5) unisex single occupancy restrooms, exterior drinking fountains, and a Janitor's closet.

II. ENVIRONMENTAL REVIEW

Basis for Categorical Exemption

The project involves repairing, renovating, and revitalizing elements throughout South Park including the relocation and reconstruction of the maintenance building and basketball courts, park landscaping and beautification, parking expansion, utility upgrades and utility installation, and sports field lighting improvements. The project falls under the following categorical exemptions included in Guidelines Sections 15301 (d), 15302 (c), 15303 (d), and 15304 (b)(f) of State CEQA Guidelines, as well as under those included in Art. III Class 1 (Cat.2, 3, and 12), Class 2 (Cat. 3), Class 3 (Cat. 5 and 6), and Class 4 (Cat. 3 and 12) of the *City of Los Angeles CEQA Guidelines*.

Consideration of Potential Exceptions to use of a Categorical Exemption

The State CEQA Guidelines (CCR Sec 15300.2) limit the use of categorical exemptions in the following circumstances:

1. Location. Exemption Classes 3, 4, 5, 6, and 11 are qualified by consideration of where the project is to be located – a project that is ordinarily insignificant in its impact on the environment may be significant in a particularly sensitive environment. Therefore, these classes are considered to apply all instances, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

This project is located in a highly urbanized area and has not been identified as a sensitive environment. As such, this exception does not apply.

2. Cumulative Impact. This exception applies when, although a particular project may not have a significant impact, the cumulative impact of successive projects of the same type in the same place, over time is significant.

Given the nature of the project which includes the repair and revitalization of an existing park through landscaping improvements, utility upgrades, installation of new playground and workout equipment, expanded parking, and given the life expectancy of the equipment, this project is not anticipated to result in a cumulative impact when included with successive projects in the same place and over time.

3. Significant Effect. This exception applies when, although the project may otherwise be exempt, there is a reasonable possibility that the project will have a significant effect due to unusual circumstances.

Air Quality

Standard SCAQMD Handbook and WATCH guidelines would be applicable for staging, construction and post-construction activities. As such, this exception does not apply.

Light/Glare

The existing lighting system will be removed and replaced with new lighting including pathway and security lighting. All sports field lighting fixtures will be focused to minimize light spillage. Field lighting will be operated daily during the evening hours until 10:00 pm. The new lighting systems will be operated to ensure that off-property spillage is contained within the limits set by the Los Angeles Municipal Code Sect. 93.0117, which prohibits the installation of exterior lighting sources that would illuminate residential units and their appurtenances by more than two (2) footcandles of lighting intensity.

Traffic/Transportation

Construction staging areas will occur on the project site and will not interfere with the public right-of-way. Street parking for construction related activities is not anticipated. As such, traffic and parking impacts are not anticipated.

Historical Resources

A historical resources evaluation, including a records search and on-site assessment, was conducted by Historic Resources Group (HRG) Environmental Consultants. Based on their evaluation, no cultural resource impacts were identified or anticipated in the project area. Please see number 6 below for details on how unanticipated discoveries will be treated. The project's intent is to revitalize and repair South Park. As the repairs will be made in areas previously disturbed, no unusual circumstances are anticipated.

4. Scenic Highway. A categorical exemption shall not be used for a project which may result in damage to scenic resources, including but not limited to trees, historic buildings, rock outcroppings, or similar resources, within a highway officially designated as a state scenic highway.

According to the Department of Transportation California Scenic Highway Mapping System for Los Angeles County (http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways) the project area is not within a highway, or within the vicinity of a highway, officially designated as a state scenic highway.

5. Hazardous Waste Site. This exception applies when a project is located on a site listed as a hazardous waste site under Government Code Section 65962.5.

As of August 24, 2018, the State Department of Toxic Substances Control (DTSC) (Envirostor at www.envirostor.dtsc.ca.gov) has not listed any contaminated sites within the project site or the in vicinity of the project.

As of August 24, 2018, the California Regional Water Quality Control Board (RWQCB) website (Geotracker at <https://geotracker.waterboards.ca.gov/>) has not listed any contaminated sites within the project site or in the vicinity of the project.

Based on the above information, this exception does not apply.

6. Historical Resources. This exception applies when a project may cause a substantial adverse change in the significance of a historical resource.

As discussed above, the project is not anticipated to have adverse significant impacts to historical resources.

The project's excavation will not exceed approximately five (5) feet (exception is sports field lighting poles with a foundation depth of between 12-14 feet), and will occur within areas previously disturbed by grading, domestic water main and lateral lines, and other utilities. Therefore, the likelihood of interfering with historical resources is low. However, in case historical artifacts are encountered, City Engineer Standard Specifications, Section 6-3.2, states: "If discovery is made of items of archaeological or paleontological interest, the Contractor shall immediately cease excavation in the area of discovery and shall not continue until ordered by the Engineer." Therefore, during activities in which there will be ground disturbances (i.e., digging, drilling, etc.) if any evidence of archaeological, cultural, or paleontological resources are found, all work within the vicinity of the find shall stop until a qualified archaeologist can assess the finds and make recommendations. No excavation of any finds should be attempted by project personnel unless directed by a qualified archaeologist. Work in other areas may continue.

Since the project includes all these limitations, this exception does not apply.

Project Area

