

Hidalgo County Biosafety Lab
100% Design Development Submittal
Final Report



August 9, 2021

APPROVAL SHEET

Submitted for Approval of Schematic Design

The A/E represents that the drawings and descriptions, to the best of the A/E's knowledge and belief, fulfill the Project Scope requirements and that the construction can be completed for the Construction Budget amount, and within the Project Schedule:



Eli R. Ochoa, PE, AIA Principal / CEO

Date



Brian Godinez, Principal / CMO

Date



Maria O. Scurry, Senior Project Manager

Date

Approval on Behalf of Hidalgo County

Those signing below have reviewed the information contained within this Schematic Design Submittal:

Richard F. Cortez, County Judge

Date

Arturo Guajardo Jr., County Clerk

Date

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Probable Cost of Construction
HC BIOSAFETY LABS
ERO Architects



ERO Architects
Project No. 20030

Designed By:
Maria O. Scurry, PE

Prepared By: Maria O. Scurry, PE
Preparation Date: Friday, August 6, 2021

Effective Date of Pricing: Friday, August 6, 2021
Est Construction Time: 300 Days

DISCLAIMER

We wish to inform you that because of the uncertainty in the construction industry, resulting from the effects of the COVID-19 pandemic, ERO Architects cannot and does not warrant or represent that bids or negotiated prices will not vary from the Hidalgo County Health and Human Services budget for the Cost of the Work (CW), or from any Probable Costs of Construction (PCC) of the CW, or evaluation, prepared or agreed to by ERO Architects. It is acknowledged that ERO Architects has no control over market conditions, in general nor those resulting from COVID-19 responses, that affect; the availability of either contractors, sub-contractors, suppliers or vendors, the cost of labor, materials, or equipment; the Contractor's methods of determining bid prices; or competitive bidding, or negotiating conditions.

For further clarification, Cost of the Work (CW), is defined as the total cost to Hidalgo County Health and Human Services to construct all elements of the projects designed or specified by ERO Architects, and includes contractors' general conditions costs, overhead and profit. The CW also includes the reasonable value of labor, materials, and equipment, donated to, or otherwise furnished by Hidalgo County Health and Human Services. The CW does not include the compensation of ERO Architects, the costs of the land, rights-of-way, financing, or contingencies for changes in the Work; or other costs that are the responsibility of Hidalgo County Health and Human Services.

CLARIFICATIONS & EXCLUSIONS

1. This Probable Cost of Construction (PCC) report is based on the Feasibility Phase.
2. PCC Report is based on today's pricing available through RS Means and local pricing from contractors, sub-contractors, suppliers and vendors.
3. It is the ERO's opinion that the anticipated (PCC) in this report should be escalated at a rate of 6% per year, compounded, to the start of construction once the construction schedule is determined. The PCC on this report has an escalation of 6 months.
4. PCC Report includes the following contingencies:
 - a. Feasibility Package Design Contingency of 7%.
 - b. Owner Contingency of 3%.
5. PCC report does not include fixtures, furniture and equipment (FFE) similar but not limited to:
 - a. Desks and chairs.
 - b. Computers.
6. PCC Report does not include any utility deposits or inspection fees.
7. PCC Report does not include any costs associated with inspections or specialty inspectors of any kind. Owner will provide all required inspections and certified inspectors required in association with permits provided by TCEQ, TPDES and all other governing agencies that may be applicable to this project.
8. PCC Report does not include the cost of relocation or moving expenses.
9. PCC Report does not include materials testing, which shall be paid for and provided by the Owner and will be coordinated with the Contractor.
10. PCC Report does not include hazardous material surveys, abatement, handling and/or removal of any of any environmentally hazardous material encountered, removal or replacement of any unsuitable subsurface materials during the course of the work.
11. The following detailed prices are derived from projects in the Rio Grande Valley, TX.
12. Pricing that ERO was not able to obtain from local contractors and/or vendors was based on the latest information provided on RS means, which is 2nd quarter 2021.

SUMMARY INFORMATION

AREA INFORMATION

	Interior	Porches	Totals
CLINIC/ADMINISTRATION	7,747	117	7,864
LABORATORY	2,279	0	2,279
	10,026	117	10,143 SF

COST ESTIMATE LEVEL I SUMMARY

System	Sub-Total	\$/SF	%
A. SUBSTRUCTURE	\$182,445	\$17.99	3.87%
B. SHELL	\$679,338	\$66.98	14.39%
C. INTERIORS	\$562,180	\$55.43	11.91%
D. SERVICES	\$1,889,804	\$186.32	40.04%
E. EQUIPMENT & FURNISHINGS	\$0	\$0.00	0.00%
F. SPECIAL CONSTRUCTION & DEMOLITION	\$261,225	\$25.75	5.53%
G. BUILDING SITEWORK	\$198,285	\$19.55	4.20%
	\$3,773,276	\$372.01	79.94%
H. CONTRACTOR FEES & CONTINGENCIES	\$946,620	\$93.33	20.06%
TOTAL Building Cost Estimate for 08.06.2021	\$4,719,896	\$465.34	100.00%

Escalated Total Building Cost

\$4,802,495

\$473.48

Date of Escalated Estimate
3.5 Number of months escalated
6.00% per year

\$4,802,495

OWNER PROVIDED FFE

VALUE MANAGEMENT STRATEGIES

Line Number	Description	Quantity	Unit	Unit Cost	Sub-Total	Total
A. SUBSTRUCTURE		10,143	SF	\$17.99		\$182,445
A10	Foundations			\$17.99	\$182,445	
A1010	Standard Foundation				\$44,223	
A10102107750a	4' x 4' Spread Footing, 24 inches deep	9.00	Ea	\$621.50	\$5,594	
A10101105100	Perimeter Grade Beam, 64 in. wide x 16 in. deep	404.00	LF	\$92.76	\$37,475	
A10101051560a	Wall Foundation, 10 in. wide x 2 ft. deep	31.30	LF	\$36.89	\$1,155	
A1020	Special Foundation				\$57,269	
A1020	Excavation for building pad foundations, remove 24" to 5ft outside of the building line, includes haul-off.	909.04	CY	\$18.00	\$16,363	
A1020	Compacted select fill for building pad, includes a 40 miles cycle haul, sheepsfoot rollover, 8" lifts	1,363.56	CY	\$30.00	\$40,907	
A1030	Slab on grade				\$80,952	
A10301204520	Slab on grade, 6" thick, light industrial, reinforced	10,582.00	SF	\$7.65	\$80,952	
A20	Basement Excavation			\$0.00	\$0	
B. SHELL		10,143	SF	\$66.98		\$679,338
B10	Superstructure			\$27.42	\$278,087	
B1020	Roof Construction				\$278,087	
B10201124900	Typical K-series Joist, 20K4 @5ft O.C., 7.2 plf, 1.4 lb/sf	7.10	Ton.	\$10,800.00	\$76,681	
B1020a	Metal roof deck, 1.5B22 Galv., 1.78 lb/sf	9.03	Ton.	\$10,800.00	\$97,495	
B1020b	Steel Columns, 22.37 plf,	1.61	Ton.	\$10,800.00	\$17,395	
B1020c	Steel Beams, 35plf	5.67	Ton.	\$10,800.00	\$61,236	
B1020d	Misc. steel, Ton. @ 12% of total steel = 5.25 Ton., used for bracing, closure angles, loose lintels, connections.	2.81	Ton.	\$9,000.00	\$25,281	
B20	Exterior Closure			\$26.17	\$265,404	
B2010	Exterior Walls				\$188,685	
B2010004000a	5.1/2" Tilt-Up Concrete Walls, includes 2" insulation, fluid applied membrane, exterior paint, gyp, & scaffolding	5,951.00	SF	\$23.81	\$141,705	
	6" metal studs, includes 2" insulation, fluid applied membrane, metal panel, gyp, & scaffolding	307.00	SF	\$52.12	\$16,001	B20101461500a 054113306400
B2010004000b	5.1/2" Tilt-Up Concrete Walls and scaffolding	641.00	SF	\$17.49	\$11,212	
B20101305050	6" metal studs, brick, gyp, & scaffolding	42.00	SF	\$20.43	\$858	
B20101251000	Brick veneer only	662.00	SF	\$14.40	\$9,533	
B20101195650	CMU Dumpster Enclosure, 8x8x16 split face cmu, paint	235.00	SF	\$20.22	\$4,752	
	Trash Enclosure Gate	1.00	Ea	\$3,000.00	\$3,000	
323129200700a	Generator fence, cedar, 4 feet tall	55.00	LF	\$29.52	\$1,624	
B2010	Exterior Soffit				\$4,320	
B20101461500	Metal Panel	109.00	SF	\$39.63	\$4,320	

Line Number	Description	Quantity	Unit	Unit Cost	Sub-Total	Total
B2020	Exterior Windows					\$43,972
B2020210180a	Alum. Storefront w/ 1" Ins. Glass.	450.00	SF	\$78.48	\$35,316	
12211313130020	Metal 1' horizontal blinds	812.00	SF	\$7.34	\$5,960	
88113300500	Frosted Glass (additional)	133.00	SF	\$20.27	\$2,696	
B2030	Exterior Doors					\$28,427
B20301106400	Door, Aluminum & glass, hardware, single door 3'-0" x 7'-0" opening.	3	Ea	\$3,549.32	\$10,648	
B20302203700	Door, steel 18 gauge, hollow metal, double door with frame, no label, 6'-0" x 7'-0".	2	Ea	\$5,139.68	\$10,279	
B2030001a	Door Hardware Accessories.	5	Ea	\$1,500.00	\$7,500	
B30	Roofing			\$13.39	\$135,847	
B3010	Roof Coverings					\$131,859
B30101204000a	TPO, single-ply.	10,143.00	SF	\$13.00	\$131,859	
B3020	Roof Openings					\$3,988
B3020	Metal Roof Ladder.	16.00	VLF	\$64.65	\$1,034	
B30202100800	Roof hatch, with curb, 1" fiberglass insulation, 2'x6" x 8'-0", aluminum curb and cover, 260 lbs.	1.00	Ea	\$2,953.50	\$2,954	
C. INTERIORS		10,143	SF	\$55.43		\$562,180
C10	Interior Construction			\$37.21	\$377,450	
C1010	Partitions					\$103,852
C10101265060	Metal Partitions, 5/8" gyp. Board face, both faces 3 5/8" @ 16" O.C.	11,674	SF	\$4.76	\$55,603	
C10101265060a	Metal Partitions, 5/8" gyp. Board face, both faces 6" @ 16" O.C.	4,396	SF	\$5.41	\$23,782	
C10107100000a	Glazed openings, Aluminum Frames, 1/4" Tempered	362	SF	\$58.33	\$21,115	
85113204600	Sliding Windows, aluminum, commercial grade, standard glass 8' x 4'	3	Ea	\$499.11	\$1,497	
	Overhead pass through door, 4' x 6', electric motor with side and overhead stripping	1	Ea	\$1,853.31	\$1,853	
C1020	Interior Doors					\$148,262
C10201222000	Wood door/metal frame, hollow core/flush, 3'-0" x 7'-0" opening, no label.	36	Ea	\$753.94	\$27,142	
	Interior Storefront Door	1	Ea	\$1,620.00	\$1,620	
	Lab door/fiber glass frame, poly door with foam core, 3'-0" x 7'-0" opening, no label.	9	Ea	\$4,500.00	\$40,500	
	Lab door/fiber glass frame, poly door with foam core, 4'-0" x 7'-0" opening, no label.	2	Ea	\$5,000.00	\$10,000	
C1020001a	Door Hardware Accessories.	46	Ea	\$1,500.00	\$69,000	
C1030	Fittings					\$125,337
C10307100130	Paper towel dispenser, flush mounted, waste receptacle.	17	Ea	\$496.73	\$8,444	
C10307100150	Grab bar sets. 1.1/2" diameter, 36" long	5	Ea	\$142.22	\$711	
C10307100170	Lavatory Mirror.	5	Ea	\$353.33	\$1,767	
C10307100190	Roll tissue dispenser, surface mounted.	5	Ea	\$45.03	\$225	
C1030a	Clothes hooks.	13	Ea	\$25.00	\$325	
C1030b	Soap dispenser, wall mounted.	13	Ea	\$57.10	\$742	
C10300000000c	Casework, upper/lower cabinets	214	LF	\$499.59	\$106,912	
10303100610	Metal Shelving	71	LF	\$87.46	\$6,210	

Line Number	Description	Quantity	Unit	Unit Cost	Sub-Total	Total
C20	Staircases			\$0.00	\$0	
C30	Interior Finishes			\$18.21	\$184,730	
C3010	Wall Finishes				\$65,157	
C30102301940	Wall Ceramic tile, thinset, 4.1/4" x 4.1/4".	1,051	SF	\$7.96	\$8,366	
C30102300080	Painting interior on plaster and drywall, brushwork, primer & 2 coats.	23,885	SF	\$2.02	\$48,248	
C30102301160	Epoxy coating. Up to 9 ft ceiling	2,455	SF	\$3.48	\$8,543	
C3020	Floor Finishes				\$56,253	
C30204101600	VCT	6,755	SF	\$5.02	\$33,910	
C30204101740	Floor Mosaic Tile, porcelain.	325	SF	\$10.05	\$3,266	
C3020b	Concrete Floor Sealer.	299	SF	\$1.19	\$356	
C3020c	Epoxy Floor	1,860	SF	\$7.81	\$14,527	
C3020d	Vinyl Sheet Flooring	392	SF	\$10.70	\$4,194	
C3030	Ceiling Finishes				\$63,320	
C30301105700	Gypsum board ceilings, 5/8" fire rated gypsum board, painted and textured finish, 1-5/8" metal stud furring, 24" OC support.	544	SF	\$3.61	\$1,964	
C3030a	Gypsum ceiling tile, 3/4", moisture and fire resistant (vinyl), 24" x 24" tile, tee grid, suspended support.	2,070	SF	\$8.50	\$17,595	
C30302106100	Acoustic ceilings, 3/4" fiberglass board, 24" x 24" tile, tee grid, suspended support.	5,029	SF	\$8.59	\$43,199	
C3030d	Exposed structure, spray painted.	299	SF	\$1.88	\$562	
D. SERVICES		10,143	SF	\$186.32		\$1,889,804
D10	Conveying Systems			\$0.00	\$0	
D20	Plumbing			\$10.54	\$106,877	
D2010	Plumbing Fixtures.	10,026	SF	\$1.64	\$16,443	
D2020	Domestic Water Distribution.	10,026	SF	\$2.11	\$21,155	
D2030	Sanitary Waste.	10,026	SF	\$4.08	\$40,906	
D2040	Rain Water Drainage.	10,026	SF	\$1.64	\$16,443	
D2090	Other Plumbing Systems.	10,026	SF	\$1.19	\$11,931	
D30	HVAC			\$140.02	\$1,420,186	
D3020	Heat Generating Systems.	7,647	SF	\$8.64	\$66,070	
D3030	Cooling Generating Systems.	7,647	SF	\$8.64	\$66,070	
D3040	Distribution Systems.	7,647	SF	\$2.76	\$21,106	
D3050	Terminal & Package Units.	7,647	SF	\$8.29	\$63,394	
D3060	Controls & Instrumentation.	1	EA	\$50,000.00	\$50,000	
D3070	System Testing & Balancing.	7,647	SF	\$1.73	\$13,229	
D3070	Commissioning.	7,647	SF	\$0.00	\$0	
D3090	Other HVAC Systems & Equipment.	7,647	SF	\$1.04	\$7,953	
D3091	Special HVAC Systems & Equipment (Lab)	2,155	SF	\$523.90	\$1,129,005	
D3092	Speical HVAC Systems & Equipment (Clinic)	224	SF	\$15.00	\$3,360	

Line Number	Description	Quantity	Unit	Unit Cost	Sub-Total	Total
D40	Fire Protection			\$3.21	\$32,585	
D4010	Sprinklers	10,026	SF	\$1.63	\$16,342	
D4020	Standpipes.	10,026	SF	\$1.46	\$14,638	
D4030	Fire Protection Specialties.	10,026	SF	\$0.08	\$802	
D4090	Other Fire Protection Systems.	10,026	SF	\$0.08	\$802	
D50	Electrical			\$32.55	\$330,156	
D5010	Electrical Service & Distribution.	10,026	SF	\$16.46	\$165,028	
D5020	Lighting & Branch Wiring.	10,026	SF	\$14.16	\$141,968	
D5030	Communications & Security.	10,026	SF	\$1.48	\$14,838	
D5090	Other Electrical Systems.	10,026	SF	\$0.83	\$8,322	
E. EQUIPMENT & FURNISHINGS		10,143	SF	\$0.00		\$0
E10	Equipment			\$0.00	\$0	
E1090	Other Equipment				\$0	
E20	Furnishings			\$0.00	\$0	
E2020	Moveable Furnishings				\$0	
F. SPECIAL CONSTRUCTION & DEMOLITION		10,143	SF	\$25.75		\$261,225
F10	Special Construction			\$25.75	\$261,225	
F10	Pre-finished aluminum canopies.	1.00	Lump	\$99,000.00	\$99,000	
F1010a	10% Drop Off	10%			\$162,224.74	6sw7
F20	Selective Building Demolition			\$0.00	\$0	
G. BUILDING SITEWORK		10,143	SF	\$19.55		\$198,285
G10	Civil Improvements			\$16.32	\$165,504	
	Clear and grub	1.75	Acre	\$4,789.24	\$8,381	
	Mobilization	1	LS	\$10,000.00	\$10,000	
	2" HMAC (Parking Stalls)	817	SY	\$12.50	\$10,213	
	6" Compacted Crushed Limestone (Parking Stalls)	817	SY	\$10.00	\$8,170	
	8" Subgrade Lime Treated (Parking Stalls)	817	SY	\$20.00	\$16,340	
	2" HMAC (Driveway Isles)	682	12	\$12.50	\$8,525	
	8" Compacted Crushed Limestone (Driveway Isles)	682	SY	\$11.00	\$7,502	
	8" Subgrade Lime Treated (Driveway Isles)	682	SY	\$20.00	\$13,640	
	Fire Line Striping	623	LF	\$1.50	\$935	
	Yellow 4" Striping	826	LF	\$0.60	\$496	
	Blue Handicap Symbol	5	EA	\$100.00	\$500	
	Yellow One Way Arrow	2	EA	\$95.00	\$190	
	Curb & Gutter	1,086	LF	\$20.00	\$21,720	

Line Number	Description	Quantity	Unit	Unit Cost	Sub-Total	Total
	Excavation (10")	417	CY	\$30.00	\$12,510	
	8" Concrete Apron	53	SY	\$74.00	\$3,922	
	6" Dumpster Concrete Pad	25	SY	\$45.00	\$1,125	
	4" Concrete Sidewalk	288	SY	\$37.00	\$10,656	
	Sidewalk Drains	2	EA	\$250.00	\$500	
	Parallel Curb Ramp	6	EA	\$500.00	\$3,000	
	Connect to Existing Sewer Line	1	LS	\$500.00	\$500	
	6" Sanitary Sewer Service Lateral	24	LF	\$25.00	\$600	
	6" Clean Out	1	EA	\$500.00	\$500	
	2" Water Service Line	25	LF	\$15.00	\$375	
	6"x6" Cut-In Tee MJ	1	EA	\$3,000.00	\$3,000	
	6" Gate Valve W/Valve Box, MJ	2	EA	\$1,500.00	\$3,000	
	6" Dip Fire Line	120	LF	\$25.00	\$3,000	
	6"x6" Tee MJ	1	EA	\$1,500.00	\$1,500	
	Fire Hydrant	1	EA	\$4,000.00	\$4,000	
	Sediment Control Fence	385	LF	\$3.00	\$1,155	
	Grate Inlet Protection	40	LF	\$10.00	\$400	
	Curb Inlet Gravel Filter	15	LF	\$10.00	\$150	
	Barricades, Signs, & Traffic Handling	3	LS	\$3,000.00	\$9,000	
				\$3.23	\$32,781	
	Hydro Mulch	1150	SY	\$0.25	\$288	
	Grass Solid Sod	0			\$0	
	SPRAY IRRIGATION SYSTEM	1	LS	\$3,900.00	\$3,900	
	DRIP IRRIGATION SYSTEM TREES	1	LS	\$2,960.00	\$2,960	
	DRIP IRRIGATION SYSTEM	1	LS	\$11,600.00	\$11,600	
	Vegetation Barrier	281	SY	\$0.75	\$211	
	PLANT MATERIAL (100-GAL)	1	EA	\$1,025.00	\$1,025	
	PLANT MATERIAL (65-GAL)	0	EA	\$600.00	\$0	
	PLANT MATERIAL (45-GAL)	0	EA	\$200.00	\$0	
	PLANT MATERIAL (30-GAL)	11	EA	\$235.00	\$2,585	
	PLANT MATERIAL (4' Palm)	0	EA	\$250.00	\$0	
	PLANT MATERIAL (2.5)[B&B]	1	EA	\$275.00	\$275	
	PLANT MATERIAL (20-GAL)	1	EA	\$125.00	\$125	
	PLANT MATERIAL (15 GAL)	0	EA	\$75.00	\$0	
	PLANT MATERIAL (10-GAL)	0	EA	\$45.00	\$0	
	PLANT MATERIAL (5-GAL)	3	EA	\$15.00	\$45	
	PLANT MATERIAL (1-GAL)	126	EA	\$12.00	\$1,512	
	PLANT MATERIAL (B&B - 1 GAL)	0	EA	\$25.00	\$0	
	Plant Bed Preparation	281	SY	\$5.50	\$1,546	
	Landscape Amenity Type 1 (boulder)	11	EA	\$200.00	\$2,200	
	Loose Aggr. Type 1	31	CY	\$97.00	\$3,007	
	Landscape Boulder 3'x5'	0			\$0	
	Landscape Boulder 2'x4'	0			\$0	
	Loose Aggr. Type 2	0	CY	\$97.00	\$0	
	Top Soil	281	SY	\$3.00	\$843	
	CONCRETE CURB (SPECIAL)	55	LF	\$12.00	\$660	
	Mobilization	0	LS	\$0.00	\$0	
	Barricades Signs Traffic Hand.	0	MO	\$0.00	\$0	
	LEVEL I - SYSTEMS SUB-TOTAL	10,143	SF	\$372.01		\$3,773,276

Line Number	Description	Quantity	Unit	Unit Cost	Sub-Total	Total
H. Contractor Fees & Contingencies		10,143	SF	\$93.33		\$946,620
H10	Contractor Fees (in Series)			\$51.02	\$517,539	
	General Conditions			8.00%	\$301,862	\$4,075,138
	Bonds			1.00%	\$40,751	\$4,115,890
	Overhead & Fee			4.25%	\$174,925	\$4,290,815
H20	Contingencies on "Fee" total above			\$42.30	\$429,081	
	Feasibility Package Design Contingency			7.00%	\$300,357	
	Owner Contingency			3.00%	\$128,724	
TOTAL Building Cost Estimate for 08.06.2021		10,143	SF	\$465.34		\$4,719,896
<i>* Refer to Escalated Total Building Cost Estimate</i>						
K. Escalated Total Building Cost		10,143	SF	\$473.48		\$4,802,495

11/16/2021 Date of Escalated Estimate
3.5 Number of months escalated
6.00% per year

DESIGN DEVELOPMENT OUTLINE SPECIFICATION

FOR

**HIDALGO COUNTY
BIOSAFETY LABORATORY**

EDINBURG, TEXAS

7/7/2021

ERO ARCHITECTS
20030

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DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

00 21 19 INSTRUCTIONS FOR PRICING

A. Pricing Documents:

1. Drawings and Specifications dated 7/7/2021 are incomplete. Those providing pricing to the Owner shall provide for further development of the Drawings and Specifications by the Architect that is reasonably consistent with the information shown. Such further development does not include items such as changes in scope, systems, kinds, and quality of materials, finishes, or equipment, all of which, if required, shall be the basis for a change in Statement of Probable Cost.
 - a. In the event of a conflict between Drawings and Specification, those providing pricing to the Owner shall use the more expensive requirement in developing the Statement of Probable Cost.
2. Include a Construction Contingency that may be used at the Contractor's discretion to cover construction costs but which do not justify a change in Statement of Probable Cost.

B. Attachments to Statement of Probable Cost

1. In submitting a Statement of Probable Cost to the Owner, attach a written statement of its basis. Include:
 - a. Probable cost organized by trade categories, allowances, contingency, "general conditions," and other items and the Contractor's overhead and profit.
 - b. List of allowances and statement of their basis.
 - c. List of Drawings and Specifications, including any addenda and contract terms and conditions used in preparation of this information.
 - d. List of clarifications and assumptions made by the Contractor in the preparation of Guaranteed Probable cost to supplement information contained in the Drawings and Specifications.
 - e. Date of Substantial Completion upon which the proposed probable cost is based.
- C. Meet with Owner and Architect to review Statement of Probable Cost and the written statement of its basis. In the event that the Owner or Architect discovers any inconsistencies or inaccuracies in the information presented, they shall make appropriate adjustments.

00 31 32 GEOTECHNICAL DATA

- A. A geotechnical report for the site will be prepared and forwarded to the Contractor at a later date.

00 52 00 AGREEMENT

- A. Based on AIA A111, "Owner-Contractor Agreement Form - Stipulated Sum" (2017).

1 72 00 GENERAL CONDITIONS

- A. Based on AIA A201, "General Conditions of the Contract for Construction" (2017),

DIVISION 01 GENERAL REQUIREMENTS

- B. Summary: Work consists of the construction of a single-story medical laboratory building with approximately 10,000 square feet of floor area and related site improvements.
- C. Division 01 “General Requirements” will be standard for construction contract administration by Architect and as appropriate for scale of project. Sections may include:
 - 01 10 00 SUMMARY
 - 01 21 00 ALLOWANCES
 - 01 22 00 UNIT PRICES
 - 01 23 00 ALTERNATES
 - 01 25 00 SUBSTITUTION PROCEDURES
 - 01 26 00 CONTRACT MODIFICATION PROCEDURES
 - 01 29 00 PAYMENT PROCEDURES
 - 01 31 00 PROJECT MANAGEMENT AND COORDINATION
 - 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
 - 01 33 00 SUBMITTAL PROCEDURES
 - 01 40 00 QUALITY REQUIREMENTS
 - 01 42 00 REFERENCES
 - 01 43 39 MOCKUPS
 - 01 50 00 TEMPORARY FACILITIES AND CONTROLS
 - 01 56 39 TEMPORARY TREE AND PLANT PROTECTION
 - 01 60 00 PRODUCT REQUIREMENTS
 - 01 73 00 EXECUTION
 - 01 77 00 CLOSEOUT PROCEDURES
 - 01 78 23 OPERATION AND MAINTENANCE DATA
 - 01 78 39 PROJECT RECORD DOCUMENTS
 - 01 79 00 DEMONSTRATION AND TRAINING

2 21 00 ALLOWANCES

- A. Includes administrative and procedural requirements governing allowances.
- B. Contract Sum includes allowances indicated.
 - 1. Allowance shall include cost to Contractor of the following:
 - a. Specific products and materials ordered by Owner or selected by Architect under allowance.
 - b. Taxes, freight, and delivery to Project site.
 - c. Receiving and handling at Project site.
 - d. Labor for installation.
 - 2. Overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

3. Use contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

C. Schedule of Allowances:

1. Allowance No. 1, Owner's Contingency Allowance: Lump sum contingency allowance of eighty thousand, seven hundred, seventy, and no/100 dollars (\$80,770.00) for use by the Owner for improvements of the project.

01 23 00 ALTERNATES

- A. Includes administrative and procedural requirements for alternates.
- B. Alternate: An amount proposed by for certain work defined in the Construction Documents that may be added to or deducted from the base bid amount if Owner decides to accept the specified alternate described in the Contract Documents.
 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- C. Schedule of Alternates: To be determined.

DIVISION 01 00 00 GENERAL REQUIREMENTS

01 89 00 SITE CONSTRUCTION PERFORMANCE REQUIREMENTS

PART 1 GENERAL

SECTION INCLUDES

Remove surface debris.

Clear site of plant life and grass. Being careful to avoid plant life and other features (such as protected wetlands and the associated buffer) remaining as a portion of final landscaping as designated by OWNER.

Remove trees and shrubs.

Remove root system of trees and shrubs.

PART 2 PRODUCTS

MATERIALS

All materials and equipment used in conjunction with this work shall be considered incidental to the work.

PART 3 EXECUTION

PROTECTION

Notify corporations, companies, individuals, or authorities owning utilities running to property before work begins and immediately notify any utilities encountered during excavating operations.

Cap or remove services in accordance with instructions by owners of services. Protect, support, and maintain utilities that are to remain. Protect trees, plant growth, and features designated to remain as final landscaping. Protect benchmarks from damage or displacement.

CLEARING

Clear areas required for access to site and execution of Work. Remove trees and shrubs within marked areas. Remove stumps and root system to a minimum depth of 12 inches.

Clear undergrowth and deadwood without distributing subsoil. Herbicides shall not be used unless directed by OWNER.

REMOVAL

Remove debris, rock, and extracted plant life as directed by OWNER.

Remove topsoil to entire depth in areas where grade is to be raised

and in all areas to be covered by structure, walk, or paving. Stockpile where indicated on Drawings or designated by OWNER. Stockpile for proper drainage. Strip stockpile areas of vegetation prior to stockpiling.

END OF SECTION

ISSUED FOR DD REVIEW
8/6/2021

**HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Edinburg, Texas**

DIVISION 02 EXISTING CONDITIONS (NOT USED)

7/7/2021

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

20030

DIVISION 03 CONCRETE

3 30 00 CAST-IN-PLACE CONCRETE

- A. Includes cast-in-place concrete, reinforcing, and formwork.
- B. Refer to Structural Drawings for requirements.

DIVISION 03 00 00 CONCRETE**03 21 00 PLAIN STEEL REINFORCEMENT BARS**

440.1. Description. This Item shall govern for the furnishing and placing of deformed and smooth reinforcing steel, of the sizes and details shown on the plans and in accordance with this Item.

All Producing Mills of reinforcing steel for the Texas Department of Transportation use shall be preapproved by the Division of Materials and Tests prior to furnishing reinforcing steel. Preapproval will be in accordance with Test Method Tex-741-I. A list of Department approved Producing Mills will be maintained by the Division of Materials and Tests. Reinforcing steel obtained from unapproved sources will not be permitted.

All reinforcing steel to be epoxy coated will be designated on the plans. Epoxy coating of reinforcing steel shall be in accordance with "Epoxy Coating of Reinforcing Steel" of this Item.

All epoxy applicators shall be preapproved by the Division of Materials and Tests prior to furnishing epoxy coated reinforcing steel. Preapproval will be in accordance with Test Method Tex-742-I. A list of Department approved applicators will be maintained by the Division of Materials and Tests.

440.2. Materials. Unless otherwise shown on the plans or specified herein, the reinforcing steel shall be Grade 60 and all bar reinforcement shall be deformed, conforming to one of the following:

- (1) ASTM A615, Grades 40 or 60, open hearth, basic oxygen, or electric furnace new billet steel.
- (2) ASTM A617, Grades 40 or 60, axle-steel.
- (3) ASTM A616, Grade 60, rail steel will be permitted in concrete pavement only. ASTM A616 bars shall be furnished as straight bars only and bending is prohibited. Bend test will not be required.
- (4) ASTM A706, Grade 60, weldable reinforcing steel.
- (5) Smooth Bars. Smooth bars for concrete pavement shall have a minimum yield strength of 60 ksi.

All other smooth bars, larger than No. 4, may be steel conforming to the above or may be furnished in any steel that meets the physical requirements of ASTM A36.

- (6) Spiral reinforcement shall be either smooth or deformed bars, or wire, of the minimum size or gage shown on the plans, or as specified herein.

Bars for spiral reinforcement shall comply with ASTM A675, Grade 80 (reference to ASTM A29 is voided) A615 or A617, Grade 40, unless otherwise shown on the plans. Smooth wire shall comply with ASTM A82 and deformed wire shall comply with ASTM A496.



In cases where the provisions of this Item are in conflict with the provisions of the ASTM Specification, the provisions of this Item shall govern.

Reinforcing steel to be structurally welded shall comply with ASTM A706 or shall have a carbon equivalency (C.E.) of not more than 0.55 %. A report of chemical analysis, showing the percentages of all elements necessary to establish the carbon equivalency, will be required for all reinforcing steel that is to be structurally welded. The above requirements do not pertain to miscellaneous welds on reinforcing steel as defined in Item 448, "Structural Field Welding."

Carbon equivalency will be calculated using the following formula:

$$C.E. = \%C + \frac{\%Mn}{6} + \frac{\%Cu}{20} + \frac{\%Ni}{10} + \frac{\%Cr}{50} - \frac{\%Mo}{50} - \frac{\%V}{10}$$

The nominal size, area and weight of reinforcing steel bars covered by this specification areas follows:

BAR SIZE NUMBER	NOMINAL DIAMETER IN.	NOMINAL AREA SQ.IN.	WEIGHT PER LINEAR FT.
2	0.250	0.05	0.167
3	0.375	0.11	0.376
4	0.500	0.20	0.668
5	0.625	0.31	1.043
6	0.750	0.44	1.502
7	0.875	0.60	2.044
8	1.000	0.79	2.670
9	1.128	1.00	3.400
10	1.270	1.27	4.303
11	1.410	1.56	5.313

Smooth round bars shall be designated by size number through No. 4. Smooth bars above No. 4 shall be designated by diameter in inches.

(7) Wire for fabric reinforcement shall conform to ASTM A82 or A496. Wire fabric shall conform to ASTM A185 or A497.

When wire is ordered by size numbers, the following relation between size number, diameter in inches and area shall apply unless otherwise specified. Where deformed wire is required, the size number shall be preceded by "D," and for smooth wire the prefix shall be "W."



SIZE NUMBER	NOMINAL DIAMETER IN.	NOMINAL AREA SQ. IN.
30	.0618	0.300
28	0.597	0.280
26	0.575	0.260
24	0.553	0.240
22	0.529	0.220
20	0.505	0.200
18	0.479	0.180
16	0.451	0.160
14	0.422	0.140
12	0.391	0.120
10	0.357	0.100
8	0.319	0.080
7	0.299	0.070
6	0.276	0.060
5.5	0.265	0.055
5	0.252	0.050
4.5	0.239	0.045
4	0.226	0.040
3.5	0.211	0.035
3	0.195	0.030
2.5	0.178	0.025
2	0.160	0.020
1.5	0.138	0.015
1.2	0.124	0.012
1	0.113	0.010
0.5	0.080	0.005

Note: Fractional sizes between the sizes listed above are also available and acceptable for use. Welded wire fabric will be designated as shown in the following example:

6 x 12 - W16 x W8; indicating six (6) inch longitudinal wire spacing and 12 inch transverse wire spacing with smooth number 16 wire longitudinally and smooth number 8 wire transversely.

(8) Epoxy Coating. The epoxy coating material and the material used for the repair of the coating shall comply with the Departmental Materials Specification D-9-8130, "Epoxy Powder Coating For Reinforcing Steel." Copies of the Departmental Materials Specifications are available from the Texas Department of Transportation, Division of Materials and Tests, 125 East 11th Street, Austin, Texas 78701-2483. An eight (8) ounce sample of epoxy powder and manufacturer's certifications will be required for each lot of epoxy powder used to coat materials for Department projects.

440.3. Bending. The reinforcement shall be bent cold, true to the shapes shown on the plans. Fabrication shall preferably be done in the shop. Field fabrication, if permitted, shall be done with equipment approved by the Engineer. Misfabricated, damaged or broken bars shall be rejected and replaced at the Contractor's expense. Damaged or broken bars imbedded in a previous concrete placement may be repaired with the approval of the Engineer.



Unless otherwise shown on the plans, the inside diameter of bar bends, in terms of the nominal bar diameter (d), shall be as follows:

Bends of 90° and greater in stirrups, ties and other secondary bars that enclose another bar in the bend shall be:

#3, #4, #5 4d
#6, #7, #8 6d

All bends in main bars and in secondary bars not covered

above shall be: #3 thru #8 6d
#9, #10, #11 8d
#14, #18 10d

Where bending of Grade 60 bars, sizes No. 14 or No. 18, is required, bend testing shall be performed on representative specimens as described for smaller bars in the applicable ASTM Specification. The required bend shall be 90 degrees around a pin having a diameter of 10 times the nominal diameter of the bar.

440.4. Tolerances. Fabricating tolerances for bars, from plan dimensions, shall not be greater than shown in Figure 1.

440.5. Storing. Steel reinforcement shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected from damage and deterioration as approved by the Engineer. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil, or other foreign materials. Reinforcement shall be free from defects such as cracks and laminations. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum cross-sectional area of a hand wire brushed specimen meets the requirements for the size of steel specified.

440.6. Splices. Splicing of bars, lap spliced or welded, shall be as shown on the plans or specified herein. Additional splices will require written approval of the Engineer.

Splices not provided for on the plans will be permitted in slabs 15 inches or less in thickness, columns, walls and parapets, but will not be included for measurement, subject to the following:

Unless otherwise approved by the Engineer, splices will not be permitted in bars 30 feet or less in plan length. For bars exceeding 30 feet in plan length, the distance center to center of splices shall not be less than 30 feet minus one splice length, with no more than one individual bar length less than 10 feet. Lap splices not shown on the plans, but permitted herein, shall be made in accordance with Table 1. The specified concrete cover and proper spacing shall be maintained at such splices and the lap spliced bars placed in contact and securely tied together.

TABLE 1
Minimum Lap Requirements for Bar Sizes Through No. 11

SIZE	LAP LENGTH	
	UNCOATED	COATED
No. 3	1'-0"	1'-6"
No. 4	1'-6"	2'-3"
No. 5	1'-10"	2'-9"
No. 6	2'-3"	3'-4"
No. 7	3'-0"	4'-6"
No. 8	3'-9"	5'-7"
No. 9	4'-8"	7'-0"
No. 10	5'-7"	8'-4"
No. 11	6'-7"	9'-10"

Spiral steel shall be lapped a minimum of one turn. Bar sizes No. 14 and No. 18 may not be lapped.

Welded splices shall conform to the requirements of the plans and Item 448, "Structural Field Welding." End preparation for butt welding reinforcing bars shall be done in the field. Delivered bars shall be of sufficient length to permit weld preparation.

Welded wire fabric shall be spliced using a lap length that will include the overlap of a minimum of two (2) cross wires plus two (2) inches on each sheet or roll. Splices using bars which develop equivalent strength and lapped in accordance with Table 1 will be permitted. For box culvert extensions with less than one (1) foot of fill, the existing longitudinal bars shall have a lap with the new bars as shown in Table 1. For extensions with more than one (1) foot of fill, a minimum of six (6) inch lap will be required.

440.7. Mechanical Couplers.

(1) General. When shown on the plans, mechanical splices may be made in the reinforcing steel bars using one of the following types:

- Sleeve-Filler Type
- Sleeve-Threaded Type
- Sleeve-Swaged Type
- Sleeve-Wedge Type

All couplers furnished by the Contractor shall be produced by a prequalified manufacturer. Prequalification shall be in accordance with Departmental Material Specification D-9-4510. Sleeve-wedge type couplers will not be permitted on coated reinforcing.

(2) Project Samples. For purposes of sampling couplers for use on an individual project, a lot of couplers shall be defined as 500 couplers, or fraction thereof, for each size and type. Prior to use on the project, three (3) test specimens shall be assembled using couplers selected at random from each lot received on the project. All test specimens shall be assembled from materials consigned to the project and shall be assembled in the presence of the Engineer. A test specimen shall consist of a coupler connecting two (2) 21 inch, or longer, bars using the same splice materials, position, equipment and procedures to be used to make splices in the work. The assembled test specimens shall be submitted to the Division of Materials and Tests for testing. Each lot of couplers shall be identified with tags or markings identifying the lot from which the samples were taken.

(3) Testing. Project samples will be tested to 125% of specified yield strength and for total slip requirements. When a test representing a lot of couplers fails to meet the requirements, four (4) additional couplers from that lot will be tested. If all four (4) tests meet the requirements, the lot will be accepted for use in the work. If any of the four (4) tests fail to meet the requirements, that lot of couplers will be rejected and not used in the work.

(4) Construction Methods. All coupling devices shall be installed in accordance with the manufacturer's recommendations. Protection of threaded male or female connections shall be provided and the threaded connections shall be clean when making the connection. Damaged threads shall not be repaired.

(5) Alternate Equivalent Strength. Alternate equivalent strength arrangements to be accomplished by substituting larger bar sizes, or more bars, will be considered if approved by the Engineer, in writing, prior to the fabrication of the systems.

440.8. Placing. Unless otherwise shown on the plans, dimensions shown for reinforcement are to the centers of the bars. Reinforcement shall be placed as near as possible in the position shown on the plans. In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/12 of the spacing between bars. In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from plan placement by more than 1/4 inch. Cover of concrete to the nearest surface of steel shall meet the above requirements but shall never be less than one (1) inch.

For bridge slabs, the clear cover tolerance for the top mat of reinforcement shall be -0, + 1/2 inch. The reinforcement shall be accurately located in the forms, and firmly held in place, before and during concrete placement, by means of bar supports, adequate in strength and number in order to prevent displacement and to keep the steel at the proper distance from the forms. Bars shall be supported by standard bar supports with plastic tips, plastic bar supports approved by the Engineer or precast mortar or concrete blocks when supports are in contact with removable or stay-in-place forms. Bright basic bar supports may be used to support reinforcing steel placed in slab overlay on concrete panels or on existing concrete slabs. Bar supports in contact with soil or subgrade shall be as approved by the Engineer. For bar supports with plastic tips, the plastic protection shall have a minimum thickness of 3/32 of an inch and extend upward on the wire to a point at least 1/2 inch above the formwork. All accessories such as tie wires, bar chairs, supports or clips used with epoxy coated reinforcement shall be of steel, fully coated with epoxy or plastic. Plastic supports approved by the

Engineer may also be used with epoxy coated reinforcement.

Mortar or concrete blocks shall be cast to uniform dimensions with adequate bearing area. A suitable tie wire shall be provided in each block for anchoring to the steel. The blocks shall be accurately cast to the thickness required in molds approved by the Engineer. The surface placed adjacent to the form shall be a true plane, free of surface imperfections. The blocks shall be cured by covering with wet burlap or mats for a period of 72 hours. Mortar for blocks shall contain approximately one (1) part portland cement to three (3) parts sand. Concrete for blocks shall contain nine (9) sacks of portland cement per cubic yard of concrete.

Individual bar supports shall be placed in rows at four (4) foot maximum spacing in each direction. Continuous type bar supports shall be placed at four (4) feet maximum spacing. Continuous bar supports will be required when permanent metal deck forms are used.

The exposure of the ends of longitudinals, stirrups and spacers used to position the reinforcement in concrete pipe and precast box culverts or sewers shall not be cause for rejection. Reinforcing steel for bridge slabs, top slabs of direct traffic culverts and the top slabs of pre-stressed box beams shall be tied at all intersections except that where the spacing is less than one (1) foot in each direction, alternate intersections only need to be tied. For reinforcing steel cages for other structural members, the steel shall be tied at a sufficient number of intersections to provide a rigid cage of steel. Mats of wire fabric shall be fastened securely at the ends and edges. Before concrete placement, all mortar, mud, dirt, etc., shall be cleaned from the reinforcement. Concrete shall not be placed until authorized by the Engineer. If the reinforcement is not adequately supported or tied to resist settlement, floating upward, overturning of truss bars, or movement in any direction during concrete placement, concrete placement will be halted until corrective measures are taken.

440.9 Epoxy Coating of Reinforcing Steel.

(1) General. When shown on the plans, coating with epoxy of reinforcing bars, plain wire, deformed wire or welded wire fabric to be used as reinforcement for concrete shall conform to the requirements herein.

(2) Surface Preparation. The reinforcing steel shall be free of surface contaminants such as oil, grease or paint when received at the manufacturer's plant and prior to cleaning and coating. The surface of steel to be coated shall be cleaned by abrasive blast cleaning to near white metal in accordance with the requirements of Item 446, "Cleaning, Paint and Painting," Class A Blast Cleaning. All traces of grit and dust from the blast cleaning shall be removed prior to coating. Other methods of cleaning may be submitted to the Engineer for approval.

(3) Application of Coating. The applicator shall notify the Engineer at least 30 days before the date of production. The coating shall be applied as recommended by the manufacturer of the coating material.

The coating shall be applied to the cleaned surface as soon as possible after cleaning and before oxidation of the surface discernible to the unaided eye occurs. The coating shall be a

smooth uniform coat and shall have a thickness of from 7 to 12 mils, after curing. The thickness of the coating shall be measured using magnetic thickness testing gages in accordance with Test Method Tex-728-I.

The coating film shall be fully cured. Sufficient checks shall be made to assure that each coated production lot is supplied in a fully cured condition.

(4) Continuity of Coating. The applicator shall check the coating for continuity after curing. The coating shall be free from holes, voids, cracks, contamination and damaged areas discernible to the unaided eye.

For reinforcing bars a 67 1/2 volt D.C. in-line holiday detector, such as Tinker and Rasor Model M-1 or approved equivalent, shall be used to check the coating for holidays. There shall be no more than two (2) holidays (pinholes not visually discernible) in any linear foot of a coated reinforcing bar.

Holiday checks to determine acceptability of wire or welded wire fabric shall be made at the manufacturer's plant with a 67 1/2 volt D.C. holiday detector. For wire, there shall not be more than an average of two (2) holidays per linear foot of wire. For welded wire fabric, there shall not be more than an average of four (4) holidays per linear foot of wire in welded wire fabric when the wire spacings are four (4) inches or more, or six (6) holidays per linear foot of wire when the spacings are less than four (4) inches. Uncoated areas at cut ends shall not be counted, nor shall sharp edges (weld spurs) at intersections be counted as holidays. When measuring the number of holidays, at least 1/2 inch of wire must be included on each side of the intersections being checked.

(5) Repair of Coating. Material for repair of the coating shall comply with the requirements in "Epoxy Coating" of this Item. Repairs shall be made in accordance with procedures recommended by the manufacturer of the epoxy coating powder. Areas to be patched shall receive at least the same coating thickness as required for the original coating. All visible damage to the coating shall be repaired. Sawed and sheared ends, cuts, breaks and/or other damage shall be repaired promptly before additional oxidation occurs. Areas to be repaired shall be clean and free from surface contaminants. Repairs shall be made in the shop or in the field as required.

The acceptable amount of patched area at the applicator shall not exceed 1/4 inch total length in any linear foot.

(6) Sampling and Testing. Sampling and testing of coated reinforcement shall be in accordance with Test Method Tex-739-I.

(7) Identification and Documentation. Identification of all reinforcing shall be maintained throughout the coating and fabrication process and until delivery to the project site.

For all production of coated reinforcing steel to be used on Department projects, the manufacturer shall furnish to the Engineer two (2) copies of a written certification that the coated reinforcing steel meets the requirements of this specification and two (2) copies of the manufacturer's control tests.

(8) Handling. All systems for handling coated reinforcement shall have padded contact areas. Bundling bands shall be padded or suitable banding shall be used to prevent damage to the coating. Bundles of coated reinforcement shall be lifted with a strong back, spreader bar, multiple supports or a platform bridge. The bundled reinforcement shall be transported with care and stored on protective cribbing. The coated reinforcement shall not be dropped or dragged.

(9) Construction Methods. Flame cutting will not be permitted on coated reinforcement. Saw or shear cutting will be permitted with permission of the Engineer. Cut ends shall be coated as specified in "Repair of Coating" of this Item.

Welding or mechanical coupling of coated reinforcing steel will not be permitted except where specifically shown on the plans. The epoxy coating shall be completely removed a minimum of six (6) inches beyond the weld limits prior to welding and two (2) inches beyond the limits of the coupler prior to assembly. After welding or coupling, the steel shall be cleaned of all oil, grease, moisture, dirt, welding contamination (slag and/or acid residue) and rust to a near white finish. The existing epoxy shall be checked for damage. Any damaged or loose epoxy shall be removed back to sound epoxy coating.

After proper cleaning, the splice area shall be coated with epoxy repair material to a thickness of 7 to 12 mils. A second application of repair material shall be applied to the bar and coupler interface to insure complete sealing of the joint.

440.10. Measurement and Payment.

Except as specified below, the work performed, materials furnished, and all labor, tools, equipment and incidentals necessary to complete the work under this Item will not be measured or paid for directly, but will be considered subsidiary to the various bid items of the contract.

The quantities of reinforcing steel shown on the plans are estimates and are for the Contractor's information.

Compensation for adjustment of reinforcing steel quantities will be as follows:

(1) When the reinforcing steel quantity for a complete structure element has been erroneously included in or omitted from the quantities shown on the plans, the quantity for that element will be added or deducted for payment. A complete structure element will be the smallest portion of a total structure for which a corresponding quantity of concrete is included on the plans. Additional payment or reduction in payment for quantities revised in this manner will be made accordingly, in accordance with Article 4.3.

(2) When the plan quantity for reinforcing steel for a complete structure element is in error by five (5) percent or more, a recalculation will be made and payment will be increased or reduced accordingly in accordance with Article 4.3.

(3) When quantities for reinforcing steel are revised by a change in design, the change in quantities will be calculated. Additional payment or reduction in payment for quantities revised in this manner will be made accordingly, in accordance with Article 4.3.

The party to the contract requesting the adjustment shall present to the other one (1) copy of the description and location, together with calculations of the quantity for the structure element involved. When this quantity is certified correct by the Engineer, it will become the basis for additional or reduced payment.

*****END OF SECTION*****

DIVISION 03 00 00 CONCRETE

03 30 00 CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK COVERED:

- A. Mixing, placing, finishing and providing all related services necessary to construct all cast-in-place concrete work indicated on plans.

1.02 QUALITY ASSURANCE:

- A. Comply with the latest published edition of the American Concrete Institute (ACI) and American Society of Testing and Materials (ASTM) standards and codes:

- 1. ACI 315 - Manual of Standard Practice for Detailing.
- 2. ACI 318 - Building Code Requirements for Reinforced Concrete.
- 3. ACI 347 - Recommended Practice for Concrete Formwork.
- 4. ASTM A36 - Structural Steel.
- 5. ASTM C33 - Concrete Aggregates.
- 6. ASTM C39 - Concrete Strength of Molded Concrete Cylinders.
- 7. ASTM C94 - Ready-Mixed Concrete.
- 8. ASTM C143 - Slump of Portland Cement Concrete.
- 9. ASTM C150 - Portland Cement.
- 10. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- 11. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- 12. ACI 301 - Specification for Structural Concrete for Building.

- B. Submit compliance submittals as specified in Division 1, including but not limited to the following: bar schedule, bar details, shop drawings including size and location of openings, water stops, joint systems and curing method.

- C. Submit proposed concrete mix proportions to ENGINEER prior to placing concrete.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT:

- A. Type I, Type II or Type III conforming to ASTM C150 as modified by Texas Department of Highways and Public Transportation, 1982 Standard Specifications.
- B. Type I or Type II cement may be used unless Type II is specified.
- C. Except when Type II specified, Type III may be used when the anticipated air temperature for the succeeding 12 hours will not exceed 60°F.



- D. Type III may be used in all precast pre-stressed concrete except in piling when Type II cement is required for substructure concrete.
- E. All cement used in a monolithic placement shall be of the same type.
- F. May be either bagged or bulk. Partially set or caked cement will be rejected.
- G. All types of cements shall be "low-alkali" cements.

2.02 WATER:

- A. Clear, fresh, free from injurious amounts of oil, alkaline, acid or organic matter or other deleterious substances and shall not contain more than 1000 parts per million of chlorides as CL nor more than 1000 parts per million of sulfates as SO₄.
- B. The sand, or mixture of sand, comprising a single fine aggregate, shall consist of clean, hard, durable, un-coated grains and shall be essentially free from clay lumps, salt or alkali, and other foreign material.
- C. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	3.0%
Other deleterious substances such as coal, shale, coated grains and soft flaky particles	3.0%

An additional loss of 2% by decantation may be allowed, provided this new additional loss is material of the same quality as specified for fine aggregate or mineral filler.

- D. Gradation, percent of weight retained:

<u>Sieve Size</u>	<u>% Retained</u>
3/8 inch	0
No. 4	0 - 5
No. 8	0 - 20
No. 16	0 - 50
No. 30	0 - 75
No. 50	0 - 90
No. 100	0 - 100
No. 200	0 - 100



E. Fineness Modulus: for Grade 1 only - 2.3 minimum, 3.1 maximum.

F. Miner Filler:

1. May be added upon written authorization of ENGINEER.
2. Shall be stone dust or clean crushed sand, or other approved inert material.
3. Shall not exceed 5% of the fine aggregate.
4. Shall meet the following requirements:

Passing No. 30 sieve	95 to 100%
Passing No. 100 sieve	70 to 100%

2.04 COARSE AGGREGATE:

- A. Crushed stone, gravel, crushed gravel, crushed blast furnace slag or a combination of these.
- B. Gravel and crushed gravel shall consist of clean, hard durable particles, free from adherent coating, thin or elongated pieces, soft or disintegrated particles, dirt, organic or deleterious substances, salt or alkali, and other foreign material.
- C. Crushed stone shall consist of the clean, dust free product resulting from crushing of stone. There shall be no adherent coatings, clay, loam organic or deleterious substance, salt or alkali, and other foreign material.
- D. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	1.0%
Shale, slate or other similar material	1.0%
Clay lumps	0.25%
Soft fragments	3.0%
Other deleterious substances, including friable, thin, elongated or laminated pieces	3.0%

- E. Course aggregates shall have a percent wear of not more than 45 when tested in accordance with Test Method Tex-410-A.
- F. Gradation, percent of weight retained on:

<u>Grade No. 1 - Maximum Nominal Size 2 1/2 in. (63 MM)</u>	
<u>Sieve</u>	<u>Percentage Retained</u>
2 1/2 in.	0%
2 in.	0 - 20%
1 1/2 in.	15 - 50%
3/4 in.	60 - 80%
No. 4	95 - 100%
<u>Grade No. 2 - Maximum Nominal Size 1 1/2 in. (37.5 mm)</u>	



<u>Sieve</u>	<u>Percentage Retained</u>
2 in.	0%
1 1/2 in.	0 - 5%
3/4 in.	30 - 65%
3/8 in.	7 - 90%
No. 4	95 - 100%

Grade No. 4 - Maximum Nominal Size 3/8 in. (9.5mm)

<u>Sieve</u>	<u>Percentage Retained</u>
1/2 in.	0 - 5%
3/8	5 - 30%
No. 4	75 - 100%

G. Gradation Requirements - maximum size of aggregate for structural concrete shall not exceed three inches, and shall be reduced in size to meet the following conditions:

1. One-sixth of the least dimension between forms of that part of the structure in which concrete is to be placed;
2. Three-fourths of the clear space between reinforcement.
3. The maximum size aggregate is defined as the clear space between the sides of the smallest square opening through which 95 percent of the weight of the aggregate can be passed.
4. Unless otherwise noted or restricted by above Grade No. 2, gradation shall be used.

2.05 PIT-RUN AGGREGATE:

- A. Pit-run aggregate is the natural gravel and sand obtained from pits without the addition of other fine or coarse aggregates, and shall consist of hard, durable, uncoated pebbles or stone particles mixed with sand.
- B. Pit-run aggregate shall be free from lumps of clay and injurious amounts of dust, shale, soft or flaky particles, salt and alkali.
- C. Pit-run aggregate shall not be used for high-strength concrete of 3000 psi and above.
- E. Pit-run aggregate may be used only for concrete cushion, cradle and protection for pipe.

2.06 ADMIXTURES:

- A. Concrete admixtures shall comply with Section 03320.

2.07 REINFORCING STEEL:

- A. Reinforcing steel shall comply with Section 03320.

2.08 CURING MATERIALS:

- A. Liquid Membrane: white pigmented chlorinated rubber, ASTM C309.
- B. Liquid Membrane: resin base, clear compound, permitting application of paint, Serviced Products Corp. - Code 2802 or equal.
- C. Plastic Film: white pigmented, 0.00085" (minimum) thick.
- D. Burlap: jute fabric, lean, free of impurities.
- E. Surface Hardener: gray crystal, acidic fluosilicate base, slightly hygroscopic chemical surface hardener, SIKA Chemical Corp. or equal.

2.09 JOINT MATERIALS:

- A. Joint Sealer: hot poured, non-extruding, elastic, ASTM D1190.
- B. Preformed Expansion Joint Filler: non-extruding, bituminous fiber, ASTM D1751.

2.10 WATERSTOP:

- A. Polyvinyl chloride or rubber, center bulb.
- B. Size to suit joints, minimum 6".

2.11 FORM MATERIALS:

- A. Use plywood, metal, metal framed plywood faced or other acceptable panel-type material.
- B. Coat forms with non-bonding, non-staining commercial compounds.

2.12 MOISTURE BARRIER:

- A. Polyethylene sheet, minimum 8 mil., ASTM E154.

2.13 CONCRETE MIX DESIGN AND CONTROL:

- A. Submit not less than 10 days prior to the start of concreting operations, to the ENGINEER.
 - 1. Mix design, using a course aggregate factor acceptable to the Engineer.
 - 2. Sufficient samples of all materials to be incorporated into the mix for testing.
 - 3. Full description of the source of supply of each material component.
- B. Course aggregate factor:
 - 1. Not more than 0.82 when voids less than 48%.
 - 2. Not more than 0.85 when voids exceed 48%.

- 3. Not less than 0.68.
- C. No changes or deviations from proportions or sources of supply without approval of ENGINEER.
- D. No concrete may be placed on the job site until the mix design has been approved by ENGINEER in writing to the CONTRACTOR.

2.14 CONCRETE QUALITY:

- A. Consistency:
 - 1. Mortar shall cling to the coarse aggregate.
 - 2. The aggregate shall not segregate during transport.
 - 3. The concrete and mortar shall show no free water when removed from the mixer.
- B. The consistency should allow the completion of all finishing operations with the addition of water to the surface.
- C. The concrete shall be uniform, workable, cohesive, possess satisfactory finishing qualities and be of the stiffest consistency that can be placed and vibrated into a homogeneous mass.
- D. Excessive bleeding shall be avoided.
- E. Slump requirements shall be as follows:

<u>Structural Concrete</u>	<u>Avg. Slump</u>	<u>Max. Slump</u>
(a) Cased Drilled Shafts and thin-walled Sections (9 inches or less)	4	5
(b) Slabs, Caps, Columns, Piers, Wall Sections Over 9 inches, etc.	3	4
(c) Slip Form Paving Underwater or seal concrete		2 1/2
(d) Rip-Rap, curb, Gutter and other Miscellaneous Concrete	As Specified	By Owner

Note: No concrete shall be permitted with slump in excess of the maximums shown. Any concrete mix failing to meet the above consistency requirements, although meeting the slump requirements shall be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

F. The concrete shall comply with Table 1 below:

TABLE 1 - CLASSES OF CONCRETE



CLASS OF CONCRETE	MIN.-MAX. SX. CEMENT	MIN. BEAM STRENGTH 28-DAY PSI	MIN. BEAM STRENGTH 7-DAY PSI	MAX. WATER CEMENT RATIO ITEM 2.1.1.	COARSE NO.
A.	5.0	3000	500	6.5	2-3-4
B	4.0	2000	330	8.0	2-3-4
C*	6.0	3600	600	6.0	1-2-3-***
D	3.0	1500	250	11.0	2-3-4
E	6.0	3000	500	7.0	2-3
F	6.5	4200	700	5.5	2-3
H***	6.5-8.0	AS SPECIFIED ON PLANS	N/A	5.5	3

* Entrained Air:

** No. 1 course aggregate may be used in foundations only (except cased drilled shafts).

*** Pre-stressed Concrete.

**** ASTM C 293 (Center Point).

2.15 GROUT:

A. Non-Shrink:

1. Use pre-mix non-shrink, Embeco Premixed Grout or Embeco Pre Mixed Mortar by Master Builders Company or equal.
2. Keep water to a minimum for placing by the dry packing method.

B. Grout for Bonding:

1. 1 part cement to 1 1/2 parts sand by weight.
2. Keep water to a minimum.

PART 3 - EXECUTION

3.01 SUBGRADE:

A. Insure sub-grade is true to line and grade and compacted as specified.



- B. Fill and re-compact any ruts or depressions.
- C. Check cross section with a template.
- D. Place moisture barrier or moisten sub-grade prior to placing of concrete. Method to be approved by the ENGINEER.

3.02 FORMS:

- A. Provide forms for all concrete work including footings and base slabs.
- B. Construct forms so that completed concrete will conform to shapes, lines, grades and dimensions indicated and required.
- C. Forms shall be true, plumb and level with reasonable tight joints. Adequately support and brace forms.
- D. Place anchors, inserts, bolts, sleeves and other device indicated or required for the various portions of all the work.
- E. Oil temporary forms with non-staining form oil before reinforcing steel is placed.
- F. Rough form finish as defined by ACI 301 permitted for concealed concrete.
- G. Smooth form finish as defined by ACI 301 permitted for concealed concrete.
- H. Provide 3/4 inch chamfer on exposed corners and edges, and 1-foot below ground level.

3.03 REMOVAL OF FORMS:

- A. Do not remove forms or supports until concrete has acquired sufficient strength to safely support its own weight and the superimposed loads.
- B. Mixing shall be done in a mixer of adequate size and type to produce uniform distribution of the material throughout the mass.
- C. The mixer shall have a plate affixed showing the manufacturer's recommended operating data and it shall be operated within the speed and capacity limits stated thereon.
- D. The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.
- E. The entire contents of the drum shall be discharged before any materials are placed.
- F. Improperly mixed concrete will not be placed.
- G. The mixing time shall be in accordance with the recommendations of the mixer manufacturer.

H. Transix Mix Concrete:

1. Sufficient transit mix equipment shall be assigned exclusively to the project as required for continuous operation.
2. Satisfactory evidence shall be furnished so that the delivery of concrete shall be continuous at regular and uniform intervals, without stoppage or interruption.
3. Concrete shall not be placed on the job after a period of 1 hour after the cement has been placed in the mixer, with mixer turning; 30 minutes without mixer turning.

I. Continuous Volumetric Mix Concrete:

1. A mobile, continuous, Volumetric mixer of the rotating puddle type may be used for when approved by ENGINEER.
2. Mixers shall be designed to receive all the concrete ingredients, including admixtures, required by the mix design in a continuous uniform rate and mix them to the required consistency before discharging.
3. The mixers shall have adequate water supply and metering devices.
4. Calibration of these mixers will be required.

3.04 PLACING CONCRETE:

- A. The minimum temperature of all concrete at the time of placement shall not be less than 50° F.
- B. Clean transporting equipment, reinforcing and embedded items before placing concrete.
- C. Batch trucks or paving equipment not permitted on prepared sub-grade unless authorized by the ENGINEER based on actual job conditions.
- D. Place no concrete until after inspection of forms by ENGINEER.
- E. The maximum time interval between the addition of cement to the batch, and the placing of concrete in the forms shall not exceed the following:

<u>AIR OR CONCRETE TEMPERATURE</u>	<u>NON-AGITATED CONCRETE</u>	<u>MAXIMUM TIME</u>
80 deg. F or Above	(26.6 deg. C)	15 minutes
35 deg. F or 79 deg. F	(1.6 to 26.1 deg. C)	30 minutes



AGITATED CONCRETE

90 deg. F or Above	(32.2 deg. C)	45 minutes
75 deg F to 89 deg. F	(23.9 to 31.6 deg. C)	60 minutes
35 deg. F to 74 deg. F	(1.6 to 23.3 deg. C)	90 minutes

- F. Prevent segregation during placing.
- G. Consolidate flat work with one pass of mechanical vibrator moving parallel to centerline. Unusual sections and widths may be hand puddled and finished.
- H. Place concrete continuously so that each pour unit will be monolithic in construction and will terminate at expansion, contraction or construction joint. Permit not more than 30 minutes between depositing adjacent batches.
- I. Place slab concrete over membrane waterproofing before waterproofing has become damaged or dirty.
- J. Concrete placement will not be permitted when impending weather conditions will impair the quality of work.
- K. Slope horizontal surfaces of exterior concrete for drainage.
- L. Deposit concrete in forms in horizontal layers not deeper than 24 inches. Avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.
- M. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spreading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
- N. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to penetrate placed layer of concrete and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. Limit vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

3.05 PLACING CONCRETE IN WATER:

- A. Concrete shall be deposited in water only when specified on the plans or with written permission of the ENGINEER.
- B. The forms or cofferdams shall be sufficiently tight to prevent any water current passing through the space in which the concrete is deposited.

- C. Pump will not be permitted during the concrete placing, nor until it has set for at least 36 hours.
- D. The concrete shall be placed with a tremie, closed bottom-dump bucket or other approved method.
- E. The concrete shall not be allowed to fall freely through the water nor shall it be disturbed after it has been placed. Its surface shall be kept approximately level during placement.
- F. The tremie shall consist of a water tight tube 14 inches or less in diameter. It shall be constructed so that the bottom can be sealed and opened after it is in place and fully charged with concrete. It shall be supported so that it can be easily moved horizontally to cover all the work area and vertically to control the concrete flow. The lower end of the tremie shall be submerged in the concrete at all times.
- G. Bottom-dump buckets used for underwater placing shall have a capacity of not less than one-half cubic yard. It shall be lowered gradually and carefully until it rests upon the concrete already gradually and carefully until it rests upon the concrete already placed and raised very slowly during the upward travel; the intent being to maintain still water at the point of discharge and to avoid agitating the mixture.
- H. The placing operations shall be continuous until the work is complete.
- I. Unless otherwise specified all concrete placed under water, except seal concrete, shall contain an additional sack of cement per cubic yard.

3.06 JOINTS:

A. CONTRACTOR:

- 1. Extend entirely across flat slabs at locations shown.
- 2. Location where not shown; maximum spacing is:
 - a. Driveways: 10'
 - b. Sidewalks: 4'
 - c. Other flat slabs: 20 times slab thickness.
- 3. Saw depth not less than 1/4 slab thickness.

B. Expansion:

- 1. Install where shown on the plans.
- 2. Locations where not shown: all structures and features which project through, into or against slab.
- 3. Install according to manufacturer's recommendations, set material securely before placing concrete.
- 4. Install 1 inch width unless shown otherwise.

C. Filling Joints:

1. Fill not later than 14 days after sawing.
2. Fill immediately following cleaning.
3. Fill to 1/8" of surface.
4. Remove excess while material is still pliable.
5. Refill low areas where necessary.
6. Omit filling sidewalk joints.

3.07 FINISHING EXTERIOR FLAT WORK:

- A. Strike off and float as required.
- B. Check surface with ten foot straight edge, maximum variance allowed - 1/8".
- C. Drag concrete surface longitudinally with double thickness burlap drag after completion of straight edging unless noted otherwise.
- D. Use edger on edges of slab.

3.08 CURING:

- A. CONTRACTOR shall inform the ENGINEER fully of the methods and procedures proposed for curing; shall provide proper equipment and material in adequate amounts; shall have approval of the proposed method, equipment and material prior to placing concrete.
- B. All concrete shall be cured for a period of 4 curing days except as noted herein.

EXCEPTIONS TO 4-DAY CURING

<u>Description</u>	<u>Required Curing</u>
Upper Surfaces of Bridge Roadway, Median and Sidewalk Slabs and Top Slabs of Direct Traffic Culverts	8 Curing Days

A curing day is defined as a calendar day when the ambient temperature, taken in the shade

***** END OF SECTION *****



DIVISION 04 MASONRY

4 26 13 MASONRY VENEER

- A. Includes face brick veneer with the following:
 - 1. Galvanized steel masonry reinforcing, ties, and anchors.
 - 2. Embedded flashing (stainless steel fabric sheet).
 - 3. Vents and weeps.
 - 4. "Mortar Net" cavity drainage material.
- B. Cavity insulation is specified in Division 7 Section "Thermal Insulation."
- C. Quality Assurance:
 - 1. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless otherwise indicated.
 - 2. Integrated Exterior Mockup: Install mockup of exterior wall assembly including masonry veneer, air barrier, flashings, sheathing, and cold-formed metal framing.
- D. Face Brick: As selected by Architect.
 - 1. Size: Modular.
- E. Mortar and Grout Materials:
 - 1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.
 - 2. Hydrated Lime: ASTM C 207, Type S.
 - 3. Colored Cement Product: Packaged blend made from portland cement and lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 4. Aggregate for Mortar: ASTM C 144.
 - 5. Aggregate for Grout: ASTM C 404.
- F. Mortar Mixes: Comply with ASTM C 270, Proportion Specification to provide Type N mortar unless otherwise indicated.

04 22 00 CONCRETE UNIT MASONRY

- A. Includes:
 - 1. Standard CMU.
 - 2. Steel masonry reinforcing.
 - 3. Galvanized steel masonry reinforcing, ties, and anchors.
- B. Quality Assurance:
 - 1. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless otherwise indicated.
 - 2. Mockup: 48 inch wide by 48 inch high masonry panel.

- C. Concrete Masonry Units:
 - 1. Size: Manufactured to standard CMU dimensions.
 - 2. Standard CMU: ASTM C 90, normal weight.
 - a. Provide units to be installed in exterior walls manufactured with integral water repellent additive.
- D. Reinforcement:
 - 1. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
 - 2. Masonry Joint Reinforcement, General: ASTM A 951/A 951M, Hot-dip galvanized, carbon steel
- E. Mortar and Grout Materials:
 - 1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.
 - 2. Hydrated Lime: ASTM C 207, Type S.
 - 3. Cement Product for Mortar: Packaged blend made from portland cement and lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 4. Aggregate for Mortar: ASTM C 144.
 - 5. Aggregate for Grout: ASTM C 404.
 - 6. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer used for CMU.
 - 7. Water: Potable.
- F. Mortar and Grout Mixes:
 - 1. Mortar: Comply with ASTM C 270, Proportion Specification to provide Type N mortar unless otherwise indicated.
 - 2. Grout: Comply with ASTM C 476. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

4 72 00 CAST STONE

- A. Includes cast trim.
- B. Comply with ASTM C 1364 for fabricating units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces.
- C. Color and Texture: As selected by Architect.
- D. Mortar and Grout Materials:
 - 1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.
 - 2. Hydrated Lime: ASTM C 207, Type S.

3. Cement Product for Mortar: Packaged blend made from portland cement and lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 4. Aggregate for Mortar: ASTM C 144.
 5. Water: Potable.
- E. Mortar Mixes:
1. Mortar: Comply with ASTM C 270, Proportion Specification to provide Type N mortar unless otherwise indicated.

DIVISION 05 METALS

5 12 00 STRUCTURAL STEEL FRAMING

A. Comply with requirements indicated on Structural Drawings.

05 21 00 STEEL JOIST FRAMING

A. Comply with requirements indicated on Structural Drawings.

05 31 00 STEEL DECKING

A. Comply with requirements indicated on Structural Drawings.

05 40 00 COLD-FORMED METAL FRAMING

- A. Includes cold-formed metal framing for:
 - 1. Exterior non-load-bearing wall framing.
 - 2. Soffit framing.
- B. Performance: Design to withstand wind loads required by local codes with maximum deflection of L/480.
- C. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- D. Manufacturers: Clark Steel Framing; Dietrich Metal Framing; a Worthington Industries Company; MarinoWare; a division of Ware Industries; SCAFCO Corporation; or manufacturer of comparable products approved by the Architect.
- E. Materials:
 - 1. General: Provide manufacturers' standard galvanized steel C-shaped studs and U-shaped track.
 - 2. Fabricate cold-formed metal framing from metallic-coated steel sheet complying with ASTM A 1003, Structural Grade, Type H:
 - a. Grade: As required by structural performance.
 - b. Coating: G90 or equivalent.
- F. Exterior Non-Load-Bearing Wall Framing:
 - 1. General: Provide framing members as follows:
 - a. Minimum Base-Metal Thickness: 0.0329 inch.
 - b. Minimum Flange Width: 1-5/8 inches.
 - 2. Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges.
 - 3. Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and matching minimum base-metal thickness of steel studs.

4. Deflection Clips and Track: Manufacturer's standard products designed to accommodate upward and downward vertical of primary structure.

5 50 00 METAL FABRICATIONS

A. Includes:

1. Miscellaneous framing.
2. Ladders.
3. Pipe bollards.

B. Materials:

1. Steel Shapes, Plates, and Bars: ASTM A 36.
2. Steel Pipe: ASTM A 53.
3. Steel Tubing: ASTM A 500 (cold formed).
4. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

C. Miscellaneous Framing: Provide steel framing and supports not specified in other Sections.

D. Ladders:

1. Typical Ladders: Comply with ANSI A14.3.
 - a. Provide aluminum ladders manufactured by O'Keefe.

E. Bollards: Fabricate from Schedule 40 steel pipe.

F. Finish:

1. Steel:
 - a. Hot-dip galvanizing (ASTM A 123 or ASTM A 153 as applicable) for items installed outside, in exterior wall or roof assemblies, and as indicated.
 - b. Shop prime interior items for field finish.
2. Aluminum: Mill finish.

DIVISION 06 WOOD, PLASTICS, AND COMPOSITES

6 10 53 MISCELLANEOUS ROUGH CARPENTRY

- A. Includes
 - 1. Framing with dimension lumber.
 - 2. Framing with engineered wood products.
 - 3. Dimension lumber for wood blocking and nailers.
 - 4. Plywood for backboards for electrical and telecommunications panels.
- B. Wood Treatment:
 - 1. Preservative Treatment by Pressure Process: AWWA C2 with chemicals acceptable to authorities having jurisdiction
 - a. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - b. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - c. Application: Treat indicated items and items installed in walls below grade, exterior walls, or with waterproofing or roofing.
 - 2. Fire-Retardant-Treated Materials: Comply with performance requirements in AWWA C20 (lumber) and AWWA C27 (plywood).
 - a. Use Exterior type for exterior locations and where indicated.
 - b. Use Interior Type A, unless otherwise indicated.
 - c. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
 - d. Application: Treat items as required by code
- C. Wood Products, General:
 - 1. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - a. Factory mark each piece of lumber with grade stamp of grading agency.
 - b. Provide dressed lumber, S4S, unless otherwise indicated.
- D. Miscellaneous Lumber:
 - 1. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - a. Blocking.
 - b. Nailers.

2. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content of any species.
3. For concealed boards, provide SPIB No. 3 grade, mixed southern pine lumber with 19 percent maximum moisture content.
- E. Plywood Backing Panels for Telephone and Electrical Equipment: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.
- F. Fasteners: Provide fasteners of size and type indicated that comply with requirements specified.
 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
 2. Power-Driven Fasteners: NES NER-272.
 3. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

06 16 00 SHEATHING

- A. Includes gypsum wall sheathing.
- B. Wall Sheathing:
 1. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M; Regular, 1/2 inch thick.
 - a. Manufacturers: CertainTeed Corporation; Georgia-Pacific Building Products; National Gypsum Company; USG Corporation; or manufacturer of comparable systems approved by the Architect.
- C. Fasteners: Size and type indicated that comply with requirements specified in this article for material and manufacture.
 1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M

06 41 16 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Includes wall and base cabinets with plastic-laminate face.
- B. Refer to Division 12 Sections for countertops installed over plastic-laminate-faced base cabinets.
- C. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for Premium grade.
- D. Cabinet Type: Flush overlay.
- E. Panel Products: MDF complying with ANSI A208.2, Grade 130, or veneer plywood.
- F. High-Pressure Decorative Laminate: NEMA LD 3.
 1. Grades: As required by woodwork quality standard.

2. Color: As selected by Architect.
- G. Glazing: Comply with Division 08 Section "Glazing" for clear glazing where indicated.
- H. Cabinet Hardware: Provide cabinet hardware and accessory materials associated with architectural cabinets.
 1. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.
 2. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
 3. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.
 4. Drawer Slides: BHMA A156.9.
 - a. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer; full-extension type; epoxy-coated steel with polymer rollers.
 - b. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
 - c. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
 - d. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
 - e. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
 5. Door Locks: BHMA A156.11, E07121.
 6. Drawer Locks: BHMA A156.11, E07041.
 7. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - a. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 - b. Satin Stainless Steel: BHMA 630.

6 64 00 PLASTIC PANELING

- A. Includes fiber-reinforced plastic (FRP) panels as selected by Architect, adhesively applied to gypsum wallboard at janitor's closet and other applications as indicated.
- B. Materials:
 1. Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319.
 - a. Nominal Thickness: Not less than 0.075 inch.
 - b. Surface Finish: Smooth.

- c. Color: White.
 - d. Manufacturers: Crane Composites, Inc.; Glasteel; Marlite; or manufacturer of comparable products approved by the Architect.
2. Adhesives: As recommended by manufacturer,

DIVISION 07 THERMAL AND MOISTURE PROTECTION

7 21 00 THERMAL INSULATION

- A. Includes:
 - 1. Glass fiber batt insulation.
 - 2. Plastic foam insulation.
 - 3. Mineral wool insulation.
- B. Glass Fiber Insulation:
 - 1. Unfaced glass fiber insulation (ASTM C 665, Type I) for installation at exterior walls with cold-formed metal framing.
 - a. Thickness: As required for indicated R-value.
 - 2. Manufacturers: Guardian Building Products, Inc.; Johns Manville, Knauf Insulation; Owens Corning; or manufacturer of comparable systems approved by the Architect.
- C. Unfaced, Mineral-Wool Board Insulation: ASTM C 612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
 - 1. Nominal density of 6 lb/cu. ft., Type II, thermal resistivity of 4.16 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - 3. Manufacturers: Industrial Insulation Group, LLC; ROXUL; Thermafiber, Inc.; or other manufacturer of comparable products acceptable to the Architect.

07 24 19 WATER- DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

- A. Includes exterior insulation and finish system (EIFS) applied over concrete.
- B. Performance Requirements for Class PB EIFS: Physical properties and structural performance complying ANSI/EIMA 99-A.
- C. Manufacturers: Dryvit Systems, Inc.; Parex, Inc.; a brand of ParexLahabra, Inc.; Sto Corp.; or manufacturer of comparable systems approved by the Architect.
- D. Materials:
 - 1. Molded, Rigid Cellular Polystyrene Board Insulation: ASTM C 578, Type I.
 - 2. Foam Shapes: Provide with profiles and dimensions indicated on Drawings.
 - 3. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials

4. Base-Coat Materials: Standard formulation
5. Finish-Coat Materials: Factory-mixed, standard acrylic-based coating in color selected by Architect from manufacturer's full range.

07 26 16 UNDER-SLAB VAPOR RETARDER

- A. Includes vapor retarder for installation under concrete slabs on grade.
- B. Materials: Comply with ASTM E 1745, Class A, and manufactured specifically for long-term underslab application.
 1. Plastic Sheet: Vapor-retarding plastic sheet:
 - a. Thickness: Not less than 15 mils.
 - b. Permaence: Not greater than 0.01 perms (ASTM E 154 ASTM E 2149).
 - c. Manufacturers: Barrier-Bac; Insulation Solutions, Inc.;Raven Industries Inc.; Stego; Tex-Trude. Inc.; or manufacturer of comparable products approved by the Architect.

07 27 13 MODIFIED BITUMINOUS SHEET AIR BARRIERS

- A. Includes self-adhering sheet air barriers installed over wall sheathing in exterior wall assemblies.
- B. Material: Self-adhering, vapor retarding 40-mil sheet air barrier with primers and accessories.
 1. Product: Carlisle Coatings & Waterproofing CCW-705; W. R. Grace & Co. Perm-A-Barrier Wall Membrane; Henry Company; Air-Blueskin SA; Tremco, Inc. ExoAir 110/110LT; or manufacturer offering comparable products approved by the Architect.

07 27 26 FLUID-APPLIED MEMBRANE AIR BARRIERS

- A. Includes vapor retarding fluid-applied air barriers installed over wall sheathing in exterior wall assemblies.
- B. Fluid-Applied, Vapor-RetardingMembrane Air Barrier: Synthetic polymer membrane with primers and accessories.
 1. Products: Carlisle Coatings & Waterproofing; Barriseal; Henry Company; Air-Bloc 06; Meadows, W. R., Inc.; Air-Shield LM; or comparable products approved by the Architect.

07 42 10.21 CONTINUOUS INSULATION WITH COMPOSITE FRAMING SUPPORT SYSTEM

- A. Includes with composite framing support system with continuous insulation.
- B. Performance:
 1. Provide composite framing support system to withstand indicated wind loads.

2. Fire-Resistance Characteristics: Provide materials and construction tested for fire resistance per ASTM E 119.
 3. Surface-Burning Characteristics: Provide solid-phenolic wall panels with a flame-spread index of 25 or less and a smoke-developed index of 450 or less, per ASTM E 84.
 4. Provide composite framing support system and continuous insulation that passes NFPA 285 testing as part of an approved assembly.
- C. Composite Framing System: Polyester and vinyl ester bioresin matrix with continuous metal inserts the length of profile and reinforced with glass fibers.
- D. Insulation: Provide factory formed edges on insulation panels that interlock with composite framing support system.
1. Mineral-Wool Board, Type II, Unfaced: ASTM C 612, Type II; passing ASTM E 136 for combustion characteristics.
 - a. Nominal density of 6 lb/cu. ft.
 - b. Flame Spread Index: 15 or less, tested in accordance with ASTM E84.
 - c. Smoke Developed Index: Zero, tested in accordance with ASTM E84.
- E. Product: Advanced Architectural Products SMARTci 2-in-1 System or comparable system approved by Architect.

07 42 13.13 FORMED METAL WALL PANELS

- A. Includes lap seam metal wall panels with concealed fasteners.
- B. Performance:
1. Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - a. Maximum Deflection: No greater than 1/180 of the span.
 2. Design system to allow no water penetration under static pressure when tested according to ASTM E 331 at a test-pressure difference of 6.24 lbf/sq. ft.
 3. Surface-Burning Characteristics: Provide wall panels with a flame-spread index of 25 or less and a smoke-developed index of 450 or less, per
- C. Basis of Design: Berridge HS-12.
1. Profile: Manufacturer's standard asymmetrical trapezoidal panel with wide reveal corrugated rib profile designed to be installed horizontally with spacing as selected by Architect.
 2. Surface: Smooth, flat finish.
 3. Coverage: 12 inches.
 4. Height: 7/8 inch.

5. Exposed Coil-Coated Finish: 2-coat fluoropolymer complying with AAMA 621 and containing not less than 70 percent PVDF resin by weight in color coat.
- D. Materials: Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
 2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.

07 42 13.53 METAL SOFFIT PANELS

- A. Includes flush-profile metal soffit panel,
- B. Structural Performance: Provide metal panel systems capable of withstanding the effects positive and negative wind pressures determined according to ASCE/SEI 7 using wind speed criteria indicated on Structural Drawings
- C. Soffit Panels: Solid panels formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.
 1. Basis of Design: Berridge FW-12 Panels.
 2. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755.
 - a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality.
 - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792, Class AZ50 coating designation, Grade 40; structural quality.
 3. Coverage: 12 inches.
 4. Height: 1-1/2 inch.
 5. Nominal Thickness: 0.028 inch.
 6. Finish: Two-coat fluoropolymer complying with AAMA 621, and containing not less than 70 percent PVDF resin by weight in color coat; color as selected by Architect.
 7. Manufacturer: Berridge Manufacturing Company; CENTRIA Architectural Systems; Fabral; Firestone Metal Products, LLC; MBCI; a division of NCI Building Systems, L.P.; or manufacturer of comparable product acceptable to the Architect.
- D. Panel Accessories: Provide components required for a complete, system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

07 54 23 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- A. Includes fully-adhered TPO roofing system.
- B. Roofing System Design: Provide roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.
 - 1. Uplift Pressures: Refer to Structural Drawings.
- C. Warranty: Manufacturer's form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within warranty period of 20 years.
- D. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.
 - 1. Thickness: 60 mils, nominal.
 - 2. Manufacturers: Carlisle SynTec Incorporated; Firestone Building Products Company; GAF Materials Corporation; Johns Manville; or manufacturer offering comparable products approved by the Architect.
 - 3. Auxiliary Materials: Adhesives, fasteners, termination bars, and miscellaneous accessories recommended by roofing manufacturer for intended use and compatible with TPO roofing membrane.
 - 4. Insulation: Polyisocyanurate insulation complying with ASTM C 1289 in thickness required to meet R-value requirements with glass-mat faced gypsum cover board.
 - a. Provide insulation units factory-tapered to provide 1/4-inch per foot of slope to roof drains.
 - b. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick, factory primed.
- E. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

07 62 00 SHEET METAL FLASHING AND TRIM

- A. Includes the following fabricated from sheet metal:
 - 1. Flashings and counterflashings.
 - 2. Scuppers.
 - 3. Collectors.
 - 4. Downspouts.
 - 5. Copings.

- B. Quality Assurance:
 - 1. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless otherwise indicated.
- C. Materials:
 - 1. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755.
 - a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality.
 - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792, Class AZ50 coating designation, Grade 40; structural quality.
 - c. Finish: Two-coat fluoropolymer complying with AAMA 621, and containing not less than 70 percent PVDF resin by weight in color coat; color as selected by Architect.
 - 2. Stainless-steel Sheet (ASTM A 240 or ASTM A 666), Type 304, dead soft, fully annealed.
- D. Comply with applicable SMACNA requirements and recommendations for fabrication and installation.
- E. Schedule:
 - 1. Scuppers: Prefinished metallic-coated steel sheet.
 - 2. Copings: Prefinished metallic-coated steel sheet.
 - 3. Flashing and Counterflashings: Mill finish metallic-coated steel sheet.
 - 4. Roof Drain Flashing: Metallic-coated steel with polymer finish.

07 65 00 FLEXIBLE FLASHING

- A. Includes self-adhered butyl sheet flashing
- B. Performance:
 - 1. Provide flexible flashing products compatible with specified air barrier systems.
 - 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- C. Flexible Flashing
 - 1. Butyl Flashing: Composite flashing product consisting of a polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing to produce an overall thickness of not less than 0.030 inch.
 - a. Products: DuPont Building Innovations; E. I. du Pont de Nemours and Company; DuPont Flashing Tape; Grace Construction Products; W.R. Grace & Co. -- Conn.; Vycor Butyl

Self Adhered Flashing; Protecto Wrap Company; BT-25 XL; pr
other product acceptable to the Architect.

07 72 00 ROOF ACCESSORIES

- A. Includes:
 - 1. Roof hatches as required to access the roof and support roof-mounted equipment.
 - 2. Automatic smoke vents.
 - 3. Prefabricated curbs.
- B. Comply with ASCE 7 to calculate wind load requirements.
- C. Fabricate from zinc-coated steel sheet or aluminum-zinc alloy-coated steel.
- D. Manufacturer:
 - 1. Roof Hatches: Bilco or or manufacturer of comparable products acceptable to the Architect.
 - 2. Curbs and Equipment Supports: Curbs Plus, Inc.; Pate Company; Thybar Corporation; or manufacturer of comparable products acceptable to the Architect.

07 92 00 JOINT SEALANTS

- A. Includes:
 - 1. Silicone sealants.
 - 2. Urethane sealants.
 - 3. Latex sealants.
- B. Comply with the following:
 - 1. Elastomeric Sealants: ASTM C 920.
 - 2. Latex Sealant: ASTM C 834.
- C. Materials:
 - 1. General: Comply with the following:
 - a. Elastomeric Sealants: ASTM C 920.
 - b. Latex Sealant: ASTM C 834,
 - 2. Color for Exposed Sealants: Color as selected by Architect.
 - 3. Manufacturers:
 - a. Silicone Sealants: Dow Corning Corporation; GE Construction Sealants; Momentive Performance Materials Inc.; Pecora Corporation; or Sika Corporation; Joint Sealants; or Tremco Incorporated.
 - b. Urethane Sealants: BASF Corporation; Construction Systems; Pecora Corporation; Sika Corporation; Joint Sealants; or Tremco Incorporated.

- c. Latex Sealants: BASF Corporation; Construction Systems; Franklin International; Pecora Corporation; or Tremco Incorporated.
- D. Joint Sealant Backing: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance as recommended by the joint sealant manufacturer,
- E. Joint Sealant Accessories: Primers, cleaners, masking tape as recommended by joint sealant manufacturer for compatibility with joint sealant material and substrate.
- F. Schedule:
 - 1. Typical Movement Joints on Non-Traffic Surfaces at Exterior and Interior Joints: Single-component neutral-cure silicone sealants.
 - 2. Exterior Traffic Areas: Two-component pourable urethane sealants.
 - 3. Interior Wet Areas: Mildew-resistant silicone.
 - 4. Interior Traffic Areas: Single-component urethanes.
 - 5. Interior Non-Moving Joints: Latex sealants.

7 92 19 ACOUSTICAL JOINT SEALANTS

- A. Includes acoustical joint sealants.
- B. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Manufacturers: Accumetric LLC; Grabber Construction Products; Hilti, Inc.; Tremco Incorporated; United States Gypsum Company; or manufacturer offering comparable products approved by the Architect.
- C. Joint Sealant Accessories: Primers, cleaners, masking tape as recommended by joint sealant manufacturer for compatibility with joint sealant material and substrate.

DIVISION 08 OPENINGS

8 11 13 HOLLOW METAL DOORS AND FRAMES

- A. Includes standard hollow metal doors and frames for exterior applications.
- B. Quality Assurance: Comply with applicable ANSI/SDI standards.
- C. Materials:
 - 1. Galvanized Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum G60 metallic coating.
 - 2. Cold-Rolled Steel Sheet: ASTM A 1008, CS, Type B; suitable for exposed applications.
 - 3. Hot-Rolled Steel Sheet: ASTM A 1011, CS, Type B.
- D. Standard Hollow Metal Doors: ANSI/SDI A250.8, flush panel except as otherwise indicated
 - 1. Exterior Doors:
 - a. Level 4 and Physical Performance Level A, Model 2.
 - b. Fabricate from 14 ga. galvanized steel sheet.
- E. Standard Hollow Metal Frames: ANSI/SDI A250.8.
 - 1. Exterior Frames: Fabricate from 14 ga. galvanized steel sheet with mitered or coped corners, full profile welded.
- F. Finish: Shop primed for field finish.
- G. Manufacturers: Ceco Door Products; Pearland Industries, Rocky Mountain Metals, Inc.; Steelcraft; or manufacturer offering comparable products approved by the Architect.

08 12 16 ALUMINUM FRAMES

- A. Includes interior aluminum frames for doors and glazing installed in gypsum board partitions.
- B. Components:
 - 1. Aluminum Framing: ASTM B 221, Alloy 6063-T5 or alloy and temper required to suit structural and finish requirements, not less than 0.062 inch thick.
 - 2. Door Frames: Extruded aluminum, reinforced for hinges, strikes, and closers.
 - 3. Glazing Frames: Extruded aluminum, for glazing thickness indicated.
- C. Finish: As selected by Architect.
- D. Product: RACO Interior Products, Inc. Classic Series or comparable product by Kawneer North America, Versatrac, or manufacturer of comparable products approved by the Architect.

08 14 16 FLUSH WOOD DOORS

- A. Includes solid core, five-ply, flush wood doors with plastic laminate faces.
- B. Quality Assurance: Comply with AWI standards to provide “Premium” grade doors.
- C. Materials:
 - 1. Structural Composite Lumber: WDMA I.S.10.
 - 2. Particleboard-Core Doors: Not permitted,
- D. Faces: Plastic laminate complying with NEMA LD 3, Grade HGS with color and pattern as selected by Architect.
- E. Fabrication:
 - 1. Core: Either glued wood stave or structural composite lumber
 - 2. Factory fit doors to suit frame-opening sizes indicated.
 - 3. Factory machine doors for hardware that is not surface applied.
 - 4. Openings: Cut and trim openings through doors in factory.
- F. Manufacturers: Algoma Hardwoods, Inc., Marshfield Door Systems, Inc., VT Industries Inc. or manufacturer offering comparable products approved by the Architect.

08 16 00 COMPOSITE DOORS

- A. Includes composite door assemblies which include FRP doors and fiberglass resin transfer molded door frames.
- B. Quality Assurance:
 - 1. Comply with AWI standards to provide “Premium” grade doors.
- C. Doors: Fabricated with fiberglass reinforced plastic (FRP) using resins resistant to corrosion.
 - 1. Door Faces: Molded in one continuous piece.
 - 2. Stiles and Rails: Formed as a single continuous frame without joints.
 - 3. Core Material: 2 psf expanded polyurethane foam filling voids between door faces.
 - 3. Finish for Exposed Door Surfaces: Identical in color and texture as selected by Architect.
- D. Frames: Manufactured using resin transfer process reinforced for mounting of door hardware.
 - 1. Finish: Match door surfaces.
- E. Door Hardware: Factory installed.
- F. Manufacturer: Chem-Pruf Door Co., Ltd.; Corrim Company; or manufacturer offering comparable products approved by the Architect.

08 31 13 ACCESS DOORS AND FRAMES

- A. Includes access doors and frames for walls and ceilings where required to access valves and dampers.
- B. Galvanized steel access doors and frames for walls and ceilings.
 - 1. Finish: Primed for field painting.
- C. Stainless steel access doors and frames for walls and ceilings at laboratories, laboratory support spaces, restrooms, toilets, kitchens, and similar service areas.
 - 1. Finish: No. 4 satin finish.
- D. Manufacturers: Acudor Products, Inc.; MIFAB, Inc.; Milcor Inc.; Nystrom, Inc. or manufacturer offering comparable product approved by the Architect.

08 33 13 COILING COUNTER DOORS

- A. Includes motor-operated overhead coiling counter doors.
- B. Door Curtain Material: Aluminum.
- C. Finish for Galvanized Steel: Shop-applied primer finish
- D. Electric Door Operator Assembly: Size and capacity recommended and provided by manufacturer for door specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.
- E. Finish for Aluminum: AAMA 611, AA-M12C22A41, Class I, clear anodic finish.
- F. Manufacturers: Cookson Company, Cornell Iron Works, Inc., Overhead Door Corporation or manufacturer offering comparable products approved by the Architect.

08 41 13 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

- A. Includes:
 - 1. Extruded aluminum framing for:
 - a. Exterior storefronts.
 - b. Punched openings.
 - c. Aluminum doors.
 - 2. Exterior aluminum doors for installation in storefront framing.

- B. Performance: Provide doors designed to comply with requirements of local code for:
 - 1. Wind Loads. Calculate wind load requirements according to ASCE 7 using wind speed criteria indicated on Structural Drawings.
 - 2. Thermal performance.
 - 3. Accessibility: Provide doors with 10-inch bottom rail to comply with accessibility requirements.
- C. Products: Kawneer Trifab 451T system or comparable system offered by a manufacturer approved by Architect.
- D. Materials:
 - 1. Aluminum Extrusions: Comply with applicable ASTM specifications for aluminum components in alloy and temper recommended by aluminum producer for application indicated.
 - 2. Fasteners: Stainless steel.
 - 3. Glazing: Comply with applicable requirements of Division 08 Section "Glazing."
- E. Storefront Framing: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Construction: Thermally broken.
 - 2. Glazing System: Retained mechanically with gaskets on four sides.
 - 3. Glazing Plane: As indicated on Drawings.
 - 4. Fabrication Method: Field-fabricated stick system.
- F. Entrances: 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members.
 - 1. Door Design: Medium stile; 3-1/2-inch nominal width.
 - 2. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
- G. Finish: AAMA 611, AA-M12C22A41, Class I, clear anodic finish.

08 56 19 PASS WINDOWS

- A. Transoms windows for interior applications.
- B. Window Framing: Aluminum extrusions.
- C. Glazing: Monolithic float glass complying with Division 08 Section "Glazing."
- D. Finish: AAMA 611, AA-M12C22A41, Class I, clear anodic finish.
- E. Product: Laurence, CRL. Co., Florence Model Pass-Thru or comparable product acceptable to the Architect.

08 71 00 DOOR HARDWARE

- A. Includes door hardware for swinging doors and other applications as indicated.
- B. Quality:
 - 1. Local code requirements for:
 - a. Fire resistance and exiting.
 - b. Accessibility.
 - 2. BHMA standards for Grade 1 door hardware.
- C. Types of door hardware required include:
 - 1. Cylindrical locks and latches (Allegion, dormakaba, or Sargent).
 - 2. Hinges and pivots (Hager, Allegion, dormakaba, or McKinney).
 - 3. Exit and panic devices (Allegion or Sargent).
 - 4. Automatic flush bolts and dust proof strikes (Hager, Allegion, dormakaba, or Trimco).
 - 5. Floor and wall stops (Hager, Allegion, dormakaba, or Trimco).
 - 6. Electromagnetic stops and holders (Hager, Allegion, dormakaba, or Sargent).
 - 7. Closers (Allegion or Sargent).
 - 8. Door seals for fire and acoustical performance (Hager, NGP, or Pemko).
 - 9. Weatherstripping and thresholds (Hager, NGP, or Pemko).
 - 10. Operating trim (Elmes, Forms + Surfaces, Hiawatha, Inc., or Rockwood).
- D. Manufacturers: As indicated or manufacturer offering comparable products approved by the Architect.
- E. Finishes: Comply with BHMA A156.18.
 - 1. BHMA 600 (primed steel finish).
 - 2. BHMA 613 (oil-rubbed bronze finish).
 - 3. BHMA 625 (polished chrome finish) where stainless steel finish is not available.
 - 4. BHMA 626 (brushed chrome finish) where stainless steel finish is not available.
 - 5. BHMA 629 (polished stainless steel finish).
 - 6. BHMA 630 (brushed stainless steel finish).

08 80 00 GLAZING

- A. Includes:
 - 1. Monolithic glazing units.
 - 2. Insulated glazing units.
 - 3. Laminated glazing units.
- B. Quality Assurance:
 - 1. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved and certified by primary glass manufacturer
- C. Performance:
 - 1. Comply with local code requirements for:
 - a. Wind Loads. Comply with ASCE 7 to calculate wind load requirements according to wind speed criteria indicated on Structural Drawings.
 - b. Energy performance.
 - 2. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.
- D. Materials:
 - 1. Clear Annealed Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3.
 - 2. Heat-Strengthened Float Glass: ASTM C 1048; Kind HS (heat strengthened), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 3. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 4. Ceramic-Coated Spandrel Glass: ASTM C 1048, Condition B, Type I, Quality-Q3. With translucent ceramic frit simulating sand-blasted or acid-etched glass.
 - 5. Insulated Glazing Units: ASTM E 774.
- E. Low-E Coatings: ASTM C 1376,
 - 1. Sputter-Coatings: Metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture.
- F. Accessories and Glazing Materials: As required and as recommended by manufacturer.
- G. Glazing Types:
 - 1. Monolithic Glass Units:
 - a. Clear, float glass, 6mm thickness,
 - b. Clear, tempered glass, 6mm thickness.

2. Insulating Glazing Units: 1-inch units as follows:
 - a. Basis of Design for Insulated Glazing Units: Products fabricated by certified fabricators using Guardian SunGuard SNR on Clear Radiant Low-E (2) for exterior lite. Provide named product or comparable products approved by the Architect.
 - b. Exterior Lite: Clear, glass, 6mm thickness, with low-e sputter coating on 2nd surface.
 - c. Interior Lite: Clear glass, 6mm thickness.
 - d. Visible Light Transmittance: 43 percent minimum.
 - e. Winter U Value: 0.29.
 - f. Solar Heat Gain Coefficient: 0.23.
3. Spandrel Units:
 - a. Clear, glass, 6mm thickness, with coating on 2nd surface.
 - b. Insulated glazing units to match typical units with heat-strengthened lites and ceramic frit on 3th surface.
 - c. Winter U Value: 0.29.

H. Schedule: Refer to Drawings for Glazing Legend.

08 83 00 MIRRORS

- A. Includes unframed tempered mirror units.
- B. Mirrors: Clear mirror complying with ASTM C 1503, Mirror Select.

8 91 19 FIXED LOUVERS

- A. Includes horizontal storm-resistant louver with extruded aluminum frames and vanes.
- B. Performance: Comply with local code requirements for:
 1. Wind Loads. Comply with ASCE 7 to calculate wind load requirements according to wind speed criteria indicated on Structural Drawings.
- C. Materials:
 1. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
 2. 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.
 3. Fasteners: Aluminum or 300 series stainless-steel fasteners; use types and sizes to suit unit installation conditions.
 - a. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Fabrication:

1. 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.
2. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

E. Finish:

1. Two-coat fluoropolymer complying with AAMA 2605, and containing not less than 70 percent PVDF resin by weight in color coat.
2. Color: As selected by Architect.

F. Manufacturers: Construction Specialties, Inc.; Nystrom Building Products; Ruskin Company; Tomkins PLC; or manufacturer offering comparable products approved by the Architect.

G. Louver Screening:

1. Bird Screening: Aluminum, 1/2-inch- square mesh, 0.063-inch wire.
2. Aluminum, as follows:
 - a. Opening Size: Not less than 1/8 inch and not more than 1/4 inch.
 - b. Wire Size: Not less than 0.032 inches.

DIVISION 09 FINISHES

9 22 16 NON-STRUCTURAL METAL FRAMING

- A. Includes galvanized steel studs, tracks, and furring for partitions, ceilings, and soffits.
- B. Quality Assurance: For STC-rated assemblies, provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.
- C. Materials:
 - 1. Framing Members: ASTM C 754 for conditions indicated with ASTM A 653, G60, hot-dip galvanized coating.
 - 2. Steel Studs and Runners and Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 3. Other Steel Sheet Components: ASTM C 645.
 - 4. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
 - 5. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 - a. Manufacturer: Armstrong World Industries, Inc., Chicago Metallic Corporation; USG Corporation; or manufacturer offering comparable products approved by the Owner.

09 29 00 GYPSUM BOARD

- A. Includes gypsum board on metal framing for interior walls and ceilings.
- B. Performance: For STC-rated assemblies, provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.
- C. Panel Materials:
 - 1. Fire Resistive Types: ASTM C 1396, Type X, 5/8 inch thick.
 - 2. Glass-Mat Faced Tile Backer Board: ASTM C 1178; Type X; "DensShield Tile Guard" by G-P Gypsum.
 - a. Manufacturers: CertainTeed Corporation; Georgia Pacific Building Products; or National Gypsum Company.
- D. Accessories:
 - 1. Zinc or Zinc Coated Accessories: ASTM C 1047/
 - 2. Extruded Aluminum Accessories: Provide in profiles indicated by Fry Reglet Corp.; Gordon, Inc.; or Pittcon Industries.

3. Sound Attenuation Batts: ASTM C 665.
- E. Installation: Comply with ASTM C 840 for installation on metal framing and furring and finishing.
 1. Install gypsum board panels as follows:
 - a. Typical Exposed Conditions: Type X.
 - b. Tile Finishes: Glass-mat faced tile backer board.
 2. Gypsum Board Finish Schedule:
 - a. Concealed Areas: Level 1.
 - b. Tile Finish: Level 2.
 - c. Typical Exposed Conditions: Level 4.
 - d. Provide Level 5 where indicated.

09 30 13 CERAMIC TILING

- A. Includes ceramic tile and setting materials.
- B. Tile Materials: ANSI A137.1.
 1. Colors, Textures, and Patterns: Provide scheduled products or materials.
- C. Crack Isolation Membrane: Manufacturer's standard product that complies with ANSI A118.12 for standard performance
- D. Setting Materials:
 1. Modified Dry-Set Mortar (Thinset): ANSI A118.4
 - a. Prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - b. For wall applications, provide nonsagging mortar.
 2. Water-Cleanable Epoxy Grout: ANSI A118.3, color as selected.
- E. Miscellaneous Materials:
 1. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation.
 2. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic, designed specifically for flooring and wall trim applications; stainless steel, ASTM A276/A276M or ASTM A666, 300 Series exposed-edge material.
- F. Tile Installation Schedule:
 1. Interior Floor Tile Thinset on Concrete: TCNA F113.
 - a. Tile Type: As scheduled.
 - b. Thin-Set Mortar: Modified dry-set mortar.
 - c. Grout: Water-cleanable epoxy.

2. Floor Joints: Movement joint design in thinset floors and perimeter joints; TCA EJ171.
3. Interior Wall Tile on Glass-Mat Faced Backer Board: TCNA W245 or W248.
 - a. Tile Type: As scheduled.
 - b. Thin-Set Mortar: Modified dry-set mortar.
 - c. Grout: High performance grout.

09 51 13 ACOUSTICAL PANEL CEILINGS

- A. Includes suspended acoustical panel ceiling systems.
- B. Quality Assurance for Fire-Test-Response Characteristics:
 1. Surface-Burning Characteristics: Provide products with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
- C. Ceiling Panels: Comply with ASTM E 1264 to provide the following types of panels:
 1. Manufacturers: Provide named product or comparable product manufactured by Certainteed or USG Interiors, Inc, approved by the Architect.
 2. Typical Panel (Type 1): Type III, (mineral base with painted finish), Form 2, Pattern CE.
 - a. Basis of Design: Armstrong Fine Fissured.
 - b. Edge: Square.
 - c. Size: 24 by 24 inches.
 - d. Thickness: 7/8 inch.
 - e. NRC: 0.75.
 - f. LR: 0.86.
 3. Panel for Lab Ceilings (Type 2) Clean Room Areas: Type IV, (mineral base with membrane-faced overlay), Form 2, Pattern E.
 - a. Basis of Design: Armstrong Ultima Health Zone High NRC.
 - b. Edge: Square.
 - c. Size: 24 by 24 inches.
 - d. Thickness: 3/4 inch.
 - e. NRC: 0.70.
 - f. LR: 0.86.
- D. Suspension Systems: Provide intermediate duty suspension assembly steel suspension assemblies.
 1. Suspension Type: Wide face with painted finish.

09 65 13 RESILIENT BASE AND ACCESSORIES

- A. Includes resilient base and transition strips and reducers.
- B. Materials:
 - 1. Vulcanized rubber coved wall base complying with ASTM F 1861, Type TS, Group I where indicated.
 - 2. Provide transition strips and reducers as required.
 - 3. Adhesives: As recommended by manufacturer
 - 4. Colors: As selected by Architect.
- C. Manufacturers: Allstate Rubber Corp.; Stoler Industries; Armstrong World Industries, Inc.; Johnsonite; Nora Rubber Flooring; Freudenberg Building Systems, Inc.; or Roppe Corporation, USA.

09 65 16 RESILIENT SHEET FLOORING

- A. Includes vinyl sheet flooring.
 - 1. Manufacturers: Armstrong World Industries, Inc.; Congoleum Corporation; Forbo Flooring, Inc.; Tarkett, Inc.; or manufacturer offering comparable systems approved by the Architect.
 - 2. Adhesives: As recommended by manufacturer.
 - 3. Colors and Patterns: As selected by Architect.
- B. Installation Materials:
 - 1. Latex-modified, portland cement based or blended hydraulic-cement-based formulation recommended by resilient sheet flooring manufacturer for leveling and patching.
 - 2. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
 - a. Color: Match flooring.
 - 3. Integral-Flash-Cove-Base Accessories: Provided or approved by resilient sheet flooring manufacturer.
 - a. Cove strip.
 - b. Cap strip.
 - c. Corners.

09 65 19 RESILIENT TILE FLOORING

- A. Includes vinyl composition tile (VCT).
- B. VCT: ASTM F 1066, Class 2, through-pattern tile, smooth finish.
 - 1. Manufacturers: Armstrong World Industries, Inc.; Congoleum Corporation; Tarkett, Inc.; or manufacturer offering comparable systems approved by the Architect.
 - 2. Size: 12 by 12 by 0.125 inches.
 - 3. Colors and Patterns: As selected by Architect.

09 65 36 STATIC-CONTROL RESILIENT FLOORING

- A. Includes static-dissipative tile products as selected by Architect.
- B. Static-Dissipative, Vinyl Composition Floor Tile: ASTM F 1066 (vinyl composition floor tile, nonasbestos formulated), Class 2 (through-pattern tile).
 - 1. Product: Armstrong World Industries, Inc; Static Dissipative SDT.
 - 2. Thickness: Not less than 0.125 inch.
 - 3. Size: 12 by 12 inches.
 - 4. Colors and Patterns: As selected by Architect.
 - 5. Adhesives: As recommended by manufacturer.

09 67 23 RESINOUS FLOORING

- A. Includes epoxy-resin flooring and 4-inch high base.
- B. Quality Assurance:
 - 1. Mockup: Install mockup sections approximately 48 by 48 inches of each type of each type of epoxy-resin flooring and base (including inside and outside corner) to demonstrate typical pattern, texture, surface finish, color, joints, and standard of workmanship.
- C. Performance: Provide flooring system in which physical properties of topping including aggregate, when tested in accordance with standards or procedures referenced below,
 - 1. Compressive Strength (ASTM C 579): 10,000 psi
 - 2. Tensile Strength (ASTM C 307): 1,750 psi
 - 3. Flexural Strength (ASTM C 580): 4,000 psi
 - 4. Hardness (ASTM D 2240/Shore D Durometer): 85-90
 - 5. Bond Strength (ASTM D 7234): >400 psi (100% concrete failure)
 - 6. Impact Resistance (ASTM D 2794): >160 in/lbs
- D. Product: Stonclad GS coated with Stonkote HT4 manufactured by Stonhard, or comparable product approved by Architect.
 - 1. Trowelled installation.
 - 2. Thickness 1/4 inch
- E. Colors and Patterns: As selected by Architect.
- F. Materials:
 - 1. Epoxy-Resin: Manufacturer's standard recommended for use indicated; provide with primers required for application and conditions indicated.
 - 2. Aggregates: As recommended by manufacturer for flooring system indicated.
 - 3. Finishing Grout: Resin based.

09 91 13 EXTERIOR PAINTING

- A. Exterior paint systems for exposed concrete, steel, and galvanized steel.
- B. Quality Assurance:
 - 1. Comply with MPI standards for paint materials and systems.
 - 2. Mockups: Apply benchmark samples 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. Final approval of color selections will be based on benchmark samples.
- C. Materials:
 - 1. Manufacturers: Sherwin Williams, Behr Process Corporation; Benjamin Moore; or PPG Architectural Finishes, Inc.
 - 2. Sheens and Colors As indicated or as selected by Architect.
 - 3. Provide each finish system with compatible finish and primer/sealer coats from a single source.
- D. Application: Finished surfaces must receive not less than 2 finish coats over primed surface.

09 91 23 INTERIOR PAINTING

- A. Interior paint systems for exposed concrete, steel, galvanized steel, and gypsum board.
- B. Quality Assurance:
 - 1. Comply with MPI standards for paint materials and systems.
 - 2. Mockups: Apply benchmark samples 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. Final approval of color selections will be based on benchmark samples.
- C. Materials:
 - 1. Manufacturers: Sherwin Williams, Behr Process Corporation; Benjamin Moore; or PPG Architectural Finishes, Inc.
 - 2. Sheens and Colors As indicated or as selected by Architect.
 - 3. Provide each finish system with compatible finish and primer/sealer coats from a single source.
- D. Application: Finished surfaces must receive not less than 2 finish coats over primed surface.

09 96 00 HIGH PERFORMANCE COATINGS

- A. Epoxy coatings for wall substrates at Laboratory and Laboratory Support Spaces.

- B. Quality Assurance:
 - 1. Comply with MPI standards for paint materials and systems.
 - 2. Mockups: Apply benchmark samples 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. Final approval of color selections will be based on benchmark samples.
- C. Materials:
 - 1. Manufacturers: PPG Architectural Finishes, Inc.; Tnemec; or Sherwin Williams.
 - 2. Sheens and Colors As indicated or as selected by Architect.
 - 3. Provide each finish system with compatible finish and primer/sealer coats from a single source.
- D. Application: Finished surfaces must receive not less than 2 finish coats over primed surface.

9 97 24 PENETRATING LIQUID FLOOR TREATMENT

- A. Includes concrete sealer hardener in service areas to improve concrete floor performance under service conditions indicated.
- B. Provide clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Products: Euclid Chemical Company (The); Euco Diamond Hard; Meadows, W. R., Inc.; Liqui-Hard; Nox-Crete Products Group, Kinsman Corporation; Duranoxl; or comparable product approved by the Architect.

DIVISION 10 SPECIALTIES

10 14 16 PLAQUES

- A. Includes cast bronze dedication plaque.
- B. Finish:
 - 1. Bronze: Clear, waterborne, air-drying, acrylic lacquer called “Incralac”;
- C. Manufacturers: Matthews International Corporation; Bronze Division; Nelson-Harkins Industries; The Southwell Company; or manufacturer offering comparable products approved by the Architect.

10 14 19 DIMENSIONAL LETTER SIGNAGE

- A. Includes aluminum cut-out letters for primary exterior building signage.
- B. Letter Style and Size: As indicated or if not indicated as selected by Architect.
- C. Finish for Aluminum:
 - 1. Baked-enamel or powder-coat finish complying with AAMA 2603; color as selected by Architect.
- D. Manufacturers: ASI-Modulex, Inc.; Nelson-Harkins Industries; Signature Signs, Incorporated; The Southwell Company; or manufacturer offering comparable products approved by the Architect.

10 14 23 PANEL SIGNAGE

- A. Includes signage types as follows:
 - 1. Wayfinding signage.
 - 2. Panel sign for each door.
- B. Unit cost allowance specified in Division 01 “Allowances” includes material and installation.
- C. Quality Requirements: Comply with accessibility requirements.
- D. Panel Signs: As indicated with tactile characters and pictograms and Braille.
- E. Manufacturers: APCO Graphics, Inc.; ASI-Modulex, Inc; InPro Corporation; Innerface Sign Systems, Inc.; or manufacturer offering comparable products approved by the Architect.

10 21 23 CUBICLE CURTAINS AND TRACK

- A. Includes curtain tracks and curtain carriers.
- B. Performance Requirements: Curtain fabrics are flame resistant and are identical to those that have passed NFPA 701 when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.

- C. Track: Extruded aluminum, 5/8-inch wide by 1/2 -inch high; with minimum wall thickness of 0.058 inch.
- D. Carriers: Nylon rollers and nylon axle with aluminum hook.
- E. Cubicle Curtain Fabric: Curtain manufacturer's standard, 100 percent polyester, inherently and permanently flame resistant, stain resistant, and antimicrobial.
 - 1. Color and Pattern: As selected by Architect.
 - 2. Mesh Top: No. 40 nylon mesh.
- F. Curtain Fabrication: Fabricate curtains to comply with the following requirements:
 - 1. Width: Equal to track length from which curtain is hung plus 10 percent added fullness, but not less than 12 inches added fullness.
 - 2. Length: Equal to floor-to-ceiling height, with 20-inch mesh top, and minus 12 inches above the finished floor at bottom.

10 26 00 WALL AND DOOR PROTECTION

- A. Includes:
 - 1. Impact-resistant wall covering.
 - 2. Corner guards.
- B. Impact-Resistant Wall Covering: Fabricated from plastic sheet wall-covering material.
 - 1. Minimum Sheet Thickness: 0.060 inch.
 - 2. Color and Texture: As selected by Architect.
 - 3. Height: Wainscot.
 - 4. Trim and Joint Moldings: Extruded rigid plastic matching sheet wall covering color.
 - 5. Mounting: Adhesive.
 - 6. Manufacturers: Construction Specialties, Inc.; IPC Door and Wall Protection Systems; Korogard Wall Protection Systems; or manufacturer offering comparable products approved by the Architect.
- C. Corner Guards: Surface mounted corner guards for exposed corners.
 - 1. Manufacturers: Construction Specialties, Inc.; Balco, Pawling, or manufacturer offering comparable products approved by the Architect.

10 28 00 TOILET, BATH, AND LAUNDRY ACCESSORIES

- A. Includes stainless steel toilet accessories.
- B. Quality Requirements: Comply with accessibility requirements.

- C. Accessories include:
 - 1. Toilet paper dispenser.
 - 2. Soap dispenser.
 - 3. Sanitary napkin/tampon disposal.
 - 4. Paper towel dispenser.
 - 5. Combination paper towel dispenser and waste receptacle.
 - 6. Mirrors.
 - 7. Toilet seat cover dispenser.
 - 8. Grab bar.
 - 9. Hot-hair hand dryer.
 - 10. Mop and broom holder.
 - 11. Sample pass-thru cabinet.
- D. Manufacturers: Bobrick, Bradley, ASI, or manufacturer offering comparable products approved by the Architect.

10 43 13 DEFIBRILLATOR CABINETS

- A. Includes recessed steel cabinets with steel doors and frame ready to receive automated external defibrillator (AED) furnished by Owner.
- B. Quality Assurance:
 - 1. AEDs designed for use by the public and approved by the US Food and Drug Administration.
- C. Provide industry standard graphics to mark location.
- D. Finish: Shop applied primer to receive field applied finish.

10 44 13 FIRE PROTECTION CABINETS

- A. Includes cabinets for portable fire extinguishers.
- B. Fire Extinguisher Cabinet: Suitable for fire extinguisher.
 - 1. Manufacturers: J. L. Industries, Inc., Larsen's Manufacturing Company, Potter Roemer LLC., or manufacturer offering comparable products approved by the Architect.
 - 2. Cabinet Construction: Nonrated.
 - 3. Cabinet Type:
 - a. Semi-recessed with square-edge trim, 1-1/4- to 1-1/2-inch backbend depth.
 - b. Surface mounted.
 - 4. Door Style: Vertical duo panel with frame.

10 44 16 FIRE EXTINGUISHERS

- A. Includes multi-purpose extinguishers and brackets.

- B. Quality: Comply with the following:
 - 1. Local fire code requirements.
 - 2. Applicable NFPA requirements.
- C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
- D. Manufacturers: J. L. Industries, Inc., Larsen's Manufacturing Company, Potter Roemer LLC., or manufacturer offering comparable products approved by the Architect.

10 51 13 METAL LOCKERS

- A. Includes standard-duty steel lockers.
- B. Quality Requirements: Comply with accessibility requirements.
- C. Manufacturer: DeBourgh Mfg. Co.; Lyon Workspace Products; Penco Products, Inc.; or manufacturer offering comparable products approved by the Architect.
- D. Standard Duty Lockers:
 - 1. Locker Arrangement: Double-tier unless otherwise indicated.
 - 2. Body and Shelves: Assembled by riveting or bolting body components together.
 - 3. Frames: Channel formed; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames.
 - 4. Door: One piece; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
 - 5. Finish: Manufacturer's standard baked enamel or powder coating in color selected by Architect.
- E. Benches:
 - 1. Overall Assembled Height: 17-1/2 inches.
 - 2. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.
 - 3. Size: Minimum 9-1/2 inches wide by 1-1/4 inches thick except provide minimum 20-inch-wide tops where accessible benches are indicated.
 - 4. Fixed Pedestals: Manufacturer's standard stainless steel or aluminum supports, with predrilled fastener holes for attaching bench top and anchoring to floor.

10 56 17 WALL-MOUNTED STANDARDS AND SHELVING

- A. Includes metal storage shelving on wall-mounted standards.
- B. Shelving: Fabricate shelves from cold-rolled steel in thickness as required for structural performance.
 - 1. Provide shelves with turned down front edge and turned up side and back edges.
- C. Standards: Slotted standards designed for “knife” type brackets.
- D. Finish: Manufacturer’s standard baked enamel or powder coating in color selected by Architect from manufacturer’s standard range.

10 73 00 PROTECTIVE COVERS

- A. Includes the following types of extruded aluminum protective covers:
 - 1. Canopies.
 - 2. Walkway cover systems.
- B. Performance: Comply with local code requirements wind loads.
- C. Manufacturer: East Texas Canopy, Inc., AVAdek, or manufacturer offering comparable products approved by the Architect.
- D. Materials:
 - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 2. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
- E. Finish: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
 - 1. Color: As selected by Architect.

10 75 16 GROUND-SET FLAGPOLES

- A. Includes ground-mounted aluminum flagpole.
- B. Structural Performance: Provide flagpole assemblies, including anchorages and supports, shall withstand the effects of gravity loads, and the following loads and stresses:
 - 1. Wind Loads: 120 mph according to SEI/ASCE 7.
 - 2. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole.
- C. Aluminum Flagpoles: Provide entasis-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inch.
 - 1. Exposed Height: 25 feet, unless otherwise indicated.

ISSUED FOR DD REVIEW
8/6/2021

HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas

- D. Manufacturers: American Flagpole; Concord Industries, Inc., U.S. Flag & Flagpole Supply, LP, or manufacturer offering comparable products approved by the Architect.

7/7/2021

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

20030

DIVISION 11 EQUIPMENT

11 31 00 RESIDENTIAL APPLIANCES

- A. Includes residential appliances.
- B. Performance: Provide appliances that comply with accessibility requirements.
- C. Appliances: As scheduled on Drawings.
 - 1. Basis of Design: provide scheduled appliances or comparable products manufactured by General Electric Company; Hotpoint; Maytag; Whirlpool Corporation approved by the Architect.
- D. Finish: Stainless steel finishes on exposed face.

11 53 00 LABORATORY FIXTURES AND EQUIPMENT

- A. By Lab Consultant.

11 53 13 LABORATORY FUME HOODS

- A. By Lab Consultant.

DIVISION 11 EQUIPMENT**11 53 00 LABORATORY FIXTURES AND EQUIPMENT**

PART 1 – GENERAL

A. SUMMARY

1. Sections Included:
 - a. Emergency Safety Showers and Eye Wash Stations
 - b. Flammable Storage Cabinets
 - c. Chemical Storage Cabinets
 - d. Compressed Gas Cylinder Storage

2. Related Sections

B. EMERGENCY SAFETY SHOWERS AND EYE WASH STATIONS

1. Alternative equipment, such as self-contained pressurized units; bottles or drench hoses are not to be considered UF or ANSI compliant, unless used in conjunction with an ANSI compliant shower or eye wash station. Self-contained units are acceptable for use in fieldwork areas where plumbed units are not possible.
2. Privacy or modesty curtains are not required for use with safety showers. Blankets or jumpsuits should be available for use as a cover-up, as a victim needs to remove all contaminated clothing.
3. To ensure complete accessibility to all laboratory staff, the shower and eyewash stations may be placed in the corridors of buildings. They shall be located to provide adequate coverage for all labs within the area. This corridor placement may not be suitable for all labs, workplaces and storage areas, and shall be considered for each situation.
4. These units may be equipped with flow alarms that would provide a visible and audible.
5. alarm when activated. This alarm would attract attention to a unit being used by someone who was splashed with a chemical and would also aid in identifying any unit that was activated in an act of vandalism.
6. In areas where stations shall be maintained outside of buildings, the unit shall be protected against freeze damage. This could include having the unit heated or enclosed with insulation.

7. EMERGENCY SAFETY SHOWERS: Emergency safety showers are required to
- a. conform to ANSI Z358.1-1998 Standards.
 - b. Be located less than 100 feet from furthest point of chemical use in labs or hazardous areas. (May need to be closer in some cases, as required by EH&S).
 - c. Total travel time from hazard may not be more than 10 seconds.
 - d. Shall not be located behind doors or other obstacles.
 - e. Shall have a "stay open valve" capable of providing a minimum of fifteen minutes of continual flow that once activated cannot be turned off without intentional action of the user.
 - f. Flow from showerhead cannot be less than thirty gallons of water per minute. This requires a minimal supply pipe size of 1".
 - g. Shower head shall be 84 inches from floor.
 - h. Minimum spray pattern shall be 20 inches in diameter at a height of sixty inches from the floor.
 - i. Locations shall be labeled with signs visible from all potential directions of travel to the unit.
 - j. Floor drains are not normally required. If required they shall be self priming.
8. EMERGENCY EYE WASH STATIONS: Emergency eye wash stations are required to:
- a. Conform to ANSI Z358.1-1998 Standards.
 - b. Be located less than 100 feet from chemical use areas of labs or hazardous areas. (May need to be closer in some cases as required by EH&S).
 - c. Total travel time from hazard may not be more than 10 seconds.
 - d. Shall not be located behind doors or other obstacles.
 - e. Shall have a "stay open valve". Once activated, this "hands off" valve shall not be turned off without intentional action of the user.
 - f. Flow from unit shall not be less than 0.4 gallons (1.5 liters) of water per minute.

- g. Unit shall be capable of maintaining flow for a minimum of fifteen minutes.
- h. Nozzles shall be protected from airborne contamination when not in use. These dust covers shall be self-removing once the unit is activated.
- i. Locations shall be labeled with signs visible from all potential directions of travel to the unit.
- j. Floor drains are not normally required. If required, they shall be self priming.

9. FLAMMABLE STORAGE CABINETS

- a. Flammable storage cabinets shall meet NFPA and OSHA requirements.
- b. Flammable storage cabinets need not be vented when installed. If vented, the vent system must meet the following criteria:
 - i. Exhaust cannot be coupled to any other exhaust system.
 - ii. Exhaust piping must be made of metal (PVC piping will not meet regulations).
 - iii. The cabinet should be exhausted through both the upper and lower vents at a combined airflow of 25 cfm.
 - iv. Flammable cabinets may not be vented in series. Each cabinet shall be vented independently to eliminate possibilities of vapors combining and reacting with each other.
- c. No more than three flammable storage cabinets may be housed in any location, unless there is a minimum of 100 feet of separation.

10. CHEMICAL STORAGE CABINETS

- a. Cabinets used to store chemicals shall meet NFPA, OSHA and the following criteria:
 - i. Must be constructed of materials that will be compatible with planned chemical storage.
 - ii. Cabinets shall be designed and be capable of withstanding weight of planned use.
 - iii. Shelves shall have one-inch lips on front edge to secure bottles.
- b. If cabinets are planned for chemical storage under fume hoods, and these cabinets are to be vented to the hood for exhausting of vapors, the cabinets shall have:
 - i. Venting installed, and not have vent ports left open.
 - ii. Venting material used which is compatible with chemicals stored.

- c. Cabinets used to store flammable or corrosive materials shall be labeled with appropriate signage.

11. COMPRESSED GAS CYLINDER STORAGE

- a. Areas where compressed gas cylinders will be stored shall be equipped with racks and securing straps or chains. Securing straps or chains shall be installed so they are located within the upper 1/3 of the cylinder.
- b. Gas storage areas shall be planned so that incompatible gasses are separated by the regulated distances. Gasses shall be secured as close as possible to the use point to minimize excessive runs of piping or tubing.
- c. Extremely hazardous gasses shall be identified to ensure they are stored within compressed gas safety cabinets. This must be reviewed by EH&S during plan review and prior to construction. The gas safety cabinet shall be exhausted from the building by a dedicated ventilation system that will exhaust to the roof of the building. This dedicated exhaust shall run continually when a cylinder is located in the cabinet, be intrinsically safe and have emergency power back up.
- d. Some compressed gas cylinder storage cabinets may need to be sprinkled for fire protection as required by the gas to be housed in the unit. Consult with EH&S for requirements.
- e. Exhausted high hazard gasses may need to be routed through a scrubbing system. These will be considered on an "as-needed basis". Proposed plans shall be reviewed by EH&S.
- f. Highly flammable gasses, such as hydrogen, should be stored outside of the building and each instance shall be reviewed by EH&S on a case-by-case basis.

END OF SECTION

11 53 23 LABORATORY REFRIGERATORS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Refrigerators for Laboratories. Refer to architectural drawings for dimensions and arrangement of units.
- B. Refer to the // architectural drawings // for refrigeration equipment schedules and installation details.
- C. Refer to electrical drawings for lighting.

1.2 RELATED WORK

- A. Section 09 30 13, CERAMIC TILING: Quarry tile floor.
- B. Section 13 21 29, CONSTANT TEMPERATURE ROOMS.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- D. Section 23 23 00, REFRIGERANT PIPING.
- E. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.

1.3 QUALITY ASSURANCE

- A. Safety Standard: ASHRAE 15 describes requirements for refrigerant containing parts.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Condensing units, with mounting rack where required.
 - 2. Unit coolers.
 - 3. Temperature controls and alarms.
 - 4. Diagrams and details of piping, wiring and controls.
- C. Operating Test Data.
- D. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS and Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Air-Conditioning and Refrigeration Institute (ARI):
 - 420-00Unit Coolers for Refrigeration.

520-04Performance Rating of Positive Displacement Condensing
Units.

- C. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE):
15-10Safety Standards for Refrigeration Systems

PART 2 - PRODUCTS

2.1 CONDENSING UNITS

- A. Comply with ARI Standard 520. Air cooled, water cooled or combination air/water cooled type as shown, motor driven integral compressor, motor starter, condenser, receiver, common base, and safety/operational controls. Receiver capacity shall be not less than 125 percent of system refrigerant charge. For units racked one above the other and for units installed in a closet, provide a factory fabricated steel rack extending approximately 1150 mm (45 inches) above the floor. For larger freezers provide two condensing units and unit coolers with independent refrigeration systems as shown. Do not locate compressors on top of refrigerator or freezers.
- B. Provide positive oil lubrication and oil level indicating device for each compressor. Provide water regulating valve for water cooled unit.
- C. Compressor Motor: Squirrel cage induction type of ample size for continuous operating at maximum compressor performance indicated. Provide inherent (Klixon) protection, in compressor terminal box, for each phase of motor.
- D. Pressure Switches: Automatic reset low pressure switch, and automatic or manual reset high pressure cutout.
- E. Air Cooled Condensing Units:
 - 1. High efficiency type piped and automatically controlled to operate at lower head pressures during low ambient temperature conditions, designed and weather-proofed for outdoor installation, to operate satisfactorily at winter ambient temperatures down to // ____// degrees C (F), and be provided with crankcase and receiver heaters.

SPEC WRITER NOTE: Insert temperature of 6 degrees C (10 degrees) below the 99% column in ASHRAE Handbook weather data.

- 2. The condenser fans shall be driven by permanent split capacitor motors.

2.2 UNIT COOLERS

- A. Comply with ARI Standard 420. Units shall be UL listed, forced-ventilation type integral defrosting, internal or external refrigerant distributor, single or multiple fans and motors, drip-pan, deflectors, aluminum or baked-enamel steel housing, hangers, and all accessories.

- B. Motors: Permanent split capacitor type in accordance with Section 11 05 12, General Motor Requirements for Equipment. Provide motors with thermal overload protection. Provide manual starting switch.
- C. Drain Pans: Galvanized sheet steel. Provide additional drain pans under uncovered refrigerant connections, and interconnect them with main drain pan. For freezer units provide electrically heated drain pan.
- D. Defrost Provision:
 - 1. Refrigerators: Defrost shall occur during compressor off cycle with evaporator fan running continuously.

2.3 PIPING, PIPE INSULATION, AND REFRIGERANT AND OIL CHARGES

- A. Refer to Section 23 23 00, REFRIGERANT PIPING

2.4 EQUIPMENT IDENTIFICATION REQUIREMENTS

- A. Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- B. Identify all refrigeration equipment and alarm devices.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install refrigeration equipment as described in the respective manufacturer's instructions. Make panel joints tight and seal all panel penetrations to prevent condensation or frosting.
 - 1. Unit cooler: NSF approval requires that the unit be suspended at 90 mm (3-1/2 inches) minimum distance below the ceiling to allow cleaning the top of the unit cooler.
 - 2. To the extent feasible, mount pipe, conduit, and instrumentation on the exterior and pass thru neatly drilled penetrations to the lights or other devices.
- B. Piping, Pipe Insulation and Refrigerant: Provide in accordance with Section 23 23 00, REFRIGERANT PIPING.
- C. Controls Installation: As specified in Section 23 09 23, Direct-Digital Controls Systems for HVAC.

3.2 REFRIGERATOR START-UP, AND PERFORMANCE TESTS AND INSTRUCTIONS

- A. Start-up Temperature Reduction: On start-up, reset the room thermostats daily for a maximum temperature drop of 8 degrees, on C scale (15 degrees on F scale per day down to 2 degrees C (36 degrees F), and a maximum of 6 degrees on C scale, (10 degrees on F scale) per day between 2 degrees C (36 degrees F) and final operating temperature.
- B. Perform test in accordance with Section 01 00 00, GENERAL REQUIREMENTS. Operate each system and record conditions hourly for eight hours. Submit the following information:
 - 1. Station, Building and System Identification, Contractor, Date and Time.

2. Compressor nameplate data: Make, model, horsepower, RPM, refrigerant and charge in pounds.
 3. Compressor operation: Approximate percentage running time, pressure gage readings, actual amps (starting and running), condenser water temperature in and out, or condenser entering air temperature.
 4. Room temperatures.
 5. Defrost and drain functions of unit coolers. Demonstrate alarm functions.
- C. By arrangement with the Resident Engineer, 24 hours in advance, use the start-up and test period for required operation and maintenance instructions to VA personnel in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

----- END -----

11 53 53 BIOLOGICAL SAFETY CABINETS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Bench-top Class II Biological Safety Cabinet
 2. Biological Safety Cabinet Supporting Base Stand
 3. Exhaust Thimble/Canopy Connection
- B. Related Sections **[Insert Appropriate Sections]**
1. Section ____: Laboratory Fittings and Fixtures
 2. Section ____: Mechanical
 3. Section ____: Plumbing
 4. Section ____: HVAC
 5. Section ____: Electrical

1.02 SCOPE AND CLASSIFICATION

- A. This specification covers the requirements for the purchase of bench-mounted Class II, Type A2 biological safety cabinets.
- B. Bench-mounted Class II, Type A2 biosafety cabinets in 3-, 4-, 5- and 6-foot widths are covered by this specification.
- C. This specification sets the intent for quality, performance and appearance.

1.03 REFERENCES

- A. The bench-mounted Class II, Type A2 biosafety cabinets must conform to the following regulations and standards.
- B. NSF International – NSF/ANSI Standard 49 for Biohazard Cabinetry.
- C. Directive on the Restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC) – RoHS Directive
- D. The bench-mounted Class II, Type A2 biosafety cabinet must carry the ETL listed mark for the following.
1. UL 61010-1 (formerly 3101-1), Underwriters Laboratories Inc., Electrical Equipment for Laboratory Use.
 2. CAN/CSA C22.2 No. 61010-1, Canadian Standards Association, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.
- E. Biosafety Cabinets that are 230 volt models must carry the CE conformity marking as required by the Council of European Communities.
1. Electrical Safety Standard – IEC 1010-1
 2. Electromagnetic Compatibility Directive – 89/336/EEC

1.04 PERFORMANCE REQUIREMENTS

- A. General Design Requirements (See Part 2 for details)
1. Class II, Type A2 – suitable for testing and experimentation with low to moderate risk biological agents.
 2. Canopy/Thimble connection [Optional: further information provided in Paragraph 2.03 M.3.] – added to Class II, Type A2 required for work with volatile and/or toxic hazardous chemical vapors below appropriate exposure limits.
 3. Base Stands [Pick one based on project requirements, delete the other two]
 - a. Telescoping Stands – Support base adjustable for eight static height positions allowing the work surface height to be set between 30” (Seated Positions) and 37” (Standing Positions).
 - b. Hydraulic Stands – Support base with infinite adjustability for work surface heights between 28” (Seated Positions) and 37” (Standing Positions).
 - c. Mobile Hydraulic Stands - Support base with infinite adjustability for work surface heights between 19.7” and 37” (Standing Positions) and overall installation height as low as 76.2” for transport through doorways.
- B. Containment & Safety
1. Cabinet shall provide biological containment protection for both operator and product proven by an actual test, (as conducted by NSF) and routinely validated by the manufacturer.
 2. Containment of biological hazards is achieved through a combination of HEPA filtration and directional, controlled airflow.
- C. Airflow
1. Calculated Air Velocity: 100 to 110 fpm through 8” OR 10” [Select appropriate sash height] sash opening with audible alarms which sound when safety glass sash window is not at its proper operating height.
 2. Measured Downflow Velocity: 50 to 60 fpm measured 4” above operating sash opening height. Must be true laminar (uniform) downflow as defined in NSF/ANSI Standard 49.
 3. Blower with Electronically Commutated Motor (ECM) shall be programmed to deliver a precise volume of air as required and automatically adjusts as filters load without relying on airflow sensors and protected from voltage (electrical) fluctuation. Systems using air (velocity or volume) sensors or pressure transducers to control blower speed are not acceptable.
 4. The Cabinet shall provide an audio signal accompanied by digital display of alert or alarm status type specific to the alarm with diagnostic measures displayed on a line-of-sight (while seated) color display.
- D. HEPA Filters
1. One supply and one exhaust HEPA filter. Each shall be a minimum of 99.99% efficient on all particles 0.3µm as scan-tested with DOP or equivalent.
 2. HEPA filters shall be industry-standard size.
 3. Motor-Blower shall be positioned so as to promote even filter loading, thereby prolonging the life of HEPA filters
 4. Motor-Blower shall automatically handle HEPA filter pressure equal to 200% of initial pressure without reducing total air delivery by more than 2%.

- E. Controls and Display
1. Cabinet shall utilize a microprocessor control system.
 2. Accessible mounted controls for operation of:
 - a. Blower
 - b. Light
 - c. Electrical Outlets
 - d. UV Light
 - e. Timers
 - f. Alarm Mute (5 minute ring-back)
 - g. Menu navigation
 3. Easy to Use/Navigate Operating System performs the following Functions.
 - a. User Programmable and customizable biosafety cabinet operation (including blower, light, optional UV light, and timer functions) controllable by movement and position of the Safety Glass Sash.
 - b. User Programmable and customizable biosafety cabinet operation that idles the motor in a reduced flow mode, reducing energy consumption by over 80% while maintaining ISO Class 5 conditions.
 - c. Digital 12- or 24-hour clock.
 - d. HEPA filter life is displayed as a percentage using real time feedback from the ECM-blower's performance. HEPA filter life timers are not acceptable.
 - e. Complete diagnostic and troubleshooting functionality.
 - f. Security password protection of cabinet use.
 - g. Programmable timed operation of fluorescent and (optional) germicidal ultraviolet (UV) light.
 - h. Password Protected Service menu for calibration and configuration of biosafety cabinet installation and operational parameters.
 - i. Selectable units of measure (Imperial or Metric).
 4. Alarms and Alerts – The cabinet shall provide both an audio signal and digital display that communicates and describes the alarm condition, provides corrective actions and utilizes a cross sectional diagram highlighting the potentially affected areas of the biosafety cabinet. Alarms shall exist for the following conditions:
 - a. Sash Height Alarm – indicating that the sash is higher than its nominal set point.
 - b. Airflow Alert – signifies that the automatically adjusting blower has had to make an abrupt change in order to maintain safe airflow.
 - c. Airflow Alarm – (If equipped with an airflow sensor) indicates that inflow or downflow velocities are excessively high or low.
 - d. Canopy Alarm – (If Canopy Kit is installed) indicates insufficient exhaust system airflow. (See Canopy Kit Accessory Details)
 - e. System Error – Indicates a failure in the communication between the microprocessor controller and the ECM blower.
- F. Noise
1. Sound level (as factory tested) shall be no more than 63 dBA measured 15 inches above the work surface and 12 inches in front of the safety glass sash, as stated by NSF/ANSI Standard 49.
- G. Illumination
1. Fluorescent lighting shall provide 90 to 150 foot-candles on work surface per NSF/ANSI Standard 49. The ballast is to be electronic containing thermal protection with automatic reset.

2. Fluorescent lighting shall be externally mounted from the work zone, energy efficient, and replaceable from front of the biosafety cabinet.
3. Optional UV light shall be a 254 nanometer germicidal lamp with life timer and replacement notifications.
4. The UV light shall be operable only when the sash is closed.

H. Pass-Through and Bulkheads

1. Sealed Service Pass-Through – All permanent and durable structures for the passing of electrical wires, cords and tubes are to be permanently sealed airtight, and shall not allow for movement of the items passing through.
2. Sealed Service Penetration – Penetrations will be air tight and sealed, and will provide for the addition of field installed service fixture/valves or testing equipment.
3. User-Modified Pass-Through – Cord, Tube & Cable Portals for the passing of such so to connect to instruments, one inside the biosafety cabinet, the other outside. Shall provide an airtight seal and be protected by a vacuum or negative pressure source.
4. All Pass-Through & Bulkhead types shall be tested and approved by NSF to the NSF/ANSI Standard 49.

I. Efficiency

1. Biosafety cabinets shall operate at, or lower than, the listed energy usage and heat output during normal operation:
 - a. 3' Models – 230 Watts / 785 BTU-HR
 - b. 4' Models – 290 Watts / 990 BTU-HR
 - c. 5' Models – 390 Watts / 1331 BTU-HR
 - d. 6' Models – 490 Watts / 1672 BTU-HR
2. During periods of non-use, the cabinet's set-back mode should operate at an 85% reduction in energy consumption.

1.05 QUALITY ASSURANCE

A. NSF Qualification

1. Biosafety cabinets, Class II, Type A2 will meet or exceed the minimum requirements of NSF/ANSI Standard 49, bear the NSF Mark, and appear in NSF's Official Product Listings.

B. Manufacturer Qualification

1. ISO 9001 Certified manufacturing plant and processes.
2. Manufacturer must maintain a testing facility at their place of business for the performance testing of bench-mounted Class II, Type A2 biosafety cabinets.
3. The test facility and manufacturing facility must be available for owner/user inspection and its quality control procedures.
4. Manufacturer shall provide evidence and documentation of specialization and manufacturing of biosafety cabinets with a minimum of no less than ten years' experience to the market.
5. All biosafety cabinets wired for 115V, 60 Hz and 230V, 60 Hz shall be built to meet or exceed all minimum requirements of UL Standard 61010-1 (formerly 3101-1) and CAN/CSA C22.2 No. 1010.1. The biosafety cabinets shall be listed by a Nationally Recognized Testing Laboratory (NRTL).
6. All biosafety cabinets wired for 230V, 50 Hz shall be built in conformance to CE requirements of the Electrical Safety Standard: IEC 1010-1 and

Electromagnetic Compatibility Directive 89/336/EEC.

- C. Biosafety Cabinets shall be Made in America.
 - 1. 95% or more of raw material and component suppliers shall be United States based.
 - 2. Stainless and cold rolled steel used in manufacturing shall be sourced from United States steel mills.
 - 3. Final product must be fabricated and assembled within the United States of America.
 - 4. Owner reserves the right to evaluate Made in America claims for compliance with the Bureau of Consumer Protection.
- D. Supply all equipment in accordance with this specification. Offering a product differing in materials, construction, or performance from this specification requires written approval obtained seven days or more before the proposal deadline.
- E. The owner/architect reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.
- F. Manufacturer's warranty against defects in material or workmanship on its biosafety cabinets will be for 5 years from the date of installation or 6 years from date of purchase, whichever is sooner, and includes replacement of parts (excluding filters and lamps) and labor.

1.06 SUBMITTALS

A. Action Submittals

- 1. Biosafety Cabinet specification sheets and product manuals shall be submitted by the manufacturer upon request, and include safe and proper operation and maintenance information.
- 2. Shop Drawings: Include plans, elevations, sections, and details.
 - a. Indicate details for anchoring biosafety cabinets to floor as required by seismic code.
 - b. Indicate locations and types of service fittings together with associated service supply connection required.
 - c. Indicate duct connections (if thimble/canopy connection is required), electrical connections, and User-Modified Pass Through.
 - d. Include roughing-in information for mechanical, plumbing, and electrical connections.
 - e. (If thimble/canopy connection is required) Provide face opening, volumetric rates, and static pressure drop data.

B. Informational Submittals

- 1. Production Test Reports: A copy of the "as manufactured" test reports conducted prior to shipping ensures compliance with NSF/ANSI Standard 49 and is shipped with each biosafety cabinet.
- 2. Independent validation:
 - a. Written verification that the biosafety cabinets carry listed markings for the following:
 - 1) NSF/ANSI Standard 49, National Sanitation Foundation, (Laminar

- Flow) Biological Safety Cabinetry
- 2) UL 61010-1 (formerly 3101-1), Underwriters Laboratories Inc., Electrical Equipment for Laboratory Use. (115V & 230V, 60Hz Models)
- 3) CAN/CSA C22.2 No. 61010-1, Canadian Standards Association, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use. (115V & 230V, 60Hz Models)
- 3. CE requirements of the Electrical Safety Standard: IEC 1010-1 and Electromagnetic Compatibility Directive 89/336/EEC. (230V, 50 Hz Models).
- 4. Documentation of ISO 9001 Certified manufacturing plant and processes.
- 5. List of five installations (of equal or greater size/scope and requirements) is available upon request.
- 6. Declaration of Made in America. Owner reserves the right to evaluate Made in America claims for compliance with the Bureau of Consumer Protection.
- 7. Start-Up Test Report shall be submitted by independent 3rd party, accredited by NSF to test and balance biosafety cabinets.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Protect finished surfaces during handling, installation and thru completion of construction with protective covering of polyethylene film or another suitable material.
- B. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install biosafety cabinet until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Labconco Corporation, 8811 Prospect Avenue, Kansas City, Missouri 64132
- B. Basis-of-Design Product: Labconco Purifier Logic+
 - 1. 3’ Models – 30231 & 30238 Series: Exterior Dims – 42.3” w x 31.2” d x 61.7” h
 - 2. 4’ Models – 30241 & 30248 Series: Exterior Dims – 54.3” w x 31.2” d x 61.7” h
 - 3. 5’ Models – 30251 & 30258 Series: Exterior Dims – 66.3” w x 31.2” d x 61.7” h
 - 4. 6’ Models – 30261 & 30268 Series: Exterior Dims – 78.3” w x 31.2” d x 61.7” h
- C. Comparable product by one of the following permitted following substitution

request and approval.

D. Other substitutions are not permitted.

2.02 MATERIALS

A. Biosafety Cabinet Interior

1. The Interior Liner (sides and back) shall be 16 gauge, Type 304 Stainless Steel.
2. The Work Surface shall be 18 gauge or greater, Type 304 Stainless Steel.
3. Motor shall be a thermally protected, DC-ECM type with resilient mounted bearings. Motors with bushings are not acceptable.
 - a. ½ HP ECM shall provide 42 Oz-Ft of torque.
 - b. ¾ HP ECM shall provide 66 Oz-Ft of torque.
4. Electrical Outlets will have interlocking ground fault interruption.
5. Internal ductwork and plenums shall be galvanized and/or stainless steel shall be RoHS compliant. Flexible, removable or replaceable plenums and ductwork are not acceptable.
6. Safety Glass Sash shall be ¼" thick tempered safety glass.

B. Biosafety Cabinet Exterior

1. Exterior panels shall be powder-coated, 18 gauge cold rolled steel.

C. HEPA Filters

1. Filters are to be borosilicate glass, mini-pleat, and separator-less HEPA filters.
2. Filter frames shall be aluminum with closed cell neoprene gaskets.

2.03 CONSTRUCTION

A. Biosafety Cabinet Interior

1. Unitized single-frame construction of 16 gauge, 304 Stainless steel. Shall pass factory test for holding pressure of 2" w.g. per NSF/ANSI Standard 49.
2. Cabinet assembly shall be constructed such that all positive pressure contaminated plenums are surrounded by negative pressure plenums.
3. Drain trough beneath the work tray is equipped to accommodate a 3/8" ball-type drain valve.
4. Optional service fixture (on models with fixture) shall be quarter-turn, ball valve. **[Modify or remove this depending on if service(s) is required]**
 - a. Valve shall be constructed of chrome-plated brass (or other based on requirements of service/utility provided).
 - b. Location of fixtures shall be ADA compliant for wheel chair accessibility.
5. Internal air balancing system shall be accessible from the outside of the biosafety cabinet, and adjustable with a standard hex-nut driver.
6. The Work Surface shall be of single piece, stamped, construction with no welding, applied sealant or solder used to seal any surface. All internal radiuses are ½" or greater.
7. A metallic diffuser screen shall promote true laminar air flow.
8. The cabinet shall accommodate up to 4 service fixtures.
9. The cabinet shall be double wall construction with negative pressure airflow from drain pan to top surrounding the back of work area.

B. Biosafety Cabinet Exterior

1. Exterior front panel shall slope approximately 10° and has no visibility-interfering protrusions.
2. Cabinet is designed such that all major service operations can be performed from the front of the cabinet.
3. HEPA filters are removable from the front of the cabinet.
4. A steel diffuser shall be mounted on top of the biosafety cabinet to promote proper exhaust airflow and protect the Exhaust HEPA filter.

C. Dimensions

1. The biosafety cabinet shall be capable of transport through a 32" wide opening.
2. Overall exterior dimensions are as follows: (excluding Base Support)
 - a. 3 foot nominal width: 42.3" w x 61.7" h x 31.2" d
 - b. 4 foot nominal width: 54.3" w x 61.7" h x 31.2" d
 - c. 5 foot nominal width: 66.3" w x 61.7" h x 31.2" d
 - d. 6 foot nominal width: 78.3" w x 61.7" h x 31.2" d
3. Overall interior dimensions are as follows:
 - a. 3 foot nominal width: 36.5" w x 61.7" h x 25.6" d
 - b. 4 foot nominal width: 48.5" w x 61.7" h x 25.6" d
 - c. 5 foot nominal width: 60.5" w x 61.7" h x 25.6" d
 - d. 6 foot nominal width: 72.5" w x 61.7" h x 25.6" d

D. Blower

1. Blower assembly shall be direct drive powered by energy saving ECM motor type.
 - a. 3' and 4' models will utilize a ½ HP ECM.
 - b. 5' and 6' models will utilize a ¾ HP ECM.
 - c. Motor mounting system shall consist of 16 Gauge, stamped steel legs with integral vibration isolation.
2. Blower shall be optimally determined forward-curved fan for each model size/width to maximize both energy efficiency and filter loading capacity.

E. Sash Assembly

1. Sash shall be single pane, tempered safety glass and angled 10° from vertical and be of a sliding operation.
2. Sash shall be capable of being closed when cabinet is not in operation.
3. Sash shall fully open to a height of 22.6".
4. Total sash height shall provide a viewing window that is no less than 27.0" tall.
5. A sash position indicator shall identify to the user where the sash is to be open to its optimum operating level.
6. Sash shall not require removal for routine filter or motor/blower service.
7. Bottom edge of sash shall be frameless and ground to a smooth edge so as to not disrupt line of sight. Framed sashes are not acceptable.
8. Sash will be interlocked to cabinet operation such that UV light (if equipped) will not operate when sash is open, and the biosafety cabinet will alarm (audio & visual) when the sash is opened beyond its nominal height when the blower is in operation.
9. Provide guides capable of holding the sash in place regardless of position and cushion sash with bumpers when fully opened or closed.

10. Maximum force required to operate sash shall not exceed 7 lbs.

F. Airflow and Foils

1. Bottom of sash opening (Air Inlet Grille) is an aerodynamic, radiused foil to ensure smooth, even flow of air into biosafety cabinet.
2. Air inlet grille will have perforations on the leading edge to draw air into the biosafety cabinet should the operator inadvertently block the grille area.
3. Corner posts are designed to be aerodynamic to ensure smooth, even flow of air into the sides of the sash opening on the biosafety cabinet.
4. A negative pressure channel shall exist at the top of the sash opening to prevent loss of containment at the top of the sash. Mechanical wipers at the top of the work area promote the creation of hazardous aerosols, and are not acceptable.

G. Electrical

1. A 10 foot 3-wire cord and plug will be provided to connect to electrical supply.
 - a. 3' and 4' 115V models will be provided with an IEC 60320 connector and NEMA 5-15 plug.
 - b. 5' and 6' 115V models will be provided with an IEC 60320 connector and NEMA 5-20 plug.
 - c. 230V models are provided with an IEC 60320 connector and NEMA 6-15 plug.
2. Two internal Electrical Outlet Duplexes will be standard, one mounted on each side wall. Outlets mounted on the rear wall of the work area are not ADA compliant, and are not acceptable.
 - a. Duplexes shall be mounted flush to the stainless steel side walls of the biosafety cabinet's interior for easy cleaning,
 - b. Duplexes will have a self-closing stainless steel splash cover with dampened (slowed action) operation for safe operator use. Splash covers shall fully close in 1 second or greater. Undampened, spring-loaded doors are not acceptable.
 - c. Duplexes will be located in compliance with ADA for wheelchair accessibility.
 - d. 115V model receptacles are NEMA 5-15.
 - e. 230V model receptacles are NEMA 6-15.
3. All major electronic components (ballasts, starters, switches, circuit breakers) shall be housed in a removable module for service or testing and be accessible from the front.
4. Wiring Harness shall be color coded and alphanumerically labeled for identification. Removable wire tags shall not be used.
5. Biosafety Cabinet shall have two separate internal circuits with breaker protection. One for service of controls, lighting and blower motor; one for internal electrical outlets.
6. Biosafety Cabinet shall have optional dry relay contacts for connection to building management system. Will communicate alarms or use for control of HVAC Mechanical System (remote blower, valves) devices.

H. Decontamination

1. Cabinet shall be easily fumigated employing an established procedure such as that recommended by NSF/ANSI Standard 49.
2. Cabinet shall be provided with a 1" nominal diameter corrugated tube supplying a vaporized sterilant (Vaporized Hydrogen Peroxide – VHP, or

Chlorine Dioxide – CD) to the positive pressure contaminated plenum for maximizing decontamination efficiency. Tube shall have a bright orange safety cap and be accessible from the front of the cabinet.

3. Liner assembly shall have an integral face flange for sealing the cabinet during decontamination and pressure test operations.
 4. The biosafety cabinet's controls will provide a program that cycles the motor blower for maximizing decontamination efficiency.
- I. HEPA filters and Plenums
1. The positive pressure, contaminated plenum shall be permanent in construction, telescoping steel and provide uniform HEPA filter loading. Flexible, consumable plasticized plenums are not acceptable.
 2. Supply HEPA filter shall be of full cabinet work zone width and depth, and be tilted with the angle of the biosafety cabinet's front so as to provide laminar airflow behind the sash.
 3. Supply HEPA filter shall be protected by a perforated metal diffuser covering the entire top of the work zone.
 4. Supply and Exhaust HEPA filters are secured in the upper cabinet assembly by clamps.
- J. Controls and Display
1. Control panel with easy-to-clean membrane touchpad for system operations (blower, lights, mute) and Operating System navigation are mounted on the front of the cabinet and shall be ADA compliant. Controls mounted above sash are not acceptable.
 2. The audible/visual alarm indicator and mute switch shall be ADA compliant.
 3. The mute function will silence audible alarms for 5 minutes before engaging a ring-back function.
 4. Display shall be mounted in a position where it is line-of-sight while seated at the cabinet and can be viewed without strain to the operator.
 5. Display shall be Digital LCD and communicate cabinet status, HEPA filter life, alarms and cabinet set up. Analog pressure gauges do not adequately provide user communication adequate to specific to cabinet function and are not acceptable.
- K. Pass-Through and Bulkheads
1. Service Fixture Provisions will be provided to accommodate up to four valve installations, shall be sealed to meet air tight pressure requirements, and shall be ADA Compliant.
 2. Cord and Cable Portal shall ship with a solid closed cell neoprene plug and be user-modified as needed per application.
 3. Cord and Cable Portals shall not require further space requirements than recommended by the manufacturer and NSF/ANSI Standard 49.
 4. Cord and Cable Portal design shall be approved by NSF testing.
- L. Ergonomics – The biosafety cabinet shall be ergonomically designed for maximum user comfort and adjustability to meet the requirements of the American with Disabilities Act (ADA).
1. Biosafety Cabinet installation with base stand shall be positioned to provide work surface heights between 30" and 37", and be in compliance with ADA.
 2. Safety Glass Sash Assembly shall be anti-racking and counterbalanced with a weight and pulley system allowing for effortless movement up and down

with one hand. Sash shall open to 21.7". Spring-loaded sash counterbalances require greater force as the sash raises and exerts force against the user's arms, this design is not acceptable.

3. Air Inlet Grille shall have a large (greater than 2") integrated curved armrest to provide comfort for user when in a resting position while maintaining containment performance. Hard and sharp angles and elevated add-on arm/elbow rests promote poor ergonomic posture and are not acceptable.
4. Maximum visibility into cabinet work zone shall be at least 27" from front access airfoil to exterior light housing.
5. The biosafety cabinets work surface shall have easy-lift knobs located on the front corners and be removable through the front opening. The stamped dish will have coved corners for easy cleaning.
6. The biosafety cabinet shall have a 10° slope front.
7. All controls (touchpad, service fixtures valves, electrical outlet duplexes, cord and cable portals) shall be in compliance with ADA.
8. The digital display shall be positioned line-of-sight while seated at the biosafety cabinet and communicate cabinet status and programming in full intuitive sentences.

M. Required Accessories [Select and Keep the options required for the project, delete rest]

1. Telescoping Base Stands – shall be adjustable at installation to provide work surface heights between 30" and 37" and come with leg levelers. – Shall be NSF Approved.
 - a. Powder coated steel square tubing construction.
 - b. Shall include a full width storage shelf.
 - c. Shall be capable of adding 5" casters.
 - d. Seismic restraints with anchor bolts for floor mount design.
2. Hydraulic Stands – models available to provide infinite settings for work surface heights between 16.5" and 36".
 - a. Shall be capable of being mobile.
3. Canopy/Thimble Connection – to be located between the biosafety cabinets exhaust HEPA filter and the building exhaust system with 10" collar duct connection. – Shall be NSF Approved.
 - a. Design shall allow maintenance of proper A2 operating airflows through sash opening whether exhaust flow decreases to no flow or whether exhaust flow increases by 50%.
 - b. Design shall incorporate a low flow alarm, and alert operator to exhaust failure within 1 second (as tested by NSF).
 - c. Exhaust alarm/low flow alarm shall communicate with BSC allowing for active protection. BSC's motor shall increase speed to 90% to maintain personnel protection during an exhaust alarm event.
 - d. Design shall include features to minimize turbulence in the housing and operate at static pressures between 0.10-0.20" static pressure w.g.
 - e. Exhaust Airflow Requirements specific to cabinet and canopy size:
 - 1) 3' Canopy: 8" sash – 223-353 CFM; 10" sash – 273-379 CFM
 - 2) 4' Canopy: 8" sash – 289-396 CFM; 10" sash – 359-470 CFM
 - 3) 5' Canopy: 8" sash – 356-470 CFM; 10" sash – 440-562 CFM
 - 4) 6' Canopy: 8" sash – 423-543 CFM; 10" sash – 523-654 CFM
 - f. Installation of canopy shall not add more than 4" to total cabinet height.
4. Air-tight Damper with flange to mate to top of canopy exhaust transition, control airflow through canopy and allow proper decontamination of the

- biosafety cabinet.
5. Ultraviolet (UV) lamp – germicidal 254 nm wavelength lamp – Shall be NSF Approved.
 6. Utility valves – greaseless, allowing for connection of service utilities (air, vacuum, gas)
 7. IV Bar with stainless steel hooks – shall be NSF Approved.
 8. Mass Airflow Monitor with integration into operating system that provides digital display of airflow readings and audible/visual alarms should readings be excessively low or high.
 9. Aspirator (Pump) Systems – for safe removal and handling of hazardous fluids.
 10. Ergonomic Footrest
 11. Ergonomic Adjustable Arm Chair
 12. Ergonomic stainless steel turn table
 13. Ergonomic Cord Management System
 14. Easy-reach interior shelves.
 15. Mobile Storage Cart with pull drawers and bins. 27" tall.
 16. Gross Particulate Pre Filters
 - a. Consumable G4 Filter kits OR
 - b. Reusable/washable wire mesh filter screens
 17. RS 232 Connection ports
 18. ULPA filters 99.999% @ 0.12 micron
 19. Scope Mounting Sash and vibration isolator table to integrate an inverted or stereo microscope into the biosafety cabinet and maintain safe containment and movement of air.
 20. Work surface with designated area to control temperature for heat/cold sensitive tissues or cultures.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine areas, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of biosafety cabinets.
- B. Coordinate with other trades for the proper and correct installation of plumbing and electrical rough-in and for rough opening dimensions required for the installation of biosafety cabinets.
- C. Examine the carton and its contents for damage that might have occurred in transit.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install biosafety cabinets according to shop drawings and manufacturer's written instructions.
- B. Install level, plumb and true; securely anchor as required.

- C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- D. Install according to standards required by authority having jurisdiction.
- E. Touch up minor damaged surfaces caused by installation. Replace damaged components as directed by Architect.

3.03 FIELD QUALITY CONTROL

- A. NSF/ANSI Standard 49 requires that biosafety cabinets be field tested after installation and prior to use.
 - 1. A qualified independent (3rd party) certifier should certify the cabinet in accordance with NSF/ANSI Standard 49, Annex F.
 - 2. Make all corrections until biosafety cabinet passes NSF/ANSI 49 Field Certification.
 - 3. If connected to building HVAC system, retest all other ventilation equipment that failed to perform as specified.

3.04 ADJUSTING AND CLEANING

- A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Verify that counterbalances operate without interference.
 - B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
 - C. Clean adjacent construction and surfaces that may have been soiled or damaged in the course of installation of work in this section.
 - D. Provide all necessary protective measures to prevent exposure of equipment and surfaces from exposure to other construction activity.
- D. Advise contractor of procedures and precautions for protection of material and installed equipment and casework from damage by work of other trades.

----- END -----

DIVISION 12 FURNISHINGS

12 21 13 HORIZONTAL LOUVER BLINDS

- A. Includes manually operated miniblinds with aluminum slats.
- B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radiused corners
 - 1. Width: 1 inch.
 - 2. Color: As selected by Architect from manufacturer's standard range.
- C. Manufacturer: Hunter Douglas; Levolor; Springs Window Fashions Division, Inc.; or manufacturer offering comparable products approved by the Architect.

12 32 53 METAL LABORATORY CASEWORK

- A. By Lab Consultant.

12 36 23.13 PLASTIC-LAMINATE-CLAD COUNTERTOPS

- A. Include plastic-laminate-clad countertops.
- B. Fabricate plastic-laminate-clad countertops to the AWI/AWMAC/WT's "Architectural Woodwork Standards."
 - 1. Grade: Premium.
- C. Panel Products: MDF complying with ANSI A208.2, Grade 130, or veneer plywood.
- D. High-Pressure Decorative Laminate: NEMA LD 3.
 - 1. Grades: As required by woodwork quality standard.
 - 2. Color: As selected by Architect.
- E. Fabrication:
 - 1. Edge: Plastic laminate matching surface.
 - 2. Use MDF core for typical countertops.
 - 3. Use marine grade veneer plywood for countertops with sinks.
- F. Do not use binders or adhesives that contain urea formaldehyde.

12 48 13 FLOOR MATS AND FRAMES

- A. Roll-up, aluminum-rail hinged mats with extruded-aluminum tread rails sitting on continuous vinyl cushions.
- B. Aluminum Foot Grilles: Provide manufacturer's standard foot grilles with extruded members, top-surfaced tread rails, and as follows:
 - 1. Tread Rails: Extruded-aluminum tread rails with extruded-aluminum frame.
 - 2. Tread Rail Spacing: 1-1/2 inches o.c. with 1/8- to 3/16-inch- wide openings between treads.

3. Aluminum Finish: Mill.
 4. Top Surface: Fusion-bonded, level-cut-pile nylon carpet insert; 1/4 inch high, 28 oz./sq. yd.
- C. Manufacturer: Balco, Inc.; C/S Group; Matco International; Reese Enterprises, Inc.; or manufacturer offering comparable products approved by the Architect.

DIVISION 12 FURNISHINGS

12 35 53 METAL LABORATORY CASEWORK

PART 1 – GENERAL

A. SUMMARY

1. Section Includes:
 - a. Steel casework.
 - b. Table frames.
 - c. Work surfaces.
 - d. Sinks and outlets.
 - e. Service fittings.
 - f. Accessory equipment.
2. Related Sections:
 - a. Section 11610 - Laboratory Fume Hoods are a part of the work of this section.
 - b. Section - : Furnishing and installation of plumbing utilities and final connections.
 - c. Section - : Furnishing and installation of exhaust ductwork and equipment, and final connection to fume hood(s).
 - d. Section - : Furnishing and installation of electrical utilities and final connections.

B. ALTERNATE PROPOSALS

Proposals are invited from alternate manufacturers only if they comply with the minimum design requirements and the minimum performance requirements. A notarized letter stating full compliance must be included in alternate proposals signed by an officer of the manufacturer to ensure compliance.

C. CASEWORK DESIGN REQUIREMENTS

1. Flush construction: Surfaces of doors, drawers and panel faces shall align with cabinet fronts without overlap of case ends, top or bottom rails. Horizontal and vertical case shell members (panels, top rails and bottoms) shall meet in the same plane without overlap, cracks or crevices.
2. Slim line styling: Front width of end panels 3/4" and front height of top and

bottom members 1".

3. Self-supporting units: Completely welded shell assembly without applied panels at ends, backs or bottoms, so that cases can be used interchangeably or as a single, stand-alone unit.
4. Interior of case units: Easily cleanable, flush interior. Base cabinets, 30" and wider, with double swinging doors shall provide full access to complete interior without center vertical post.
5. Drawers: Sized on a modular basis for interchange to meet varying storage needs, and designed to be easily removable in field without the use of special tools.
6. Case openings: Rabbeted joints all four sides of case opening for hinged doors and two sides for sliding doors in order to provide dust resistant case.
7. Framed glazed doors: Identical in construction, hardware and installation to solid panel doors. Design frame glazed doors to be removable for glass replacement.

D. CASEWORK PERFORMANCE REQUIREMENTS

1. Structural performance requirements: Casework components shall withstand the following minimum loads without damage or permanent deformation to the component or to the casework operation:
 - a. Steel base unit load capacity: 500 lbs. per lineal foot.
 - b. Suspended units: 300 lbs.
 - c. Drawers in a cabinet: 150 lbs.
 - d. Utility tables (4 legged): 300 lbs.
 - e. Hanging wall cases: 300 lbs.
 - f. Load capacity for shelves of base units, wall cases and tall cases: 40 lbs. per square foot, up to 200 lbs.
2. Metal Finish Performance Requirements:
 - a. Abrasion resistance: Maximum weight loss of 5.5 mg per 100 cycle when tested on a Taber Abrasion Tester #E40101 with 1000 gm wheel pressure and Calibrase #CS10 wheel.
 - b. Hardness: Surface hardness equivalent to 4H pencil.
 - c. Humidity resistance: Withstand 1000 hour exposure in saturated humidity at 100°F.
 - d. Moisture resistance:

- No visible effect to surface finish after boiling water trickled over test panel inclined at 45°F for five minutes.
 - No visible effect to surface finish following 100 hour continuous application of a water soaked cellulose sponge, maintained in a wet condition throughout the test period.
- e. Adhesion: Score finish surface of test panel with razor blade into 100 squares, 1/16" x 1/16", cutting completely through the finish but with minimum penetration of the substrate, and brush away particles with soft brush. Minimum 95 squares shall maintain their finish.
 - f. Salt spray: Withstand minimum 200 hour salt spray test.

3. Chemical Resistance Finish Performance Requirements:

At specifier's option, insert chemical resistance requirements.

E. WORK SURFACE PERFORMANCE REQUIREMENTS

At specifier's option, insert here applicable performance requirements for selected work surfaces from Appendix A.

F. SUBMITTALS

Include number of each type of submittal required if this information is not covered in Division 1 or elsewhere.

1. Shop Drawings: Provide 3/4" = 1'-0" scale elevations of individual and battery of casework units, cross sections, rough-in and anchor placements, tolerances and clearances. Indicate relation of units to surrounding walls, windows, doors and other building components. Provide 1/4" = 1'-0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.
2. Product Data: Submit manufacturer's data for each component and item of laboratory equipment specified. Include component dimensions, configurations, construction details, joint details, and attachments, utility and service requirements and locations.
3. Product Samples Upon Request: Submit for approval:
 - a. Top sample.
 - b. Finish sample (3" X 5" painted steel).
4. Finish Samples: Submit [3 x 5] [] x [] inch samples of each color of finish for casework, work surfaces and for other prefinished equipment and accessories for selection by [Architect] [Owner].
5. Test Reports: When requested by [Architect] [Owner], submit independent, third

party, laboratory certified test reports verifying conformance to test performance specified.

G. QUALITY ASSURANCE

1. Single source responsibility: Casework, work surfaces, laboratory fume hood and equipment and accessories shall be manufactured or furnished by a single laboratory furniture company.
2. **All casework construction and performance characteristics shall be in full compliance with SEFA 8 standards.** At the owner's request, independent, third party testing must be submitted validating compliance and adheres to the architectural specifications.
3. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:
 - a. Ten years or more experience in manufacture of laboratory casework and equipment of type specified.
 - b. Ten installations of equal or larger size and requirements.
4. Installer's qualifications: Factory trained and/or certified by the manufacturer.
5. Cabinet identification: Cabinets are identified on drawings by manufacturer's catalog numbers. Unless otherwise modified on drawings or in specifications, catalog description constitutes specific requirements for each type of cabinet.

H. REFERENCE STANDARDS

1. All casework, worksurface and service fixture construction and performance characteristics shall be in full compliance with SEFA (Scientific Equipment and Furniture Association) standards. At the owner's request, independent, third party testing must be submitted validating compliance and adheres to the architectural specifications.
 - a. SEFA 1.2 – Laboratory Fume Hoods
 - b. SEFA 2.3 – Installation of Scientific Laboratory Furniture and Equipment
 - c. SEFA 3 – Work Surfaces
 - d. SEFA 7 – Laboratory and Hospital Fixtures
 - e. SEFA 8 – Laboratory Furniture

I. DELIVERY, STORAGE AND HANDLING

1. Schedule delivery of casework and equipment so that spaces are sufficiently complete and material can be installed immediately following delivery.
2. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.
3. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard completely covering the top and securely taped to edges. Mark

cardboard in large lettering "No Standing."

J. PROJECT CONDITIONS

1. Do not deliver or install equipment until the following conditions have been met:
 - a. Windows and doors are installed; and the building is secure and weather tight.
 - b. Ceiling, overhead ductwork and lighting are installed.
 - c. All painting is completed and floor tile is installed.

PART 2 – PRODUCTS

A. MANUFACTURER

1. Design, materials, construction and finish of casework specified are the minimum acceptable standard of quality for inset steel laboratory casework. The basis of this product specification is Hamilton Laboratory Solutions, 825 East Albert Drive, Manitowoc, WI 54220

B. CASEWORK MATERIALS

1. Sheet steel: Mild, cold rolled and leveled unfinished steel.
2. Minimum gauges:
 - a. 20 gauge: Solid door interior panels, drawer fronts, scribing strips, filler panels, enclosures, drawer bodies, shelves, security panels and sloping tops.
 - b. 18 gauge: Case tops, ends, bottoms, bases, backs, vertical posts, uprights, glazed door members, door exterior panels and access panels.
 - c. 16 gauge: Top front rails, top rear gussets, intermediate horizontal rails, table legs and frames, leg rails and stretchers.
 - d. 14 gauge: Drawer suspensions, door and case hinge reinforcements and front corner reinforcements.
 - e. 11 gauge: Table leg corner brackets and gussets for leveling screws.
3. Glass for glazed swinging and sliding doors and/or unframed doors: [Specifier's Option]
 - a. 6mm Clear Float Glass (unframed)
 - b. 6mm Safety Glass – Laminated (framed)
 - c. 6mm Safety Glass – Tempered (framed)

C. CASEWORK FABRICATION

1. Base Units and Cases:

- a. Base units and 25", 31" and 37" high wall cases: End panels and back reinforced with internal reinforcing front and rear posts.
- b. 49" and 84" high cases: Formed end panels with front and rear reinforcing post channels; back shall be formed steel panel, recessed 3/4" for mounting purposes.
- c. Posts: Front post fully closed with full height reinforcing upright. Shelf adjustment holes in front and rear posts shall be perfectly aligned for level setting, adjustable to 1/2" o.c.
- d. Secure intersection of case members with spot and arc welds. Provide gusset reinforcement at front corners.
- e. Base unit backs: Provide drawer units without backs and cupboard units with removable backs for access to services behind units.
- f. Base unit backs: Provide fixed backs at all drawer and cupboard units. No access to services behind.
- g. Bottoms: Base units and 25", 31", 37" and 49" high wall cases shall have one-piece bottom with front edge formed into front rail, rabbeted as required for swinging doors and drawers and flush design for sliding doors.

Following paragraph is a casework back option for access to services behind units.

- h. Top rail for base units: Interlock with end panels, flush with front of unit.

Following paragraph is a casework back option for vermin protection (no access to services behind).

- i. Horizontal intermediate rails: Recessed behind doors and drawer fronts.
- j. Base for base units: 4" high x 3" deep with formed steel base and 11 gauge die formed steel gussets at corners. Provide 3/8" diameter leveling screw with integral bottom flange of minimum 0.56 sq. in. area at each corner, accessible through openings in toe space.
- k. Tops of wall cases: One piece, with front edge formed into front rail.

2. Drawers: [Steel]

- a. Drawer fronts: 3/4" thick, double wall construction, pre-painted prior to assembly and sound deadened.
- b. Drawer bodies: Bottom and sides formed into one-piece center section with bottom and sides coved and formed top edges. Front and back panels spot welded to center section.
- c. Drawer suspension: Heavy duty coved raceways for both case and drawer with nylon tired, ball bearing rollers; self-centering and self-closing when open to within 3" of the closed position.
- d. Provide drawer with rubber bumpers. Friction centering devices are not acceptable.
- e. Provide security panels for drawers with keyed different locks.

- f. File drawers: Provide with 150 lbs. full extension slides for full access and operation.
3. Drawer suspension: **[Specifier's Option]**
 - a. Heavy duty coved raceways for both case and drawer with nylon tired, ball bearing rollers; self-centering and self-closing when open to within 3" of the closed position – Standard Default
 - b. Accuride (or equal) 150 lb. full extension drawer slides. File drawers: Provide with 150# full extension slides for full access and operation.
 - c. Provide drawer with rubber bumpers. Friction centering devices are not acceptable.
 - d. Provide security panels for drawers with keyed different locks.
 4. Doors: [Steel]
 - a. Solid panel doors: 3/4" thick, double wall, telescoping box steel construction with interior pre-painted and sound deadened. Reinforce interior of front panel with welded steel hat channels. Hinges with screws to internal 14 gauge reinforcing in case and door. Hinges shall be removable; welding of hinges not acceptable. Doors shall close against rubber bumpers.
 - b. Frame glazed doors: Outer head to be one piece construction. Inner head to consist of top, bottom and side framing members which are removable for installation or replacement of glass. Provide continuous vinyl glazing retainer to receive glass. In all other respects, framed glazed door construction and quality shall match solid panel doors.
 - c. Sliding doors – solid or framed glazed: Design for tilt-out removal after removal of bottom guide. Doors shall be hung with nylon tired sleeve bearing rollers in formed steel top hung track and shall close against rubber bumpers.
 - d. Unframed sliding glass doors: Glass with edges ground set in extruded aluminum shoe with integral pulls, wheel assemblies and top and bottom extruded aluminum track. Provide rubber bumpers at fully opened and closed door position.
 5. Shelves:
 - a. Form front and back edges down and back 3/4". Form ends down 3/4".
 - b. Reinforce shelves over 36" long with welded hat channel reinforcement the full width of shelf.
 - c. Pull out shelves: Same suspension as specified for drawers.
 6. Base molding: 4" high, to be furnished and installed by flooring contractor.
 7. Corner base guards: 4" high #304 stainless steel corner guards.
 8. Hardware:
 - a. Drawer and hinged door pulls: Clear anodized extruded aluminum, screw

attached on 4" centers. [Specifier's Option]

- Pull Location
Horizontal at drawers, vertical at doors
 - Pull Types
Brushed Aluminum rectangular style finger pull
- b. Sliding door pulls: Recessed stainless steel, styled and sized to harmonize with drawer pulls.
 - c. Hinges: Institutional type, five knuckle projecting barrel hinges, minimum 2-1/2" long, type 302 or 304 stainless steel. Provide two hinges for doors up to 36" high; three hinges for doors over 36" high. Drill each leaf for three screw attachment to door and frame.
 - d. Door catches: Adjustable type, spring actuated nylon roller catches.
 - e. Elbow catches: Spring type of cadmium plated steel, with strike of suitable design.
 - f. Locks: National Lock Remove-A-Core 5-disc
 - g. Keying: Locks [location shown on drawings] shall have capacity for 225 primary key changes. Master key one level with the potential of 40 different, non-interchangeable master key groups.
 - h. Keys: Stamped brass available from manufacturer or local locksmith, and supplied in the following quantities unless otherwise specified:
 - Two (2) for each keyed different lock.
 - Three (3) for each group keyed alike locks.
 - Two (2) for master keys for each system.
 - i. Label holders: [locations shown on drawings] Formed steel with satin chrome finish, 1" x 1-1/2", screw installed.
 - j. Shelf clips: Die formed steel, zinc plated, designed to engage in shelf adjustment holes.

D. TABLE FRAMES

1. Table frames: 4-1/2" high "C" channel front and back aprons, end rails and cross rails.
2. Table drawers: Provide front and back rails; drawer unit, hardware and suspension same as specified for base unit drawers.
3. Legs: 2" x 2" steel tube legs with welded leg bracket. Attach legs with two bolts to front and back aprons and weld to end rails. Each leg shall have a recessed leveling screw and a black, coved vinyl or rubber leg shoe, 2" in height.
4. Knee space frame: 2" high apron where no drawers required.
5. Leg rails and stretchers: Channel formed.

E. METAL FINISH

1. Metal finish:

- a. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pre-treat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.
- b. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thickness: **Liquid, dipped, solvent based finishes are not and will not be acceptable.**
 - Exterior and interior exposed surfaces: 1.5 mil average and 1.2 mil min.
 - Backs of cabinets and other surfaces not exposed to view: 1.2 mil average.

2. Cabinet Surface Finish Tests:

All casework construction and performance characteristics shall be in full compliance with SEFA 8 standards. At the owner's request, independent, third party performance testing must be submitted validating compliance and adheres to the finish specifications.

a. Chemical Spot Test

- Purpose of Test

The purpose of the chemical spot test is to evaluate the resistance a finish has to chemical spills.

Note: Many organic solvents are suspected carcinogens, toxic and/or flammable. Great care should be exercised to protect personnel and the environment from exposure to harmful levels of these materials.

- Test Procedure

- Obtain one sample panel measuring 14" x 24" (355.6mm x 609.6mm). The received sample to be tested for chemical resistance as described herein.
- Place panel on a flat surface, clean with soap and water and blot dry. Condition the panel for 48-hours at 73±3°F / 23±2°C and 50±5% relative humidity. Test the panel for chemical resistance using forty-nine different chemical reagents by one of the following methods:
- Method A – Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a one-ounce (29.574cc) bottle and inverting the bottle on the surface of the panel.
- Method B – Test volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24mm watch glass, convex side down.
- For both of the above methods, leave the reagents on the panel for a period of one hour. Wash off the panel with water, clean with detergent and naphtha, and rinse with deionized water. Dry

with a towel and evaluate after 24-hours at $73\pm 3^{\circ}\text{F}$ / $23^{\circ}\pm 2^{\circ}\text{C}$ and $50\pm 5\%$ relative humidity using the following rating system:

- Level 0: No detectable change.
- Level 1: Slight change in color or gloss.
- Level 2: Slight surface etching or severe staining.
- Level 3: Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

Test #	Chemical Reagent	Test Method
1.	Acetate, Amyl	A
2.	Acetate, Ethyl	A
3.	Acetic Acid, 98%	B
4.	Acetone	A
5.	Acid Dichromate, 5%	B
6.	Alcohol, Butyl	A
7.	Alcohol, Ethyl	A
8.	Alcohol, Methyl	A
9.	Ammonium Hydroxide, 28%	B
10.	Benzene	A
11.	Carbon Tetrachloride	A
12.	Chloroform	A
13.	Chromic Acid, 60%	B
14.	Cresol	A
15.	Dichlor Acetic Acid	A
16.	Dimethylformamide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	A
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrochloric Acid, 37%	B
24.	Hydrochloric Acid, 48%	B
25.	Hydrogen Peroxide, 3%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Mono Chlorobenzene	A
30.	Naphthalene	A
31.	Nitric Acid, 20%	B
32.	Nitric Acid, 30%	B
33.	Nitric Acid, 70%	B
34.	Phenol, 90%	A
35.	Phosphoric Acid, 85%	B
36.	Silver Nitrate, Saturated	B
37.	Sodium Hydroxide, 10%	B
38.	Sodium Hydroxide, 20%	B
39.	Sodium Hydroxide, 40%	B
40.	Sodium Hydroxide, Flake	B
41.	Sodium Hydroxide, Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid, 96%	B
45.	Sulfuric Acid, 77% and Nitric Acid, 70% equal parts	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

- Acceptance Level

Results will vary from manufacturer to manufacturer. **Laboratory grade finishes should result in no more than four Level 3 conditions.**

Suitability for a given application is dependent upon the chemicals used in a given laboratory.

b. Hot Water Test

- Purpose of Test

The purpose of this test is to insure the coating is resistant to hot water.

- Test Procedure

Hot water, 190°F to 205°F (88°C to 96°C), shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces (177.44 cc) per minute on the surface, which shall be set at an angle of 45° for a period of five minutes.

- Acceptance Level

After cooling and wiping dry, the finish shall show no visible effect from the hot water.

c. Impact Test

- Purpose of Test

The purpose of this test is to evaluate the ductility of the coating.

- Test Procedure

A one-pound ball approximately 2" (50.8mm) in diameter shall be dropped from a distance of 12" (304.8mm) onto a flat horizontal surface, coated to manufacturer's standard manufacturing method.

- Acceptance Level

There shall be no visible evidence to the naked eye of cracks or checks in the finish due to impact.

d. Paint Adhesion on Steel Test

- Purpose of Test

The paint adhesion test is used to determine the bond of the coating to steel. This does not apply to non-steel products.

- Test Procedure

This test is based on ASTM D2197-86 "Standard Method of Test for Adhesion of Organic Coating". Two sets of eleven parallel lines 1/16" (1.587mm) apart shall be cut with a razor blade to intersect at right angles thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush for one minute. Examine under 100-foot candles of illumination.

- Acceptance Level

Ninety or more of the squares shall show finish intact.

e. Paint Hardness on Steel Test

- Purpose of Test
The paint hardness test is used to determine the resistance of the coatings to scratches.
- Test Procedure
 - Pencils, regardless of their brand, are valued in this way: 8-H is the hardest, and next 11 order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which are softest).
 - The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one, that is the hardest pencil that will not rupture the film, is then used to express or designate the hardness.
- Acceptance Level
The paint shall have a hardness of 4-H minimum with no visible puncture of the finish surface.

PART 3 – EXECUTION

A. INSTALLATION

1. Casework installation:
 - a. Set casework components plumb, square, and straight with no distortion and securely anchored to building structure. Shim as required using concealed shims.
 - b. Bolt continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16" tolerance.
 - c. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board.
 - d. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8" between top units.
2. Work surface installation:
 - a. Where required due to field conditions, scribe to abutting surfaces.
 - b. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure joints in field, where practicable, in the same manner as in factory, with dowels, splines, adhesive or fasteners recommended by manufacturer.
 - c. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.
3. Sink installation: Sinks which were not factory installed shall be set in chemical resistant sealing compound and secured and supported per manufacturer's recommendations.

4. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations. Turn screws to seat flat; do not drive.
- B. ADJUSTING
1. Repair or remove and replace defective work, as directed by [Architect] [Owner] upon completion of installation.
 2. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.
- C. CLEANING
1. Clean shop finished casework, touch up as required.
 2. Clean countertops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Use no wax or oils.
- D. PROTECTION OF FINISHED WORK
1. Provide all necessary protective measures to prevent exposure of casework and equipment from exposure to other construction activity.
 2. Advise contractor of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

END OF SECTION

12 36 53 LABORATORY WORK SURFACES

PART 1 – GENERAL

A. SECTION INCLUDES

1. Solid composite work surfaces.

B. RELATED SECTIONS

1. Documents affecting work in this section includes but is not limited to the General Conditions, Supplementary Conditions and Sections in Division 1 – General Requirements of these Specifications.

a. 06200 - Finish Carpentry.

b. 10500 - Lockers.

c. 10670 - Shelving.

d. 12300 - Laboratory Casework and Fixtures.

e. 15400 - Sinks Field Inserted in Countertops.

C. REFERENCES

1. SEFA 3-2010 Recommended Practices for Laboratory Work Surfaces

D. SUBMITTALS

1. Submit in accordance with Section 01300.
2. Submit four samples 4" x 6" of each color and thickness of material used.

E. DELIVERY, STORAGE AND HANDLING

1. Deliver and store materials in the manufacturer's original protective packaging. Store materials in an enclosed shelter providing protection from damage and exposure to the elements.

F. COORDINATION

1. Field Measurements: Secure field measurements before preparation of shop drawings and fabrication where possible, for proper and adequate fabrication and installation of the work.
2. Coordination: Furnish anchorage and top connection devices or material as

specified.

G. WARRANTY

1. Worktops to be warranted against delamination for 10 years. The factory authorized fabricator, product installer and material manufacturer must sign the Warranty documents and submit a copy to the Contractor.

PART 2 – PRODUCTS

A. MANUFACTURERS

1. These specifications are based on raw material panels manufactured by Trespa, and provided by Trespa North America, Ltd., located at 62 Greene Street, New York, NY 10012, 800-487-3772. Approved fabricators that provide products that comply with this specification section as judged and approved by the architect may be acquired from the above.
2. All products specified in this section shall be provided by a single manufacturer.

B. MATERIALS

1. Basis of design: Trespa Toplab Plus SSC (Single Sided Crystal).
2. Thickness: As specified on drawings or by Architect.
3. Color: to be selected by Architect from Manufacturer's standard color pallet.

C. FABRICATION

1. Drip grooves shall be provided on the underside at all exposed edges unless otherwise noted on Laboratory Furnishings Drawings.
2. All exposed edges to be sanded to a smooth finish and, except as indicated below, shall be rounded to a ¼" radius at front top edge and at vertical corners.
3. Fix work surface panels with blind fastenings into the back or underside of the panel. Use #10, type A sheet metal screws sized to stop at least 1/8" short of the finished face. Pre-drill panel with an

11/64" diameter high speed drills bit aligned with 7/32" clearance holes in the supporting structure.

4. Form tight-fitting butt joints in the work surface using two part epoxy adhesive, or mechanical fasteners positioned to be concealed after installation.
5. Curbs shall be bonded to the top of the work surface to form a square joint.
6. Cutouts for drop-in sinks shall be routed to form openings with 3/8" minimum depth supporting flanges and such that the rim of the sink when installed is at the same level as the work surface top. Epoxy sinks shall be set in beds of epoxy adhesive. Stainless steel and polypropylene sinks shall be set in beds of silicone sealant.
7. Cutouts for under-mounted sinks shall be routed and sanded to form smooth edged openings with the top edge radiused to approximately 1/8". The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radiused not less than 3/4". Under-mounted sinks shall be supported by brackets blind-fixed to the underside of the work surface.

D. SOURCE QUALITY CONTROL

1. Panels shall be of material specifically designed for laboratory work surfaces. Fabricated work surfaces shall comply with all current codes and regulations. Tops and shelves shall have uniform thickness (+0.03") and flatness (maximum difference of 0.03") for 10 foot span.
2. Panels to be U.L. registered and labeled for quality consistency.
3. Chemical Resistance: Evaluation of chemical resistance is based on SEFA 32010 Laboratory Work Surfaces (Scientific Equipment and Furniture Association) standard list of 49 chemicals / concentrations, their required methods of testing (24 hour surface test) and their minimum acceptable results as a means of establishing a minimum acceptable level of performance for all exposed and semi-exposed surfaces.
4. Panels to have screw pull-out strength minimums per following chart (lbs.):

<u>Screw depth:</u>	<u>#6</u>	<u>#8</u>	<u>#10</u>	<u>#12</u>	<u>1/4"</u>	<u>5/16"</u>	<u>3/8"</u>	<u>7/16"</u>	<u>1/2"</u>
1/2" panels:	250	300	340	390	450	560	680	790	900
5/8" panels:	310	370	430	490	560	710	850	990	1,100
3/4" panels:			510	590	680	850	1,000	1,200	1,400

5. Uniform load to cause no more than 1/4" deflection at center of the span:

<u>Thickness</u>	<u>12" x 24"</u>	<u>12" x 36"</u>	<u>12" x 48"</u>	<u>24" x 36"</u>
1/2" panels:	370	110	45	220
5/8" panels:	690	210	85	410
3/4" panels:	1,400	400	170	800
1" panels:	2,600	780	330	1,500

6. Performance requirements:

- a. Modulus of elasticity: 1,500,000 psi minimum.
- b. Shear strength: 2000 psi minimum.
- c. Compressive strength: 24,000 psi minimum.
- d. Weight: 93 lbs. per cubic foot maximum.
- e. Flame spread (ASTM E-84): Class 1A (25).
- f. Non-porous surface and edges.
- g. Will not support micro-organic growth.
- h. Will not support oxidation of material surface

PART 3 – EXECUTION

A. INSTALLATION

1. Install work tops as per shop drawings on frames or base cabinets provided per specification.

B. PROTECTION

1. After installation, the General Contractor shall protect the worktops from damage. The tops shall be kept free from paint, plaster, cement scratches, or any other destructive forces.


END OF SECTION

ISSUED FOR DD REVIEW
7/7/2021

**HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas**

DIVISION 13 SPECIAL CONSTRUCTION (NOT USED)

8/6/2021

 NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

20030

ISSUED FOR DD REVIEW
7/7/2021

HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas

DIVISION 14 CONVEYING EQUIPMENT (NOT USED)

8/6/2021

 NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

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7/7/2021

HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas

DIVISION 21 – FIRE SUPPRESSION

8/6/2021


NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

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DIVISION 21 00 00 FIRE SUPPRESSION

Fire Suppression – Division 21

211313 – Wet-Type Sprinkler systems: This specification section includes for a Contractor to furnish and install a complete wet-type fire sprinkler system as specified in contract documents. Includes the submittal process and Contractor qualification requirements, design criteria, testing, fire department coordination and type of components for the system.

ISSUED FOR DD REVIEW
8/6/2021

HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas

DIVISION 22 – PLUMBING

7/7/2021

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

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DIVISION 22 00 00 PLUMBING

Plumbing – Division 22

220111 – Summary of Plumbing Work: The following Summary of Work is intended as an aid to achieve an understanding of the various elements of work included in the project, as is not intended to be all-inclusive. Detailed descriptions of work and requirements are given in drawings and specifications.

220501 – Common Plumbing Requirements: A. Includes But Not Limited To:

1. Common requirements and procedures for plumbing systems.
2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
3. Furnish and install sealants relating to installation of systems installed under this Division.
4. Furnish and install Firestop Penetration Systems for plumbing systems penetrations as described in Contract Documents.

220529 – Hangers & Supports for Plumbing Equipment: Includes But Not Limited To: Common hanger and support requirements and procedures for plumbing systems.

220553 – Identification for Plumbing Pipes & Equipment: Includes But Not Limited To: Furnish and install identification of plumbing piping and equipment as described in Contract Documents.

220719 – Plumbing Piping Insulation: Includes But Not Limited To: Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents, Furnish and install insulation on roof drain piping as described in Contract Documents.

221116 - Domestic Water Piping: Includes But Not Limited To: Perform excavating and backfilling required by work of this Section, Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building and connect with outside utility lines 5 feet from building perimeter as described in Contract Documents.

221119 – Domestic Water Piping Specialties: Includes But Not Limited To: Balancing valves, Washer-supply outlets, Key-operation hydrants, Trap seal primer valves, Drain valves, Miscellaneous piping specialties, Sleeve penetration systems, Flashing materials.

221313 – Facility Sanitary Sewer: Includes But Not Limited To: Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines 5 feet out from building where applicable; Perform excavation and backfill required by work of this Section.

221319 – Facility Sanitary Sewer Specialties: Products Furnished But Not Installed Under this Section as described in Contract Documents: Cleanout, Floor drains.

224200 – Plumbing Fixtures: This Section includes plumbing fixtures and related components.

224713 – Electric Drinking Fountain: This Section includes the following: Drinking fountains, Self-contained water coolers, Fixture supports.

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8/6/2021

HIDALGO COUNTY
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Hidalgo County
Weslaco, Texas

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

7/7/2021

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

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DIVISION 23 00 00 MECHANICAL

Mechanical – Division 23

- 230100 – *Summary of Mechanical Work*: this section covers basic Mechanical coordination requirements and submittal requirements
- 230510 – *Basic Mechanical Materials & Methods*: This Section includes the basic mechanical materials and methods to complement other Sections:
- 230529 – *Hangers & Supports*: This Section includes hangers and supports for mechanical system piping and equipment.
- 230529 – *Supports & Anchors*: (similar to above)
- 230593 – *Testing & Balancing*: This Section includes testing, adjusting, and balancing HVAC systems to produce design objectives.
- 230601 – *Mechanical Identification*: This Section includes the mechanical identification of materials and their installation:
- 230713 – *Duct Insulation*: This Section includes semirigid and flexible duct, plenum, and breeching insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.
- 232300 – *Refrigerant Piping*: Includes But Not Limited To: Furnish and install piping and specialties for refrigeration systems as described in Contract Documents.
- 232600 – *Condensate Drain Piping*: Includes But Not Limited To: Coordinate installation of condensate drain piping with Section 22 0501 as described in Contract Documents.
- 233100 – *Duct Accessories*: This Section includes the following: Backdraft dampers. Manual-volume dampers. Fire dampers. Turning vanes. Duct-mounted access doors and panels. Flexible ducts. Flexible connectors. Duct accessory hardware.
- 233113 – *Metal Ducts*: This Section includes rectangular, round, and flat-oval metal ducts and plenums for heating, ventilating, and air-conditioning systems in pressure classes from minus 2- to plus 10-inch wg.
- 233346 – *Flexible Ducts*: Furnish and install supply air branch duct runouts to diffusers as described in Contract Documents.
- 233423 – *Centrifugal Fans*: This Section includes centrifugal fans and vent sets.
- 233713 – *Registers & Grilles*: This Section includes ceiling- and wall-mounted diffusers, registers, and grilles.
- 237400 – *Rooftop Units Single Zone VAV*: This Section includes construction of rooftop units and refrigeration components.

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8/6/2021

HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas

DIVISION 26 – ELECTRICAL

7/7/2021

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

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DIVISION 26 00 00 ELECTRICAL

Electrical – Division 26

260100 – *Summary of electrical work*: This section covers basic electrical coordination requirements and submittal requirements.

260110 – *Basic Electrical Materials and Methods* - This section includes the specifications for electrical materials: raceways, building wire and connectors, supporting devices, electrical identification, electrical demolition. Equipment installation requirements common to equipment sections.

260120 – *Basic Electrical Requirements* – This sections covers general provisions, Supplemental General Provisions, Special Provisions, Specification Sections and all relevant documents shall form a part of this Section of the Specifications, and shall be incorporated in this Section and each Section 260000.

260126 – *Electrical Testing* - This sections covers general electrical testing to electrical circuits and electrical service.

260519 – *Low-Voltage Electrical Power Conductors and Cable* - This sections includes specification for building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

260526 – *Grounding Bonding* - This sections includes grounding and bonding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

260529 – *Hangers and Supports* - This sections includes type of hangers and supports for electrical systems. Section includes acceptable manufacturers, materials and installation methods.

260533 – *Raceways and Boxes* - This sections covers raceways, fittings, boxes, enclosures, and cabinets for electrical wiring. Section includes acceptable manufacturers, material type, installation methods and applications.

260543 – *Underground Ducts and Raceways for electrical systems* - This sections covers underground raceways for electrical utility requirements.

260553 – *Electrical Identification* - This section covers labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of electrical identification, including related accessories

260573.13 – *Short Circuit Studies* - This section covers general requirements for Contractor to furnish short-circuit, protective device coordination studies which shall be prepared by the equipment manufacturer.

260573.19 – *Arc-Flash Hazard Analysis* - This section covers general requirements for Contractor to furnish arc flash hazard analysis studies which shall be prepared by the equipment manufacturer.

260926 – *Lighting Control System* - This section covers general requirements for lighting controls. Section includes acceptable manufacturers, installation methods and applications.

262413 – Switchboards – This section covers electrical switchboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V. Section includes acceptable manufacturers, installation methods and applications.

262416 – Panelboards – This section covers load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V. Section includes acceptable manufacturers, installation methods and applications.

262726 – Wiring Devices - This section covers receptacles, connectors, switches, and finish plates. Section includes acceptable manufacturers, material type, installation methods and applications.

262813 – Fuses - This section covers electrical fuses. Section includes acceptable manufacturers, material type, installation methods and applications.

262818 – Enclosed Switches - This section covers electrical safety disconnect switch. Section includes acceptable manufacturers, material type, installation methods and applications.

264313 – Surge Protective Devices for Low-Voltage Electrical Power Circuits - This section covers labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of a high-energy power conditioning surge protection device(s) at branch circuit panelboards where indicated on the Drawings. The device shall incorporate transient voltage surge suppression and high-frequency electrical line noise filtering. The device shall provide effective high energy transient voltage suppression, surge current diversion, high-frequency attenuation, and line stabilization in ANSI/IEEE C62.41-2002 environments connected downstream from the facility's main overcurrent protective device. The device shall be connected in parallel with the facility's wiring system. Section includes acceptable manufacturers, material type, installation methods and applications.

265100 – Interior Lighting - This section covers interior lighting fixtures, lighting fixtures mounted on interior building surfaces, emergency lighting units, and accessories. Section includes general type of light but references electrical plans to light fixture schedule.

265600 – Exterior Lighting - This section covers interior lighting fixtures, lighting fixtures mounted on exterior building surfaces, poles and accessories. Section includes general type of light but references electrical plans to light fixture schedule.

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8/6/2021

HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas

DIVISION 27 – COMMUNICATIONS

7/7/2021

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

20030

DIVISION 27 00 00 ELECTRICAL

Electrical Division 27


270533 – Conduits and Backboxes for Communication systems - This section covers labor and material for the conduit infrastructural system for Voice and Data requirements. Section includes installation conduit sizes and requirements.

ISSUED FOR DD REVIEW
8/6/2021

HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

7/7/2021


NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

20030

DIVISION 28 00 00 ELECTRICAL

Electrical Division 28

283100 – Intrusion Detection - This section covers labor and material for a complete Intrusion security detection system. Section provides requirements for installation, programming and configuration of the system and includes equipment requirements. Section includes acceptable manufacturers and submittal process.

284621 – Fire Alarm/Life Safety system - This section covers labor and material for a complete Fire Alarm emergency voice communication system. Section provides requirements for installation, programming and configuration of the system and includes equipment requirements. Section includes acceptable manufacturers and submittal process.

DIVISION 31 EARTHWORK

31 10 00 SITE CLEARING

- A. Clear site of trees, shrubs, and grasses; strip topsoil and stockpile in location designated by the Owner for future use.

31 20 00 EARTH MOVING

- A. Comply with recommendations in Owner's Geotechnical Report unless otherwise directed in writing.
- B. Clear and excavate site as required for utilities, foundations, pavings and walks, and to bring building slabs and sidewalks to grades indicated.
- C. Provide select fill or cement stabilized sand for fill and back fill unless otherwise indicated or directed.
- D. Compact fill and backfill materials to not less than 95 percent of maximum dry unit weight according to ASTM D 698 unless otherwise approved by the Architect.

31 31 16 TERMITE CONTROL

- A. Includes termiticide applied to soil under slabs, at penetrations in slab, and at voids in masonry.
- B. Comply with applicable EPA regulations for products and application.

DIVISION 31 00 00 EARTHWORK

31 05 00 COMMON WORK RESULTS FOR EATHWORK

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

- A. This work consist of materials for and the installation of manholes for sanitary and storm sewer systems.
- B. Manholes shall be constructed in accordance with the design and details shown on the plans and as hereinafter provided.
- C. Precast concrete cone units may be used on brick, concrete block, and poured concrete manholes.
- D. Invert elevations shall not vary more than 0.05 feet from the grade designated by the ENGINEER.
- E. Manholes will not be constructed with cast in place steps. Where steps are required by the ENGINEER, the steps will be installed after the manhole has been constructed. The step used shall be a 1/2" grade 60 steel reinforcing rod encapsulated in a co-polymer polypropylene as manufactured by M.A. Industries, Inc. (Model #P-2-PFS) or equal as approved by the ENGINEER. Installation of the steps shall be as recommended by the manufacturer.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. All cement used shall by Type II Portland Cement.
- B. All manhole foundations or bases shall be concrete and constructed as shown on the plans and in no case shall the thickness be less than 6 inches.

2.02 BRICK MANHOLES:

- A. Unless otherwise specified, manholes described herein shall be constructed of grade MS Brick and Type M Concrete Mortar.

2.03 CONCRETE MANHOLES:

- A. Precast Manholes & Sections
 - 1. Construct eccentric or concentric top manholes as indicated of precast pipe on conformance with ASTM C-478 using Type II Portland Cement.
 - 2. Provide factory block-outs at base or cast-in-place rubber gasket for connection of required sewer line.



3. Minimum wall thickness will be 5 inches.
4. Concrete in foundation shall comply with Section 03300 - Cast-in-Place Concrete.
5. Reinforcing steel shall comply with Section 03330 - Reinforcing Steel.

B. Cast-in-Place Manholes

1. Concrete shall comply with Section 03300 - Cast-in-Place Concrete.
2. Reinforcing Steel shall comply with Section 03330 - Reinforcing Steel.
3. Minimum wall thickness will be 5 inches.
4. Provide cast-in-place rubber gasket for connection of required sewer line.

C. Precast Concrete Manhole Bases

1. Precast concrete manhole bases may be used when approved by the ENGINEER. If approved, it shall be with the understanding that the CONTRACTOR shall be responsible for placing the bases at the specified elevation, location, and alignment.
2. Precast bases shall be manufactured with cast-in-place sewer pipe gaskets, such as: "A-LOK" or approved equal.

2.04 COATING OF MANHOLES:

A. Exterior of Manholes

1. If required, the coating shall be a waterproofing type of bitumastic or asphaltic material, as approved by the ENGINEER.
2. Application shall be in accordance with the manufacturer's published recommendations.

B. Interior of Manhole

1. If required, drain manhole coating shall be an epoxy type material conforming with Section 02590 - Polyurethane Protective Coatings.
2. All sanitary sewer manhole shall require two coating applications of Inertal Standard as manufactured by the Inertal Company, Inc. or equal as approved by ENGINEER.

C. Plastering of Manholes



1. The work shall include the coating of the surface of existing brick or block manholes with plaster as required on the plans or directed by the ENGINEER.

2.05 FRAMES, GRATES, RINGS AND COVERS:

A. Welded Steel

1. Welded steel grates and frames shall conform to the member, size, dimensions and details indicated and shall be welded into an assembly in accordance with those details.
2. Steel shall conform to the requirements of ASTM A 36.

B. Castings

1. Castings, whether Carbon-Steel, Gray Cast Iron, or Ductile Iron shall conform to the shape and dimensions required and shall be clean substantial castings, free from sand or blowholes or other defects. Surfaces of the castings shall be free from burnt on sand and shall be reasonably smooth.
2. Runners, risers, fins and other cast on pieces shall be removed from the castings and such areas ground smooth.
3. Bearing surfaces between manhole rings and covers or grates and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact.
4. Pairs of machined castings shall be matchmarked to facilitate subsequent identification at installation.
5. Steel castings shall conform to ASTM A 27, "Mild to Medium Strength Carbon Steel Castings or General Application." Grade 70-36 shall be furnished unless otherwise specified.
6. Cast iron castings shall conform to ASTM A 48, "Gray Iron Castings," Class 30.
7. Ductile Iron castings shall conform to ASTM A 536, "Ductile Iron Castings." Grade 60-40-18 shall be used unless otherwise specified.

C. Rings

1. Adjusting rings shall conform to ASTM A 536, "Gray Iron Castings."

D. Nuts and Bolts

1. Commercial grade galvanized nuts and bolts shall be as indicated. The zinc coating shall be uniform in thickness, smooth, and continuous.

E. Mortar

Mortar for bedding castings shall consist of 1 part cement and 3 parts sand meeting the requirements of fine aggregate Grade No. 1 in Section 03300 - Cast-In-Place Concrete.

F. Manhole Accessories

1. Manhole lid and cover:
 - a. Gray cast iron, with minimum clear opening 24-inches.
 - b. Use Neenah R-1916-F or approved equal for bolted covers.
 - c. Use Neenah R-1670-D or approved equal for lids not requiring bolting features.
 - d. Provide anchor bolt holes for exposed manhole tops.
2. Manhole Rings - provide minimum of three throat rings between cone and manhole lid and cover.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Foundations shall be poured in place
- B. Construct manhole foundation and channel inverts integrally. See Plan details.
- C. Precast manhole sections may be installed after foundation concrete has attained 75% of design strength.
- D. Forms for cast-in-place manhole may be installed after foundation concrete has attained 75% of design strength.
- E. Manhole foundation and manhole may be installed simultaneously if manhole section is supported on concrete blocks and foundation concrete placed under and around bottom section.
- F. Completely fill joints with pre-formed plastic gasket.
- G. Heat materials in freezing weather and protect work from cold; maintain temperature of work at 40o F. for at least 24 hours after placing.
- H. Invert Channels:
 1. Form invert channel as required.
 2. Make changes in direction of flow with smooth curves of as large a radius as size of manhole permits.
 3. Make changes in size and grade smoothly and uniformly.

4. Slope floor of manhole adjacent to channel and drain thereto.
5. Finish channel bottom smoothly without roughness, irregularity, or pockets.

I. Pipe Connections:

1. Make watertight.
2. Use rubber gasket.
3. All connections shall be at flowline of manhole, unless otherwise required.

J. Exterior Pipe Support:

1. Support vitrified clay pipe on concrete cradle from manhole connection to first joint.
2. Provide first pipe joint within 18 inches of manhole wall.

K. Castings, frames, and fittings:

1. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is place.
2. The unit shall be protected until mortar or concrete is set.

L. Coatings shall be applied after ENGINEER's approval of structure.

M. Soil foundations, one foot beyond perimeter of concrete to base shall be compacted to a depth of one foot to 95% maximum density of ASTM D 1557.

3.02 BRICK MANHOLES:

- A. Brick shall be clean, saturated surface dry before laying and shall be laid on a full mortar bed with "push joints."
- B. In no event will slushing or grouting of a joint be permitted nor shall a joint be made by working in mortar after the brick has been laid.
- C. Joints between the courses of bricks in manholes and other structures shall be as nearly as possible to a uniform thickness of 3/8 inch.
- D. The inside and outside of all brick sewer structures shall be neatly plastered with Type M mortar 1/2 inch thick and cured.
- E. Brick work shall not be laid upon a concrete foundation less than 24 hours after such foundation has been poured.



- F. No brick work shall be laid in water nor, except as prescribed for curing, shall water be allowed to stand or run on any brick work until the mortar has thoroughly set.
- G. Where new work is joined to existing unfinished work, the contact surfaces of the latter shall be thoroughly cleaned and moistened.

3.03 CONCRETE MANHOLES

- A. Manholes constructed of poured concrete (reinforced or non-reinforced) or precast reinforced concrete risers and tops shall comply with the requirements of ASTM C 478.
- B. Circular precast manhole sections shall be provided with a rubber or mastic gasket to seal joints between sections.
- C. All lifting holes, except Type "C" manhole cover lids, and gaps at joints shall be filled with a non-shrink grout.

3.04 ABANDONMENT OF MANHOLES:

- A. Abandonment of manhole, which is part of a sewer line being abandoned, shall entail the following work and materials.
 1. Manhole will not be removed but will be abandoned in place.
 2. All manhole inlet and outlet lines shall be plugged with a 12-inch long concrete mortar plug.
 3. Salvageable material shall be stockpiled on the job site. The CONTRACTOR shall contact the OWNER to inspect the materials for usability. Salvageable materials shall be transported for usability. Salvageable materials shall be transported by the CONTRACTOR to the OWNER'S storage yards. CONTRACTOR will receive a receipt for the turned-in materials. Receipts will be submitted to the ENGINEER prior to final acceptance of the Project.
 4. Unusable material will be removed from the project site and properly disposed of by the CONTRACTOR.
 5. Manhole bottom will be thoroughly pulverized, as directed by the ENGINEER.
 6. The manhole shall be filled with cement treated base (CTB) material to the top of the proposed subgrade of the pavement or to the ground surface finished grade.
 7. All labor, materials and equipment necessary to complete this work shall be furnished by the CONTRACTOR.

3.05 MANHOLE REHABILITATION IN REPLACEMENT WORK:



- A. The work under this item shall be to replace the existing manhole frame and cover and to place a concrete pad around the existing manhole as required per the construction plans.
- B. This work will be done when an existing manhole is encountered in the normal course of the replacement work that has a light weight, vented, multi-holed manhole cover.
- C. This work shall include the following:
 - 1. Remove any and all existing brick under frame and replace with new Grade MS brick as necessary to bring new frame and cover to street grade.
 - 2. Remove and replace existing concrete pad, or construct a new pad around the collar.
 - 3. Remove existing manhole steps and if manhole is greater than 10 feet deep, new steps will be installed.
 - 4. Remove an repair pavement.
 - 5. Excavation and compaction of backfill as required.
 - 6. All materials, labor and equipment necessary to do the work under this item shall be furnished by the CONTRACTOR.
- D. The work and materials under this item shall be done according to the manner set forth in the plan details and other sections of these specifications.
- E. Salvageable material shall be stockpiled on the job site. The CONTRACTOR shall contact the OWNER to inspect the materials for usability. Salvageable materials shall be transported by the CONTRACTOR to the OWNER's Storage Yards. CONTRACTOR will receive a receipt for the turned-in materials. Receipts will be submitted to the ENGINEER prior to final acceptance of the Project. Unusable materials will be properly disposed of by the CONTRACTOR.

3.06 MANHOLE DATA SHEET:

- A. Before this work is accepted, the CONTRACTOR shall provide to the ENGINEER a completed manhole data sheet for each new manhole constructed.
- B. Manhole data sheet as shown in Exhibit 02575-1 will be completed in accordance with the following instructions:
 - 1. A Manhole Data Sheet will be prepared for each manhole constructed.
 - 2. The original copy of the Data Sheet will be filed with the ENGINEER. Distribution of copies will be made to all interested parties.



3. The Manhole Number will be assigned by the OWNER.
4. Manhole Type is the general description of the manhole, e.g.: 6 foot diameter Type C, or 4 foot diameter Type E as per plan details.
5. Manhole cover Size is the nominal diameter of the manhole cover. Type, Model and Pattern refers to the manufacturer, material made of, model number and design pattern to identify the identical manhole cover for replacement.
6. Section 3 requires the name of the CONTRACTOR, the name of the foreman, and the name of the inspector actually responsible for the construction of the manhole.
7. Under "Project Name" is the work order number under this contract.
8. Date Warranty Begins is the official date of acceptance of the Project or portion of the Project of which this manhole was a part.
9. Data Warranty expires is the expiration date under the Contract for requiring warranty repairs.
10. Street Location: Give both block number and street name. For manholes in intersections give both streets. The "Remarks" section may be used for further clarification of manhole location.
11. Disregard the section on coordinate location. To be filled in by the OWNER at a later date.
12. All applicable items on the Manhole Data Sheet should be filled in. However, accuracy is more important than filling in blank spaces. Therefore, if an item is unknown and cannot be determined, leave the space blank.



EXHIBIT 02575 - 1

MANHOLE DATA SHEET

SECTION 1

SECTION 2

Manhole Number:

Manhole Cover Size

Manhole Type:

Manhole Cover Type & Model:

Date Installed:

Manhole Pattern:

Project Name:

Number of Rings Used:

SECTION 3

SECTION 4

Contractor's Name:

Date Warranty Begins:

Foreman's Name:

Date Warranty Expires:

City Inspector's Name:

SECTION 5

SECTION 6

Street Location:

Rim Elevation:

Intersection Location:

Invert

Elevation:

Remarks:

SECTION 7 (To be completed by owner)

COORDINATE LOCATION

POINT	X (East) Departure	Y (North) Departure	Z Elevation
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Center Manhole Invert:

Center Manhole Cover:

Electronic Marker Disc:



PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. New Manholes

1. Manholes of specified diameters with depths of 6 feet or less shall be measured per each.
2. Manholes of specified diameters with depths greater than 6 feet shall be measured per each. In addition, manholes for diameters specified shall be each measured per vertical linear foot of depth over 6 feet.
3. Measurements will be made to the nearest foot and will be from the manhole rim elevation to the manhole invert elevation.

B. Elevation Adjustments

1. When a new manhole is installed, no measurement or payment will be made for rim elevation adjustments to conform to proposed surface grades.
2. The following measurements for rim elevation adjustments on existing manholes will be made as follows:
 - a. Adjustment to a manhole frame by the addition of adjustment rings (s) will be measured per each manhole adjusted.
 - b. Leveling brick adjustment will be measured per each manhole adjusted.
 - c. Adjustment of manhole cone or barrel will be measured by the manhole diameter per vertical foot.

C. Manhole Coating

1. If required, exterior coating of manholes will not be measured and will be considered incidental to the appropriate manhole.
2. Plastering of the interior of manholes will be measured per each manhole of specified diameter.
3. Polyurethane protective coatings will be measured as provided in Section 02590 - Polyurethane Protective Coatings.
4. Protective Inertal coatings for sanitary sewer manholes shall not be measured for payment.



D. Manhole Steps

1.If required, manhole steps will not be measured and will be considered incidental to the appropriate manhole.

E. Abandonment of Manholes

1.Abandonment of manholes will be measured per each for the work specified.

F. Manhole Rehabilitation

1.Manhole rehabilitation will be measured per each for the work specified.

4.02 PAYMENT:

A. New Manholes

1.Manholes of specified diameters with depths of 6 feet or less shall be paid for at the contract unit price per each manhole.

2.Manholes of specified diameters with depths greater than 6 feet shall be paid for at the contract unit price per each manhole as in 4.02 A.1 above. Additional payment shall be made at the contract unit price per each vertical linear foot of depth in excess of 6 feet for manholes of specified diameters.

3.Payment for manholes of any diameter and depth will include: excavation, compacted backfilling, shelving, cover or cone, leveling bricks, frame and cover, and concrete pad or collar.

B. Elevation Adjustments

1.The following payments for accepted quantities of rim elevation adjustments on existing manholes will be as follows:

a. Adjustment of a manhole frame by addition of adjustment ring(s) will be paid for at the unit contract price per each manhole adjusted.

b. Leveling brick adjustment will be paid for at the unit contract price per each manhole adjusted.

c. Adjustment of manhole cone or barrel will be paid for at the unit contract price per manhole diameter per vertical foot.

C. Manhole Coating

1.If required, no direct payment shall be made for coating of the exterior of manholes and will be considered incidental to the appropriate manhole.

2.Plastering of the interior of manholes will be paid for at the unit contract price per manhole.



3. Polyurethane protective coatings will be paid for as provided in Section 02590 - Polyurethane Protective Coatings.

D. Manhole Steps

1. If required no direct payment shall be made for manhole steps, where required, and will be considered incidental to the appropriate manhole.

E. Payment for abandonment of manholes will be paid for at the unit price per each for the work specified.

F. Payment for manhole rehabilitation will be paid for at the unit price per each for the work specified.

G. If required, the following items will be included in the unit price per appropriate adjustment: pavement removal and repair, excavation, compacted backfill, concrete collar or pad, leveling bricks, adjusting rings, and frame and cover.

H. Compensation will be for furnishing all materials, labor, equipment, tools and incidentals required including polyurethane protective coating if not included as a separate pay item in this contract. All in accordance with the plans and specifications herein.

*** * * * END OF SECTION * * * ***



DIVISION 31 00 00 EARTHWORK

31 11 00 CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

- A. Cleaning and grubbing on project site of trees, stumps, brush, roots, vegetation, logs rubbish and other objectionable matter within limits described in specifications or as shown on plans.
- B. Cleaning and grubbing shall be in advance of grading operation except that in cuts over 3 feet in depth, grubbing may be done simultaneously with excavation, provided objectionable matter is removed as specified.
- C. Dispose of all debris resulting from clearing and grubbing work.

1.02 PROTECTION OF ADJACENT WORK:

- A. Protect all areas outside indicated construction areas.
- B. Protect existing improvements, adjacent property, utilities and other facilities, and trees and plants not to be removed from injury or damage.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Provide materials required to perform work as specified.

PART 3 - EXECUTION

3.01 CLEARING:

- A. Clear all areas covered by dikes, roads, structures and embankments within project limits unless otherwise shown in plans.
- B. Remove all saplings, brush, down-timber and debris unless shown or directed otherwise.
- C. Use tree wound paint to treat scars, gashes or limbs stubs on trees not removed.

3.02 GRUBBING:

- A. Trees, stumps, root systems, rocks and other obstructions shall be removed to the depths shown when they fall within the construction templates for the following items:



- 1. Footings 18-inches below bottom of footing.
- 2. Sidewalks (or other types of walks) 12-inches below bottom of walk.
- 3. Roadways or Streets 18-inches below bottom of subgrade
- 4. Parking Areas 18-inches below bottom of subgrade
- 5. Grassed Areas 18-inches below top soil
- 6. Fills 24-inches below bottom of fill

B. Blasting not permitted.

3.03 REMOVAL OF DEBRIS AND CLEANUP

A. Burning is not permitted.

B. Dispose of all waste materials not burned by removal from site.

C. Materials cleared and grubbed shall be the property of the Contractor and shall be his responsibility for disposal.

PART 4 - MEASUREMENT AND PAYMENT

4.01 CLEARING AND GRUBBING:

A. Clearing and Grubbing shall be measured for payment either in acres or by lump sum only for areas indicated on the plans, or as provided in the proposal and contract.

B. When not listed as separate contract pay item, Clearing and Grubbing shall be considered as incidental work, and the cost thereof shall be included in such contract pay items as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor equipment, tools and in incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION



DIVISION 31 00 00 EARTHWORK

31 23 00 EXCAVATION AND FILL

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

- A. This work shall consist of excavating and properly utilizing or otherwise properly disposing of all excavated materials, of whatever character, within the limit of work.
- B. Excavation shall also consist of constructing, compacting, shaping and finishing of all earthwork in designated areas on the plans, as specified herein, and in conformity with the required lines grades and typical cross sections or as directed by the ENGINEER.

PART 2 - PRODUCTS

2.01 CLASSIFICATION:

- A. All excavations shall be unclassified as shall include all materials encountered regardless of their nature or the manner in which they are removed.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

- A. Prior to commencing this work, all erosion control and tree protection measures required shall be in place and all utilities located and protected.
- B. Construction equipment shall not be operated within the drip line of trees, unless otherwise indicated.
- C. Construction materials shall not be stockpiled under the canopies of trees. No excavation or embankment shall be placed within the drip line of trees until tree wells are constructed.
- D. All excavation shall be performed as specified herein and shall conform to the established alignment, grades and cross sections.
- E. Suitable excavated materials may be utilized in constructing required embankments.



- F. The construction of all embankments shall conform to Section 02236 - Embankment. No material shall be stockpiled within the banks of a waterway.
- G. Unsuitable excavated materials or excavation in excess of that needed for construction shall be known as "Waste" and shall become the property of the CONTRACTOR and it shall become his sole responsibility to properly dispose of this material off site in an environmentally sound manner at a permitted disposal site.
- H. Adequate dewatering and drainage of excavation shall be maintained throughout the time required to complete the work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 EXCAVATION

- A. When listed as a separate contract pay item, shall be measured in accordance with "Measurement and Basis of Payment" section or as shown on the Bid Proposal Form.
- B. When not listed as a separate contract pay item, shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.
- C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***



DIVISION 31 00 00 EARTHWORK**31 23 00 EXCAVATION AND FILL****PART 1 - GENERAL**

1.01 GENERAL DESCRIPTION OF WORK

- A. This work shall consist of shoring, bracing, bank stabilization, bank sloping, providing trench boxes or trench shields or other equivalent means to protect employees from the effects of moving ground or cave-ins for all trenches 5-feet or more in depth.
- B. All work shall be done in conformance with OSHA Safety and Health Standards (29 CFR 1926/1010 Chapter XVII Subpart P-Excavations, Trenching and Shoring.).
- C. Trench safety plan shall be submitted by a Texas Registered Professional Engineer 30 days prior to commencement of any trenching operation in accordance with the Special Provisions of the specifications.

1.02 DEFINITIONS APPLICABLE TO THIS SPECIFICATION

- A. "Accepted engineering requirements (or practices)" - Those requirements or practices which are compatible with standards required a Registered Professional Engineer, or other duly licensed or recognized authority.
- B. "Angle of repose" - The greatest angle above the horizontal plane at which a material will lie without sliding.
- C. "Bank" - A mass of soil rising above a digging level.
- D. "Belled excavation" - A part of shaft or footing excavation, usually near the bottom and bell-shaped; i.e., an enlargement of the cross section above.
- E. "Braces (trench)" - The horizontal members of the shoring system whose ends bear against the uprights or stringers.
- F. "Excavation" - Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.
- G. "Faces" - See paragraph (k) of this section.
- H. "Hard compact soil" - All earth materials not classified as running or unstable.
- I. "Kickouts" - Accidental release or failure of a shore or brace.
- J. "Sheet pile" - A pile, or sheeting, that may form one of the continuous interlocking

line, or a row of timber, concrete, or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

- K. "Sides", "Walls", or "Faces" - The vertical or inclined earth surfaces formed as a result of excavation work.
- L. "Slope" - The angle with the horizontal at which a particular earth material will stand indefinitely without movement.
- M. "Stringers" (wales) - The horizontal members of a shoring system whose sides bear against the uprights or earth.
- N. "Trench" - A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15-feet.
- O. "Trench shield" - A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.
- P. "Unstable soil" - Earth material, other than running, that because of its nature of the influence of related conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.
- Q. "Uprights" - the vertical members of a shoring system.
- R. "Wales" - See paragraph M of this section.
- S. "Walls" - See paragraph K of this section.

PART 2 - PRODUCTS

No information for this section

PART 3 - EXECUTION

3.01 GENERAL PROTECTION REQUIREMENTS

- A. Walkways, runways, and sidewalks shall be kept clear of excavated material or other obstructions and no sidewalks shall be undermined unless shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.
- B. If planks are used for raised walkways, runways, or sidewalks they shall be laid parallel to the length of the walk and fastened together against displacement.
- C. Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping.
- D. Raised walkways, runways, and sidewalks shall be provided with plank steps on string stringers. Ramps, used in lieu of steps, shall be provided with cleats to insure a safe walking surface.

- E. All employees shall be protected with personal protective equipment for the protection of the head, eyes, respiratory organs, hands, feet and other parts of the body as set forth in OSHA Standards.
- F. Employees exposed to vehicular traffic shall be provided with and shall be instructed to wear warning vests marked with or made or reflectorized with high visibility material.
- G. Employees subjected to hazardous dusts, gases, fumes, mists, or atmospheres deficient in oxygen, shall be protected with approved respiratory protection as set forth in OSHA Standards.
- H. No person shall be permitted under loads handled by power shovels, derricks, or hoists. To avoid any spillage, employees shall be required to stand away from any vehicle being loaded.
- I. Daily inspections of excavations shall be made by a competent person. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard employees.

3.02 SPECIFIC EXCAVATION REQUIREMENTS

- A. Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e., sewer, telephone, water, fuel, electric lines, etc., will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.
- B. Trees, boulders, and other surface encumbrances, located so as to create a hazard employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed or made safe before excavating is begun.
- C. The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground or some other equivalent means.
- D. Excavations shall be inspected by a competent person after ever rainstorm or other hazard-increasing occurrence, and the protection against slides and cave-ins shall be increased if necessary.
- E. The determination of the angle of repose and design of the supporting system shall be based on careful evaluation of pertinent factors such as: Depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying materials, or stored material; and vibration from equipment, blasting, traffic, or other sources.

- F. Supporting systems, i.e., piling, cribbing, shoring, etc., shall be designed by a qualified person and meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes or drains or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports.
- G. All slopes shall be excavated to at least the angle of repose except for areas where solid rock allows for line drilling or presplitting.
- H. The angle of repose shall be flattened when an excavation has water conditions, silty materials, loose boulders, and areas where erosion deep frost action and slide planes appear.
- I. Clearances:
1. In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least 2-feet or more from the edge of the excavation.
 2. an alternative to the clearance prescribed in subparagraph 1, the Contractor may use effective barriers or other effective retaining devices in lieu thereof in order to prevent excavated or other materials from falling into the excavation.
- J. Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing, or other equally effective means. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.
- K. Support systems shall be planned and designed by a qualified person when excavation is in excess of 20-feet in depth, adjacent to structures or improvements, or subject to vibration or ground water.
- L. Materials used for sheeting, sheet piling, cribbing, bracing, shoring and underpinning shall be in good serviceable condition, and timbers shall be sound, free from large or loose knots, and of proper dimensions.
- M. Special precautions shall be taken in sloping or shoring the sides of excavations adjacent to previously backfilled excavation for a fill, particularly when the separation is less than the depth of the excavation. Particular attention also shall be paid to joints and seams of material comprising a face and the slope of such seams and joints.
- N. Except in hard rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted, unless the wall is underpinned and all other precautions taken to insure the stability of the adjacent walls for the protection of employees involved in excavation work or in the vicinity thereof.

- O. If the stability of adjoining building or walls is endangered by excavations, shoring, bracing or underpinning shall be provided as necessary to insure their safety. Such shoring, bracing or underpinning shall be inspected daily or more often, as conditions warrant, by a competent person the protection effectively maintained.
- P. Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water shall not be allowed to accumulate in an excavation.
- Q. If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above and near an excavation, the side of the excavation shall be sheet-piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.
- R. Blasting and the use of explosives are not allowed unless authorized in other portions of the specifications.
- S. When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs or barricades shall be installed. if possible, the grade should be away from the excavation.
- T. Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc. shall be backfilled.
- U. If possible, dust conditions shall be kept to a minimum by the use of water, salt, calcium chloride, oil, or other means.
- V. In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls, as set forth in OSHA Standards shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided or sources of ignition shall be eliminated. Attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, basket stretcher, etc. shall be readily available where adverse atmospheric conditions may exist or develop in an excavation.
- W. Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.
- X. Where ramps are used for employees or equipment, they shall be designed and constructed by qualified persons in accordance with accepted engineering requirements.
- Y. All ladders used on excavation operations shall be in accordance with requirements of OSHA Standards.

3.03 SPECIFIC TRENCHING REQUIREMENTS

- A. Banks more than 5-feet shall be shored, laid back to a stable slope or some other equivalent means of protection shall be provided where employees may be exposed to moving ground or cave-ins. Trenches less than 5-feet in depth shall also be effectively protected when examination of the ground indicates hazardous ground movement may be expected.
- B. Sides of trenches in unstable or soft material, 5-feet or more in depth, shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect the employees working within them.
- C. Sides of trenches in hard or compact soil, including embankments, shall be shored or otherwise supported when the trench is more than 5-feet in depth and 8-feet or more in length. In lieu of shoring, the sides of the trench above the 5-foot level may be sloped to preclude collapse, but shall not be steeper than a 1-foot rise to each 1/2-foot horizontal. When the outside diameter of a pipe is greater than 6-feet, a bench of 4-foot minimum shall be provided at the toe of the sloped portion.
- D. Materials used for sheeting and sheet piling, bracing, shoring, and underpinning, shall be in good serviceable condition, and timbers used shall be sound and free from large or loose knots, and shall be designed and installed so as to be effective to the bottom of the excavation.
- E. Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.
- F. Employees entering bell-bottom pier holes shall be protected by the installation of a removable-type casing of sufficient strength to resist shifting of the surrounding earth. Such temporary protection shall be provided for the full depth of that part of each pier and securely fastened to shoulder harness, shall be worn by each employee entering the shafts. This lifeline shall be individually manned and separate from any line used to remove materials excavated from the bell footing.
- G. Minimum requirements for trench timbering shall be in accordance with Table 19000-1. Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stresses in excess of values given by the following formula:

$$S + 1300 - \frac{20L}{D}$$

$$\text{Maximum } \frac{L}{D} = 50$$

Ratio

Where:



- L = Length, unsupported, inches
 D = Least side of the timber in inches
 S = Allowable stress in pounds per square inch of cross-section.

- H. When employees are required to be in trenches 4-feet deep or more, an adequate means of exit, such as a ladder or steps shall be provided and located so as to require no more than 25-feet of lateral travel.
- I. Bracing or shoring of trenches shall be carried along with the excavation.
- J. Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling, or kickouts.
- K. Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench. The Contractor shall provide a statement certified by a Registered Professional Engineer of the adequacy of trench boxes or shields.
- L. Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

3.05 CONSTRUCTION REQUIREMENTS

- A. The Contractor unless provided for in the plans otherwise shall provide the minimum shoring shown in Table 19000-1 for the soil class noted in the plans.
- B. Should the soil conditions differ from those specified or should ground water be encountered in the excavation the contractor shall notify the Engineer immediately. The Contractor shall refrain from operating in that portion of the trench where changed conditions are noted until such time as an inspection of conditions takes place and the contractor is notified of measures necessary for continued operation.
- C. The Contractor shall prepare and submit a plan of operation. This plan of operation shall identify material, equipment, methods and installation and shall be inspected by a Registered Professional Engineer. The Contractor's Engineer shall certify the adequacy of the trench protection system and its adherence of OSHA Standards.

PART 4 - MEASUREMENT AND PAYMENT

4.01 TRENCH PROTECTION SYSTEM

- A. When listed as a separate contract pay item, shall be measured in accordance with "Measurement and Basis of Payment" section or as shown

on the Bid Proposal Form.

- B. When not listed as a separate contract pay item, shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.
- C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

SEE ATTACHED TABLE

*****END OF SECTION*****



DIVISION 31 00 00 EARTHWORK

31 32 00 SOIL STABILIZATION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

- A. Treating of subgrade, subbase, and base courses by the pulverization, addition of lime, mixing and compacting the mixed material to the required density.
- B. Application to natural ground, embankment, existing pavement, base or subbases under this contract, or as directed by the ENGINEER, which shall be constructed as specified herein and in conformity with the typical section, lines, and grades as shown on the plans.

1.02 QUALITY ASSURANCE:

A. Comply with the latest published edition (or addended portions thereof) of the following standards and codes:

- 1. ASTM C-207 or Type N - Requirements for Hydrated Lime
- 2. ASTM Designation C5 - Quick Lime for Structural Purposes
- 3. Texas DOT Test Method Tex-600-J - Hydrated Lime
- 4. ASTM D-1557 - Density of Compacted Materials
- 5. ASTM D-2049 - Density of Compacted Materials
- 6. Texas DOT Test Method Tex 113-E - Density of Compacted Materials
- 7. AASHTO T-99, Method C - Density of Compacted Materials
- 8. AASHTO M-216 - Hydrated Lime

PART 2 - PRODUCTS

2.01 HYDRATED (DRY) LIME:

- A. Use, for stabilization of soils, a dry powder consisting primarily of calcium hydroxide (Ca(OH)₂).
- B. Provide Material in accordance with Texas SDHPT Test Method TEX-600-J and conforming to the following chemical composition:

Hydrate Alkalinity, Percent by Weight Ca(OH) ₂	90% Min.
Unhydrate Lime Content, Percent by Weight CaO	5% Max.
"Free Water" Content, Percent by Weight H ₂ O	4% Max.

And with the following residue retainage:

Residue Retained on No 6 Sieve	None
Residue Retained on No. 10 Sieve	1% Max.
Residue Retained on No. 30 Sieve	2.5% Max.



- C. Store and handle hydrated lime in closed, weather proof containers, storage bins, or bags until immediately before application to the road.
- D. Furnish hydrated lime in trucks, as applicable, with weight of lime measured on certified scales and clearly marked on the truck or stamped on a haul ticket.
- E. Furnish hydrated lime in bags, as applicable, bearing the manufacturer's certified weight. Bags varying more than five percent may be rejected.

2.02 HYDRATED LIME SLURRY:

- A. Provide a pumpable suspension of solids, principally composed of hydrated lime, in water.
- B. Provide material with a "Solids Content" having a hydrated alkalinity $\text{Ca}(\text{OH})_2$ of not less than 90 percent by weight and a residue retainage equal to the retainage specified in Part 2.01 above.
- C. Supply Type B, commercial lime slurry, with a "dry solids content" of at least 31% by weight of the slurry (Grade 1).
- D. Procure mixing water only from City of Edinburg water mains. The Contractor shall make arrangements with the City Water Department to obtain a meter and subsequent payment for water used.

2.03 TYPE C QUICKLIME (MASON'S LIME):

- A. GRADE S, quicklime, is unsuitable for "Dry Placing;" Provide as a dry powder in a tank, to form a lime slurry.
- B. GRADE DS, "pebble" quicklime, is suitable for either "Dry Placing" or for preparation of a slurry for "Slurry Placing."

PART 3 - EXECUTION

3.01 GENERAL:

- A. Provide a completed course of treated materials containing a uniform lime mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth, and with a smooth surface and suitable for placement of subsequent courses.
- B. Regulate sequence of work, use proper amounts of lime, maintain the work, and rework the courses as necessary to meet the requirements of this specification.
- C. Construct and shape roadbed to conform with typical sections, lines, and grades as shown on the plans, or as directed by the ENGINEER.
- D. Excavate materials to be treated to the proposed bottom of lime treatment grade and remove or windrow to expose secondary grade.

- E. Correct any wet or unstable material below the secondary grade by scarifying, adding lime and compacting until uniform stability is achieved.
- F. Use a cutting or pulverizing machine, as applicable, to remove subgrade material accurately to secondary grade and pulverize the material at the same time. When a cutting or pulverizing machine is used, the requirement for exposing and windrowing the material is waived.
- G. Proof Roll subgrade before use of pulverizing machinery and correct any soft areas that proof rolling operations shall reveal.
- H. Materials for new bases and subbases shall be delivered, placed and spread in the required amount per station. The material shall be thoroughly mixed prior to the addition of lime.
- I. Lime shall be spread only on that area where first mixing operation can be completed in the same working day.
- J. The rate of lime application or the lime content of the treated material shall be as specified by the Engineer.

3.02 SLURRY PLACING:

- A. Mix lime with water in trucks or approved distributors and apply as a thin water suspension or slurry.
- B. The lime slurry shall be applied with approved distributors by successive passes over a measured surface of roadway until the proper moisture and lime content is achieved.
- C. Lime slurry distributors shall be equipped with an agitator for maintaining lime and water in a uniform mixture.

3.03 DRY PLACING:

- A. Apply lime at a uniform rate by an approved screw type spreader box or by bag distribution until the proper lime content is achieved.
- B. Distribute lime in such a manner as to reduce scattering of lime to a minimum. Lime shall not be applied "dry" when wind conditions, in the opinion of the ENGINEER, will cause objectionable blowing of lime towards traffic or adjacent properties.
- C. Motor graders shall not be used to spread "dry" lime, except TYPE C, GRADE DS, "pebble" quicklime.
- D. Sprinkle material until proper moisture content is achieved.

3.04 MIXING

A. Mixing procedures shall be the same for "Dry Placing" or "Slurry Placing" of lime.

B. Treatment for Materials in Place:

1. Thoroughly mix material and lime using approved road mixers or other approved equipment, until a homogeneous, friable mixture of material is obtained, free from all clods and lumps.
2. For materials containing plastic clay or other materials not readily mixed with lime, mix as thoroughly as possible at the time of lime application, bring to proper moisture content, seal with a pneumatic roller, and leave to cure two to four days, unless otherwise directed by the ENGINEER.
3. During curing period, material shall be kept moist by method(s) approved by the ENGINEER.
4. Uniformly mix, after required curing time, using approved methods.
5. Clods in soil binder - Lime mixture shall be reduced in size by raking, blading, discing, harrowing, scarifying or by other approved pulverization methods such that nonslaking aggregates obtained on the No. 4 sieve are removed. The remainder of the material shall meet the following requirements when test dry by laboratory sieves:

Minimum Passing 1 3/4 inch	100%
Minimum Passing No. 4 Sieve	60%

C. Treatment of New Material

1. Thoroughly mix and blend, using approved road mixers or other approved equipment, the base or subbase material, lime and required water until a homogeneous, friable mixture is obtained.
2. When lime is placed as a slurry and mixed by use of blades, the material shall be bladed as the limewater mixture is applied.

D. During the time between application and mixing, hydrated lime that has been exposed to the open air for a period of six hours or more or has been subjected to excessive loss due to washing or blowing, shall not be accepted for payment.

3.05 COMPACTION:

- A. Compaction of the mixture shall begin immediately after final mixing and in no case later than three calendar days after final mixing.
- B. Aerate or sprinkle material as necessary to provide optimum moisture.
- C. Compaction shall begin at the bottom and shall continue in 6-inch lifts (maximum) until entire depth of mixture is uniformly compacted to 95% of maximum density as determined by AASHTO T-99, Method C.



D. If any portion fails to meet the density specified, it shall be reworked as required to obtain specified density.

3.06 FINISHING, CURING, AND PREPARATION FOR SURFACING:

A. Shape surface after compaction to the required lines, grades, and cross sections, followed by thorough rolling sufficiently light to prevent hair-line cracking.

B. Completed shaped and rolled sections shall be moist cured for a minimum of seven days before further courses are added or any traffic, other than sprinkling equipment, is permitted on the completed sections.

C. The surface or compacted layer shall be kept moist until covered by other base or paving material, or until a curing seal of CSS-1 or SS-1 emulsified asphalt has been applied. If used, the curing seal shall be applied, as soon as possible after final rolling, at a rate of 0.10 to 0.20 gallons per square yard. The exact rate will be as directed by the ENGINEER.

D. No equipment or traffic will be permitted on lime treated materials for 72 hours after application of a curing seal.

3.07 MAINTENANCE OF COMPLETED SECTIONS:

A. Maintain the completed lime treated material within the limits of contract, in condition satisfactory to the ENGINEER as to grade, crown and cross section until following course is constructed.

B. Immediately repair all irregularities and defects that may occur before the next course is constructed at no cost to the City and as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 LIME STABILIZATION

A. When listed as a separate contract pay item, shall be measured in accordance with "Measurement and Basis of Payment" section or as shown on the Bid Proposal Form.

B. When not listed as a separate contract pay item, shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***



DIVISION 32 00 00 Exterior Improvements

32 12 00 Flexible Paving

PART I - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

- A. This work shall consist of furnishing and placing a foundation course for surface courses or for other base courses.
- B. Flexible base shall be composed of either caliche (argillaceous limestone, calcareous or calcareous clay particles, with or without stone, conglomerate, gravel, sand or other granular materials), crushed stone, gravel, iron ore topsoil, sand shell, or crushed slag.
- C. Flexible base shall be constructed as specified herein in one or more courses in conformance with details, lines and grades shown on the plans, and as established by the ENGINEER.
- D. When lime stabilization of the subgrade is specified, the flexible base is to be added in accordance with Section 02240, Lime stabilization.

PART 2 -PRODUCTS

2.01 MATERIALS:

- A. Materials for flexible base shall be crushed or uncrushed as necessary to comply with the requirements hereinafter specified.
- B. Materials shall consist of durable coarse aggregate particles mixed with approved binding materials.

2.02 LIME STABILIZATION:

- A. Were shown on the plans, or directed by the ENGINEER, material for flexible base shall be lime stabilized in accordance with the provisions of Section 02240.

2.03 TYPES:

- A. Type A - Crushed or broken aggregate (excluding gravel aggregate).
- B. Type B - Gravel Aggregate
- C. Type C - Iron Ore Topsoil
- D. Type D - Shell Aggregate with Sand Admixture
- E. Type E - Shell Aggregate with Sand and Caliche Admixture



- F. Type F - Caliche
- G. Type G - Crushed Slag
- H. Unless otherwise noted on the plans, the CONTRACTOR may use any one type of these types provided the material used meet the requirements set forth in the specification test limits herein.

2.04 GRADES:

- A. Unless otherwise shown on the plans or directed by the ENGINEER, the final course of base material shall consist of Grades 1 or 2 as specified in Table 02601-1.
- B. Base courses or sub-base materials, unless otherwise noted on the plans or directed by the ENGINEER, may consist of Grades 1, 2, 3, or 4, as specified in Table 02601-1.
- C. All grades shall, when tested in accordance with standard laboratory test procedures, meet the physical requirements set forth in Table 02601-1.
- D. Testing of flexible base materials shall be in accordance with the following test procedures:

TEST	TESTING PROCEDURE
Preparation for soil constants and sieve analysis	TEX-101-E
Liquid Limit	TEX-104-E
Plastic Limit	TEX-105-E
Plasticity Limit	TEX-106-E
Sieve Analysis	TEX-110-E
Wet Ball Mill	TEX-116-E
Triaxial Test	TEX-117-E (Part I or II)

- E. Unless otherwise specified on the plans, samples for testing the material for Soil Constants, Gradation and Wet Ball Mill shall be taken prior to the compaction operations.
- F. Unless otherwise specified on the plans, samples for triaxial tests shall be taken from the stockpile or from production, as directed by the ENGINEER, where stockpiling is required and from production where stockpiling is not required.



TABLE 02601-1

PHYSICAL REQUIREMENTS FOR FLEXIBLE BASE MATERIALS

GRADES				
TYPES of 4:	Grades 1:	Grade 2:	Grade 3:	Grade
	(Triaxial class 1 Min. compressive strength, psi: 45 at 0 psi lateral pressure and 175 at 15 psi lateral pressure	(Triaxial Class 1 to 2.3) Min. com- pressive strength, psi: 35 at 0 psi lateral pressures and 175 at 15 psi lateral pressure	(Unspecified Tri axial Class)	
TYPE A Crushed or Broken Aggregate (excluding gravel aggregate)	Retained on % Sq. Sieve 1-3/4".....0 7/8".....10-35 3/8".....30-50 No. 4.....45-65 No. 40.....70-85 Max LL.....35 Max PI.....10 Wet Ball Mill Max Amt.....40 in Passing No. 40.....20	Retained on % Sq. Sieve 1-3/4".....0-10 No. 4.....45-75 No. 40.....60-85 Max LL.....40 Max PI.....12 Wet Ball Mill Max Amt.....50 Max Increase in Passing No. 40.....20	Retained on % Sq. Sieve 1-3/4".....0-10. No. 40.....60-85 Max LL.....45 Max PI.....15 Wet Ball Mill Max Amt.....55 Max Increase in passing No. 40.....20.	As Shown on Plans
TYPE B Gravel Aggregate		Retained on % Sq. Sieve 1-3/4".....0-10 No. 4.....30-75 No. 40.....70-85 Max LL.....35 Max PI.....12	Retained on % Sq. Sieve 1-3/4".....0-5 No. 4.....30-75 No. 40.....65-85 Max LL.....35 Max PI.....12	As Shown. On Plans
TYPE C Iron Ore Topsoil		Retained on % Sq. Sieve 2-1/2".....0 No. 40.....50-85 Max LL.....35 Max PI.....12	Retained on % Sq. Sieve 2-3/4".....0 No. 40.....45-85 Max LL.....35 Max PI.....12	As Shown. on Plans



TYPE D Sand-Shell	Retained on % Sq. Sieve 1-3/4".....0-10 No. 4.....45-65 No. 40.....50-70 Max LL.....35 Max PI.....12	Retained % Sq. Sieve 1-3/4".....0 No. 40.....45-65 Max LL.....35 Max PI.....12	As Shown. on Plans
TYPE E Shell with Sand and Caliche	Retained % Sq. Sieve 1-3/4".....0 No. 40.....45-65 Max LL.....35 Max PI.....10	Retained % Sq. Sieve 1-3/4".....0 No. 40.....45-65 Max LL.....35 Max PI.....12	As Shown. on Plans
TYPE F Caliche	Retained % Sq. Sieve 1-3/4".....0 No. 4.....45-75 No. 40.....50-85 Max LL.....40 Max PI.....12	Retained % Sq. Sieve 1-3/4".....0 No. 40.....50-85 Max LL.....40 Max PI.....12	As Shown. on Plans
TYPE G Crushed Blast Fur- nace Slag			As Shown on Plans

G. The limits establishing reasonably close conformity with the specified gradation and plasticity index are defined by the following:

1. The ENGINEER may accept the material, providing not more than 2 of 10 consecutive gradation tests performed are outside the specified limits on any individual or combination of sieves by no more than 5% and where no two consecutive tests are outside the specified limits.

2. The ENGINEER may accept the material providing not more than 2 of 10 consecutive plasticity index samples tested are outside the specified limit by no more than two points and where no two consecutive tests are outside the specified limit.

2.05 STOCKPILING:



- A. When specified on the plans, the material shall be stockpiled prior to delivery on the road. The stockpile shall be not less than the height indicated and shall be made up of layers of material not to exceed the depth shown on the plans.
- B. After a sufficient stockpile has been constructed as specified on the plans, the CONTRACTOR may proceed with loading from the stockpile for delivery to the road.
- C. In loading from the stockpile for delivery to the road, the material shall be loaded by making successive vertical cuts through the entire depth of the stockpile.
- D. If the CONTRACTOR elects to produce the Type "A" material from more than one material or more than one source, each material shall be crushed separately and placed in separate stockpiles so that at least 75 percent of the material in the coarse aggregate stockpiles will be retained on the No. 4 sieve and at least 70 percent of the material in the fine aggregate stockpile will pass the No. 4 sieve.
- E. The materials shall be combined in a central mixing plant in the proportions determined by the ENGINEER to produce a uniform mixture which meets all of the requirements of the specification. In the event that combinations of the materials produced fail to meet all of the specification requirements, the CONTRACTOR will be required to secure other materials which will meet specifications requirements.
- F. The central mixing plant shall be either the batch or continuous flow type and shall be equipped with feeding and metering devices which will add the materials into the mixer in the specified quantities.
- G. Mixing shall continue until a uniform mixture is obtained.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE:

- A. Type roadbed shall be excavated and shaped in conformity with the typical sections shown on the plans and to the lines and grades as established by the ENGINEER.
- B. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material.
- C. All holes, ruts and depressions shall be filled with approved material and, if required, the subgrade shall be thoroughly wetted with water and reshaped and rolled to the extent directed in order to place the subgrade in an acceptable condition to receive the base material.

- D. The surface of the subgrade shall be finished to line and grade as established and in conformity with the typical section shown on plans, and any deviation in excess of 1/2 inch in cross section and in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.
- E. Sufficient subgrade shall be prepared in advance to insure satisfactory prosecution of the work.
- F. Material excavated in the preparation of the subgrade shall be utilized in the construction of adjacent shoulders and slopes or otherwise disposed on as directed, and any additional material required for the completion of the shoulders and slopes shall be secured from sources indicated on plans or as directed by the Engineer.

3.02 PLACEMENT OF FIRST COURSE - TYPE A, TYPE B, TYPE C, TYPE F, AND TYPE G

MATERIAL:

- A. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section.
- B. The material shall be delivered in approved vehicles of a uniform capacity, and it shall be the charge of the CONTRACTOR that the required amount of specified material shall be delivered in each 100- foot station.
- C. Material deposited upon the subgrade shall be spread and shaped the same day.
- D. In the event inclement weather or other unforeseen circumstances render impractical the spreading of the material during the first 24-hour period, the materials shall be scarified and spread as directed by the Engineer.
- E. The material shall be sprinkled, if directed, and shall then be bladed, dragged and shaped to conform to typical sections as shown on plans.
- F. All areas and "nests" of segregated coarse or fine material shall be corrected to removed and replaced with well graded material, as directed by the ENGINEER.
- G. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and supplies in the amount directed by the ENGINEER. Such binder material shall be carefully and evenly incorporated with the material in place by scarifying, harrowing, brooming or by other approved methods.



- H. The course shall be compacted by method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.
1. When the "Ordinary Compaction" method is to be used, the following provisions shall apply:
 - a) The course shall be sprinkled as required and rolled as directed until a uniform compaction is secured. Throughout this entire operation, the shape of the course shall be maintained by blading and the surface upon completion shall be smooth and in conformity with the typical sections shown on plans and to the established lines and grades.
 - b) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.
 - c) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.
 2. When the "Density Control" method of compaction is to be used, the following provisions shall apply:
 - a) The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified under "Density".
 - b) In addition to the requirements specified for density, the full depth of the flexible base shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment.
 - c) After each section of flexible base is completed, density tests shall be performed as required by the ENGINEER. If the material fails to meet the density requirements, it shall be reworked as necessary to meet the density requirements.
 - d) Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical sections shown on the plans and to the established lines and grades.
 - e) In that area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section in a length of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.



- f) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.
- I. Should the base course, due to any reason or cause, lose the required stability, density or finish before the surfacing is complete, it shall be re-compacted and refinished at the sole expense of the CONTRACTOR.
- J. Where Type C material is used, the material shall be scarified, thoroughly wetted, mixed, manipulated, and bladed so as to secure a uniformly wetted material, and pulled in over the subgrade in courses and set under the action of blading and rolling. The work of mixing, blading, rolling, shaping, and subsequent maintenance shall be performed by the continuous use of sufficient number of satisfactory rollers and power maintainers with adequate scarifier attachments.

3.03 PLACEMENT OF FIRST COURSE - TYPE D MATERIAL:

- A. Immediately before placing the base material, the sub-grade shall be checked as to conformity with grade and section, and corrections made if necessary.
- B. All materials shall be delivered in approved vehicles of a uniform capacity.
- C. The required amount of shell shall be uniformly spread across the section and allowed to dry sufficiently to ensure proper slaking and mixing of the binder material. Immediately upon completion of the drying period, as determined by the ENGINEER, the specified amount of sand admixture as required to produce a combined material meeting the requirements hereinbefore specified, shall be spread uniformly across the shell.
- D. The material shall then be sprinkled as required and thoroughly mixed by blading and harrowing, or other approved methods.
- E. Failure to proceed with the placing of sand admixture or mixing and placing operations will be grounds for the suspension of placing of shell.
- F. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.
- G. The course shall be compacted by the method of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.

1. When the plans indicate that the "Ordinary Compaction" method is to be used, the following provisions shall apply:
 - a) After mixing, all material shall be windrowed, and then spread over the section in layers.
 - b) The layer shall not exceed 2 inches in loose depth.
 - c) If necessary to prevent segregation, the material shall be wetted in the window prior to spreading.
 - d) After each lift is spread, it shall be sprinkled and rolled to secure maximum compaction as directed by the ENGINEER. Succeeding layers shall then be placed similarly until the course is completed.
 - e) All areas and "nest of segregated coarse or fine material shall be corrected or removed and replaced with well graded material, as directed by the ENGINEER.
 - f) The course shall then be sprinkled as required and rolled as directed until a uniform compaction is secured.
 - g) Throughout this entire operation, the shape of the course shall be maintained by blading; and the surface, upon completion, shall be smooth and in conformity with the typical sections shown on plans, and to the established lines and grades.
 - h) In that area on which pavement is to be place, any deviation in excess of 1/4 inch in cross section in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.
 - i) All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and re-compacting by sprinkling and rolling.
2. When the plans indicate that the "Density Control" method of compaction is to be used, the compaction method shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.
- H. When indicated on the plans or permitted by the ENGINEER, Type D material may be mixed in a central mixing plant and delivered to the road as a combined mixture. When this method is used, the combined mixture shall meet the requirements for type D material as hereinbefore specified and the placing and compaction requirement shall be the same as prescribed for Type A, Type B, Type C, Type F and Type G material.

3.04 PLACEMENT OF FIRST COURSE - TYPE E MATERIAL:



- A. The construction methods for placing the first course of Type E material shall be the same as prescribed for Type D material except that after the shell and sand have been placed, the prescribed amount of caliche shall then be spread across the sand and shell.
- B. The composite mixture shall then be sprinkled as required and thoroughly mixed by blading and harrowing or other approved methods.
- C. Compaction of the first course of Type E material shall be the same as prescribed above for Type D material.
- D. Failure to proceed with placing the sand and caliche admixture or mixing and placing operations will be grounds for the suspension of placing of shell.
- E. Under no conditions will the CONTRACTOR be allowed to place an excessive amount of shell without proceeding with the mixing and placing operations.

3.05 PLACEMENT OF SUCCEEDING COURSES - ALL MATERIAL TYPES:

- A. Construction methods shall be the same as prescribed for the first course.
- B. Prior to placing the surfacing on the completed base, the base shall be "dry cured" to the extent directed by the ENGINEER.

3.06 DENSITY CONTROL:

- A. When the "Density Control" method of compaction is indicated on the plans, each course of flexible base shall be compacted to the percent density shown on the plans.
- B. The testing will be as outlined in TX DOT Test Method Tex-114-E.
- C. It is the intent of this specification to provide in the top 8 inches of the base material immediately below the finished surface of the roadway not less than 100 percent of the density as determined by the compaction ratio method.
- D. Field density determination shall be made in accordance with TX DOT Test Method Tex-115-E.

3.07 TOLERANCES:

- A. When tolerances are permitted by the plans, the limits establishing reasonably close conformity with percent density specified are defined by the following:



1. The ENGINEER may accept the work providing not more than 25 percent of the density tests performed each day are outside the specified density by no more than three pounds per cubic foot and where no two consecutive tests on continuous work are outside the specified limits.

PART 4 - MEASUREMENT AND PAYMENT

- A. When listed as a separate contract pay item, shall be measured in accordance with "Measurement and Basis of Payment" section or as shown on the Bid Proposal Form.
- B. When not listed as a separate contract pay item, shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.
- C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***



DIVISION 32 EXTERIOR IMPROVEMENTS**32 12 00 FLEXIBLE PAVING****PART 1 - GENERAL****1.01 GENERAL DESCRIPTION:**

A. Prime coat shall consist of application of asphaltic materials on completed base course and/or other approved area, which shall be applied in accordance with these specifications, as shown on the plans, and as directed by the ENGINEER.

1.02 QUALITY ASSURANCE:

A. Test and Certification of Bituminous Materials.

1. Bituminous material is to be tested in accordance with the requirements of AASHTO M-82 and sampled in conformance with AASHTO T-40.
2. Supply, at the time of delivery of each shipment of asphalt, two certified copies of test reports, from supplying vendor, to the ENGINEER.
3. Test reports shall indicate name of vendor, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, purchase order number, and result of specified tests. The test report, signed by an authorized representative of the vendor, shall certify that the product delivered conforms to the specifications for type and grade indicated. Certified test reports and the testing required in the preparation of such report shall be at no cost to the COUNTY.
4. Final acceptance of bituminous materials shall be dependent on the determination by the ENGINEER that the material meets prescribed standards.

PART 2- PRODUCTS**2.01 MEDIUM CURING CUTBACK ASPHALT:**

- A. Medium-curing liquid asphalt, designated by the letters MC, shall consist of an uncracked petroleum base stock, produced by the processing of asphaltic or semi-asphaltic base crude petroleum, blended with a kerosene-type solvent. The base stock for all MC materials shall be straight run asphalt produced within the penetration range of 100 to 300, and the end point of the kerosene type solvent shall not exceed 525 degrees F. Medium curing liquid cutback asphalt shall be free from water and show no separation.
- B. Medium curing cutback asphalt shall consist of materials specified above and

conforming to the requirements set forth in Table 2610-1.

C. Unless otherwise noted on the plans or directed by the ENGINEER, cutback asphalt Grade MC-30 shall be used.

2.02 BLOTTER MATERIAL:

A. Supply blotter material consisting of native sand and/or sweepings from base course.

B. Native sand shall be local material obtained from approved sources as approved by the ENGINEER.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS:

A. Unless otherwise specified on the plans or, required by the ENGINEER, only asphaltic material shall be used. Where required, a combination of asphaltic and blotter material shall be used.

B. Application of Asphaltic Materials Only.

1. Apply prime coat to prepared surface when ambient air temperature is above 40 degrees F. and is rising and shall not be applied when the ambient air temperature is below 50 degrees F. and falling.
2. Apply prime coat to surfaces that have been cleaned by sweeping or other approved methods and where base is thoroughly dry and satisfactory for receiving prime coat.
3. Apply prime coat to cleaned base, at a rate of 0.2 to 0.5 gallons per square yard of surface area, using an approved type of self-propelled pressure distributor so constructed and operated to distribute the material evenly and smoothly.
4. Provide necessary facilities for the determination of temperature of asphaltic material in all heating equipment and distributors; and for determination of rate at which it is applied; and for securing uniformity at the junction of two distributor loads.
5. Keep in clean and good working condition all storage tanks, piping, reports, booster tanks and distributors used in the storage and handling of asphaltic materials.
6. Operate all associated equipment in a manner such that there is no contamination of asphaltic material with foreign material.
7. Calibrate distributor and furnish ENGINEER with an accurate and satisfactory record of such calibrations.

TABLE 2610-1

Specification Designation	Test	AASHTO		ASTM		Grade					
		Test Method	Test Method	MC	MC	MC	MC	MC	MC	MC	
				30	30	70	70	250	250	800	3000
Flash Point (Open Cleve) oF, Min.		T 48	D 92	100	100	150	150	150	150	150	150
Viscosity 140oF, Kinematic, CS		T 201	D 2170	60	30 to 140	70 to 500	250 to 1600	800 to 6000	3000 to		
Furol Viscosity at 77 F. (Secs.) at 122 F. (Secs.) at 140 F. (Secs.) at 180 F. (Secs.)		T 72	D 88		75-150 60-120 125-250 100-200	300 to 600					
Distillation Distillate (% of Total Distillate to 680 F) to 437 F) to 500 F to 600 F		T 78	D 402		0-25 40-70 75-93	0-20 25-60 75-90	0-10 20-55 70-85	-0- 10-35 65-80	-0- 15-15 50-75		
Residue from Distillation to 680 F Volume % by Difference Min.					50	55	67	75	80		
Tests on Residue From Distillation Penetration at 77 F		T 49	D 5		120 to 250	120 to 250	120 to 250	120 to 250	120 to 250		
*Ductility 77 F cm., Min.		T 51	D 113		100	100	100	100	100	100	100

Solubility in CC1 4, % Min.	T44	NONE	99.5	99.5	99.5	99.5	99.5
Water, % Min.	T 55	D 95	0.2	0.2	0.2	0.2	0.2
Reaction to Spot Test	T 102**	-0-	-0-	-0-	-0-	-0-	-0-

* If penetration of residue is more than 200 and its ductility at 77 F is less than 100, the material will be acceptable if the ductility at 60 F is greater than 100.

** Using 85% Standard Naphtha and 15% Xylene.

NOTE: Viscosity tests may be made by either Kinematic or Furol test methods.

8. Recalibrates distributor, in a manner satisfactory to the ENGINEER, after the beginning of work, should the yield on the asphaltic material applied appear to be in error.
9. No traffic, hauling or placing of subsequent courses shall be permitted over freshly applied prime coat until authorized by the ENGINEER.
10. Apply asphaltic material at a temperature within 15 F of temperature of application selected by the ENGINEER based on temperature viscosity relationship noted in Table 2610-1.
11. Maintain surface until work is Blotter Material.

C. Application of Asphaltic and Blotter Material

1. Haul blotter material in vehicles of uniform capacity and placed on shoulders at spacings designated by the ENGINEER.
2. After application of asphaltic material as specified above, cover surface with blotter material as directed by the ENGINEER.
3. After application of blotter material, drag surface with approved drag broom, evenly and smoothly distributing the blotter material. Brooming or dragging operation shall continue, as directed by the ENGINEER, until the course has properly cured under traffic.

PART 4 - MEASUREMENT AND PAYMENT

4.01 PRIME COAT:

- A. Asphaltic material for prime coat will be measured for payment at point of delivery on the project in gallons at applied temperature. Payment will be paid at the unit bid price for "Prime Coat".
- B. When not listed as a separate contract pay item, prime coat shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.
- C. Compensation, whether by contract pay item or incidental work will be for furnishing all material, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

4.02 BLOTTER MATERIALS:

A. Blotter mater will be considered incidental to asphaltic material for prime coat withno direct payment or payment therefor.

*** * * * END OF SECTION * * * ***

DIVISION 32 00 00 EXTERIOR IMPROVEMENTS**32 17 00 PAVING SPECIALTIES****PART 1 – DESCRIPTION**

Construct hydraulic cement concrete sidewalks.

PART 2 – MATERIALS

Furnish materials conforming to the following:

- Section 03300, "Cast-in-Place Concrete"
- Section 03330, "Reinforcing Steel."

Use Class A concrete or other concrete as specified. Use Grade 8 course aggregate for extruded Class A concrete. Use other grades if approved by the Engineer.

PART 3 – EXECUTION

Shape and compact subgrade, foundation, or pavement surface to the line, grade, and cross-section shown on the plans. Lightly sprinkle subgrade or foundation material immediately before concrete placement. Hand-tamp and sprinkle foundation when placement is directly on subgrade or foundation materials. Remove and dispose of existing concrete in accordance with Section 02238, "Removal of Concrete." Provide a clean surface for concrete placement directly on the surface material or pavement.

Mix and place concrete in accordance with the pertinent Items. Hand-finishing is allowed for any method of construction. Finish exposed surfaces to a uniform transverse broom finish surface. Curb ramps must include a detectable warning surface and conform to details shown on the plans. Install joints as shown on the plans. Brush all exposed surfaces to a smooth and uniform surface. Ensure that abrupt changes in sidewalk elevation do not exceed 1/4 inch, sidewalk cross slope does not exceed 2%, curb ramp grade does not exceed 8.3%, and flares adjacent to the ramp do not exceed 10% slope. Where a sidewalk crosses a concrete driveway, ensure that the sidewalk depth and reinforcement are not less than the driveway cross-sectional details shown on the plans.

Provide finished work with a well-compacted mass, a surface free from voids and honeycomb, and the required true-to-line shape and grade. Cure for at least 72 hr. in accordance with Section 03300, "Cast-in-Place Concrete."

A. Conventionally Formed Concrete. Provide sidewalk sections separated by premold or board joint of the thickness shown on the plans in lengths greater than 8 ft. but less than 40 ft., unless otherwise directed. Terminate workday production at an expansion joint.



B. Extruded or Slipformed Concrete. Provide any additional surface finishing immediately after extrusion or slipforming as required on the plans. Construct joints at locations as shown on the plans or as directed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 SIDEWALKS

A. When listed as a separate contract pay item, shall be measured in accordance with "Measurement and Basis of Payment" section or as shown on the Bid Proposal Form.

B. When not listed as a separate contract pay item, shall be considered as incidental work, and the cost thereof shall be included in such contract pay item(s) as are provided in the proposal contract.

C. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***



DIVISION 32 EXTERIOR IMPROVEMENTS

32 13 13 CONCRETE PAVING

- A. Includes reinforced concrete for driveways, parking lots, curbs and gutters, and walks.
- B. Quality Assurance: Comply with ACI 301 unless otherwise indicated.
- C. Steel Reinforcement:
 - 1. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
 - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
 - 3. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- D. Concrete Materials:
 - 1. Portland Cement: ASTM C 150, gray portland cement Type I/II. Use same type, brand, and source throughout Project
 - 2. Normal-Weight Aggregates: ASTM C 33, Class 4M, uniformly graded. Provide aggregates from a single source.
 - 3. Water: Potable and complying with ASTM C 94/C 94M.
- E. Concrete Mixtures and Mixing:
 - 1. Prepare design mixtures, proportioned according to ACI 301, to provide concrete with a compressive strength (28 days) of not less than 3000 psi unless otherwise indicated.
 - 2. Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

32 13 73 CONCRETE PAVING JOINT SEALANTS

- A. Includes cold applied joint sealants.
- B. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant for Concrete: ASTM C 920, Type M, Grade P, Class 25, for Use T.
- C. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.
- D. Manufacturers: BASF Corporation; Construction Systems; Pecora Corporation; Sika Corporation; Joint Sealants; or Tremco Incorporated; or manufacturer offering comparable products approved by the Architect.

32 17 13 PARKING BUMPERS

- A. Includes concrete wheel stops.
- B. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi minimum compressive strength, manufacturer's standard height and width by 72 inches long. Provide chamfered corners, and a minimum

of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.

1. Mounting Hardware: Galvanized-steel hardware as standard with wheel-stop manufacturer for application indicated.

32 17 23 PAVEMENT MARKINGS

- A. Includes painted markings applied to asphalt or concrete pavement.
- B. Accessibility Standard: Comply with applicable provisions in the TDLR “2012 Texas Accessibility Standards” (TAS).
- C. Pavement-Marking Paint: MPI #97, latex traffic-marking paint.
 1. Color: As indicated.

32 31 19 DECORATIVE METAL FENCES AND GATES

- A. Includes welded steel fence and gates.
- B. Materials:
 1. Steel Shapes, Plates, and Bars: ASTM A 36.
 2. Steel Pipe: ASTM A 53.
 3. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).
 4. Metal Panels: Galvanized metal panel where required for privacy or security.
- C. Pedestrian Gates:
 1. Size: As indicated.
 2. Operation: Manual.
- D. Vehicular Gates:
 1. Type: As indicated.
 2. Operation: Motor-operated.
- E. Finish: Hot-dip galvanizing (ASTM A 123 or ASTM A 153 as applicable).

32 31 29 WOOD FENCES AND GATES

- A. Includes wood fencing.
- B. Lumber: DOC PS 20.
 1. Provide dressed lumber, S4S, unless otherwise indicated.
 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

- C. Preservative Treatment by Pressure Process: Treat rails according to AWWPA C2 (lumber).
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
 - 2. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber. Do not use material that is warped or does not comply with requirements for untreated material.
 - 3. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
- D. Rails and Framing: No. 2 grade lumber with 19 percent maximum moisture content and the following species:
 - 1. Mixed southern pine; SPIB.
- E. Pickets: Lumber with 19 percent maximum moisture content and the following species and grades:
 - 1. Cedar, No. 1 or better, WCLIB.
- F. Metal Pipe and Tubing: Galvanized steel. Comply with ASTM F 1083 and ASTM F 1043 for materials and protective coatings.
 - 1. Provide Standard Weight Pipe (Schedule 40) unless otherwise indicated.
- G. Fasteners: Provide stainless steel fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
- H. Clear Wood Finish: Factory-formulated oil-based clear wood finish.
- I. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.


ISSUED FOR DD REVIEW
8/6/2021

**HIDALGO COUNTY
BIOSAFETY LABORATORY
Hidalgo County
Weslaco, Texas**

DIVISION 33 UTILITIES

END SPECIFICATION

7/7/2021


NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

20030

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32 80 00 - UNDERGROUND IRRIGATION SYSTEM
32 81 00 - Irrigation Components
32 84 00 - Planting Irrigation
32 84 13 - Drip Irrigation
32 84 23 - Underground Sprinklers

This project includes an irrigation system with electric controllers and valves. It shall be the Contractor's responsibility to program and maintain the system so that the minimum watering requirements are met. In the event the irrigation system fails, the Contractor shall meet the watering requirements by a method approved by the owner. The cost of water used by the automated irrigation system for this Item shall be paid for by the owner.

The drawings are generally diagrammatic and indicative of the work to be installed. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, and sleeves, which may be required. The Contractor shall carefully investigate the site conditions affecting all work and shall plan his work accordingly, furnishing such offsets, fittings, and sleeves as may be required to meet site conditions.

The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been known the owner. Such obstructions or differences should be brought to the attention the owner who will recommend necessary changes. This work shall be considered incidental to the project. In the event this notification is not performed, the Contractor shall assume full responsibility for any revisions necessary.

The Contractor shall field verify dimensions and minimum 55 PSI static water pressure at each meter before trenching, if discrepancies exist, notify the owner before proceeding. If the Contractor fails to verify pressures, he assumes full responsibility and costs for any system alterations.

A copy of the complete project and all additional project information shall be with the irrigation Contractor at all times. The Contractor must coordinate his installation activities and the site needs with the general Contractor.

All necessary boring for electrical work and water sleeves shall be subsidiary to this item.

Sleeving material to be installed by the Contractor.

Use of sleeves for all roadway crossings shall be required.

Materials:

All irrigation system utility meters, for billing purposes only, shall be applied for by the Contractor in the name of the owner. The Contractor shall be responsible for paying the cost of all meters, taps, installation, and any fees or other costs associated with the utility meters. The owner will be

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responsible only for the cost of the water and electricity used on this project to operate the irrigation system.

Any water hauled to the site during the installation of a ninety (90)-day maintenance period shall be paid by the Contractor.

Above ground pipe. All aboveground pipe and buried risers and swing-joint components shall be schedule 40 PVC pipe rated for direct sunlight exposure.

1. Underground pipe. All underground pipe shall be domestic extruded pipe manufactured from PVC 1120, Type I, grade I, PVC compound. The pipe shall be SDR 13.5, 315, for all 1/2", pipe and SDR 21, Class 200 for all other sizes, pressure rated with twin gasket couplings and fittings or slip type solvent welded joints. All fittings incorporated into the system shall be of the same type and class material as the pipe. All fittings shall be regularly manufactured parts (reducers, bushings, and other appurtenances), intended for use with the aforementioned materials. All pipe and fittings shall conform to ASTM D-1784 and shall be marked in accordance with ASTM D-2241.
2. Remote control valves. All remote-control valves shall be as indicated in the plans or approved equal in the sizes indicated on the plans. The Contractor shall furnish valve data to the owner for approval prior to beginning the work.
3. Water meter. Water meter shall as specified in the plans.
4. Valve boxes. All gate valves, remote control valves, and quick coupling valves shall be mounted below grade in Ametek or approved equal valve boxes. Minimum size of any box shall be ten (10) inches and shall be installed with the top flush with finished grade. No more than one (1) valve is to occupy the same box to allow easy access for maintenance operations as determined by the owner.
5. Rotary and pop-up heads and spray heads: irrigation heads on this system shall as shown in the plans, or approved equal. The Contractor shall furnish head data to the owner for approval prior to beginning the work.
6. Miscellaneous Fittings. The Contractor shall furnish all other fittings and appurtenances necessary to complete the system.
7. Irrigation Controller. The contractor shall as specified in the plans.

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8. Control wire. All low voltage control wire shall be 14 ga. Color coded and specifically manufactured for direct burial. All wire connections and splices shall be made with waterproof compression clamps covered with scotch fill and coated with Scotch Kote, or an approved equal.
13. Backflow prevention devices. Backflow shall as specified in the plans.
Example: FEBCO PVB (2") or an approved equal
11. Solvent cement. Solvent cement shall be the type recommended by the pipe manufacturer.

Installation method

1. Excavation and backfilling. The Contractor shall do all necessary excavating and backfilling required for the proper installation of the pipe and other irrigation equipment. Excavation depth and pipe location shall be in strict accordance with the dimensions and notes on the plans. Deviations in the piping as shown on the plans shall not be permitted without approval, in writing, from owner. Minor adjustments to the layout that may be necessary to avoid unforeseen underground obstructions may be made by the Contractor so long as they are recorded on the field drawings and incorporated into the "as-built drawings" described hereinafter.
 - (a) Trench excavation. Trench excavation shall follow, as much as possible, the layout indicated on the drawings. Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trench shall be clean and smooth with all organic debris and sharp objects removed. Trench depths shall be as shown on the plans.

Pipe shall be snaked in the trench, with scheduling facing up for clear inspection by the owner and in order to allow for expansion and contraction. Solvent weld pipe shall not be installed when air temperature is below forty (40) degrees Fahrenheit. Plastic pipe shall be cut with a handsaw, hacksaw, or other cutter, in a manner that will insure a square cut. Burrs at cut ends shall be removed prior to installation so that a smooth unobstructed flow will be obtained. Plastic to plastic joints shall be made following manufacturer's recommendations.

All main and lateral lines are to be pressure tested and inspected by the owner prior to any backfilling.
 - (b) Depth of Cover. Irrigation mains shall have a minimum of eighteen (18) inches of cover, and lateral lines shall have a minimum cover of twelve (12) inches of soil.

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- (c) Backfill. All backfill material shall be free of sharp rock, large stones, or other materials that could damage the pipe during the backfilling operation.

Backfilling shall not be done in freezing weather except with written approval of the owner. The site of the work shall be continuously cleared of excess and/or waste materials as the backfilling progresses, and shall be left in a workmanlike condition to the satisfaction of the owner. In order to prevent accidental injury, any open trenches shall be covered or clearly flagged to the owner's satisfaction.

- (d) Compaction of Backfill. All trenches shall be backfilled in lifts of no more than twelve (12) inches and then compacted by an approved method. Compaction of the pipe trenches must be sufficient to limit short term settling of the backfill to no more than one-tenth (0.10) of a vertical foot. The Contractor shall be responsible for correcting any settling greater than this without additional compensation.

2. Installation of Spray Heads. All spray heads shall be installed in accordance with the details in the drawings. All heads shall only be installed on the risers after the system has been thoroughly flushed to remove all soil and trash that may have accumulated in the lines during the installation.
3. Installation of Valves. All valves, remote, electric, or manual, shall be installed in accordance with the details in the drawings and in an approved valve box which shall reach to at least two (2) inches below the bottom of the valve. A minimum of eighteen (18) inches of extra control wire shall be coiled below the valve in the valve box.
4. Installation of Control Wire. All low voltage control wire shall be laid in the pipe trenches below the pipe. Any wire that cannot be installed directly in a pipe trench shall be placed in a minimum two (2) inch conduit over its entire run. All wire runs shall be continuous lengths. No splices shall be made in the trench. Any wire splices that are required shall be made at the valves using waterproof materials specified herein.
5. Installation of controllers. Controllers shall be installed in accordance with the drawings and details. The location of the controllers shall be as shown on the plans. Adjustment of the location may be necessary to meet unforeseen site conditions. Should relocation be necessary the Contractor shall contact the owner immediately and the owner will work with the Contractor to establish the final location. Such a relocation shall be considered an incidental change, and there will be no additional compensation.
6. Installation of water meters and backflow preventers. If required, Water meters and backflow preventers shall be installed in accordance with the drawings and details. The location of water meters and backflow preventers shall be as shown on the plans. Adjustment of the location may be necessary to meet unforeseen site conditions. Should relocation be necessary the Contractor

SECTION 02810 Underground Irrigation System

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shall contact the owner immediately and the owner will work with the Contractor to establish the final location. Such a relocation shall be considered an incidental change and there will be no additional compensation.

10. Project supervision. The Contractor shall continuously maintain a competent superintendent, licensed by the State of Texas as an irrigator and satisfactory to the owner, on the site during all construction operations. The superintendent shall be able to make decisions and direct the work as the representative of the Contractor. It shall be the responsibility of the superintendent to notify the owner of work accomplished at least forty-eight (48) hours in advance of required onsite inspections and to maintain a set of plans on the site at all times on which all field adjustments or deviations from the drawings are to be recorded for the preparation of the as-built drawings. The field plans shall at all times be available for the inspection of the owner.

Guarantee and acceptance

1. Maintenance Period. The irrigation system shall be inspected concurrently with, and subject to the same 180-day maintenance period required by the owner. During the 180-day maintenance period, the Contractor shall perform the following maintenance activities as a minimum and to the satisfaction of the owner:
 - (a) Install and maintain the controller program to insure the proper distribution of water.
 - (b) Inspect, repair, and/or replace any equipment that is found to be defective or that may be damaged by other maintenance activities.
 - (c) Make any adjustments that may become necessary to insure the proper delivery of water to the plant material.
2. As-built Drawings. Upon completion of the 90-day maintenance period, the owner will make an inspection of the project at this time. The Contractor shall furnish the owner a set of as built drawings on reproducible film base sheets prepared by a qualified draftsman. The owner will check these base sheets to be sure they are a true reflection of the project conditions and will direct the Contractor to correct any errors that are found. The drawings shall show all valve locations by triangulation from a fixed object and any change to sprinkler head location and rerouting of main and lateral lines. Any changes of this nature shall be approved by the owner prior to installation.
3. Operating and maintenance data. The Contractor shall provide instructions covering full operation, care and maintenance of the equipment, including a schedule showing length of time each valve is to be open to provide determined amount of water and instruct the owner's designated personnel in proper operation of the system.

SECTION 02810 Underground Irrigation System

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4. Test. Testing of the system for leakage shall be in accordance with the local plumbing codes. The Contractor shall also test and assure the proper electrical working order of the system to the satisfaction of the owner. The Contractor shall set the valve sequence as directed by the owner to ensure grass establishment.

END OF SECTION

SECTION 02810 Underground Irrigation System

32 90 00 – Planting
32 93 00 - Plants
32 93 13 - Ground Covers
32 93 23 - Plants and Bulbs
32 93 33 - Shrubs
32 93 43 - Trees

The Contractor shall make an examination of the project site and completely familiarize himself with the nature and extent of the work to be accomplished. No extra compensation will be allowed for any work made necessary by unusual conditions or obstacles encountered during the progress of the work, which are readily apparent upon a visit to the site. If there are any questions in this regard, or discrepancies between the plans and actual site conditions, the Contractor shall notify the owner prior to the submission of bids.

All material and work required for repair and replacement shall meet with the approval of the owner, and will not be paid for directly, but will be subsidiary to this bid item.

The Contractor shall be responsible for contacting, locating, and protecting all underground utilities and structures. The owner may assist the Contractor in locating underground utilities and structures. However, any damage to existing utilities or structures shall be repaired at the Contractor's expense. If in the course of the work, underground utilities or structures are encountered and are in conflict with the work, the Contractor shall contact the owner who will recommend necessary adjustments. Changes of this nature are considered incidental to the work and shall not entitle the Contractor to additional compensation.

If the Contractor needs additional area for employee parking, servicing, storage, and securing of equipment and materials used in the performance of the specified work, the owner will, upon request from the Contractor, designate an area for this purpose. Upon completion of the work, the Contractor shall promptly remove all equipment, structures, and excess materials from the site and restore the area to its original condition, including the reestablishment of surface vegetation. This work shall be accomplished to the satisfaction of the owner and shall be subsidiary to the bid Item.

The Contractor shall be responsible for protection of his materials and equipment from theft, vandalism, animals, fire, etc., while said materials and equipment are on the project site, whether stored or installed in place, until the project has been accepted by the owner. In like manner, the Contractor shall protect all earthwork.

Upon completion of the project, the site(s) as defined herein, shall be cleaned of all debris and left in a neat and presentable condition. This shall include but not be limited to, the removal of all noxious weeds and debris from planted areas as specified herein or as specified by the owner. This work shall not be paid for directly, but shall be subsidiary to the bid Item.

The Contractor shall be responsible for providing material samples as well as any manufacturer's literature of materials used on this project as required by the owner. Any costs associated with any sampling and testing shall be the responsibility of the Contractor. These costs shall be considered as incidental and the Contractor will not be entitled to any additional compensation.

Any water hauled to the site during the plant installation period, a 90-day maintenance period shall be paid for by the Contractor.

The Contractor shall be required to verify and adhere to the requirements and codes of the controlling utility authorities in the event any materials or installation of any utilities shown on the plans are not adequate to meet the requirements or codes of the controlling utility authorities. Any changes that may be necessary shall be considered incidental and the Contractor shall not be entitled to any additional compensation.

Pre-construction conference

Prior to beginning work on the project and soon after the award of the contract, a conference will be held between the representatives of the owner, the Contractor, and any sub-Contractors that will be involved in the work. At this time the Contractor shall submit charts or briefs, outlining the manner of execution of the work that is intended in order to complete the specified work within the allotted time. This conference will more completely establish the sequence of work to be followed and establish the estimated progress schedule for completion of the various tasks.

In addition, at this conference, the Contractor shall be responsible for furnishing the owner with all of the following, as specified herein or as directed by the owner:

1. Samples of all materials, except plants, to be used on the project with identification as to product name, name, location, phone number (including area code), and mailing address of product source and manufacturer, if different from source, content of product, amount of each ingredient in the product, and manufacturer's directions as to use and application of the product, if applicable.
2. Manufacturer's literature of all materials and equipment installed on the project.
3. Any and all State and Federal certifications stating that the plant materials are free from disease and insect infestation.

SECTION 02900 Planting and Establishment

4. All nursery locations, names, phone numbers (including area codes), and mailing addresses where the Contractor intends to procure plant material for the project so that critical plants may be inspected at the source, if necessary. Also, indicate which materials shall be used from each nursery.
5. A plan for transporting plant materials.
6. The source of water and the means of distribution on the project (this may be irrigation system or by other means as required by the project).

All of the requirements listed under the "pre-construction conference" will be subject to review, testing, and approval by the owner. If Items fail to meet approval, the Contractor shall correct the deficiencies

and resubmit for approval as directed by the owner prior to beginning work on the project. If these Items fail a second approval, the owner will determine the course of action for the Contractor to follow. Any approval given, as stated above, shall not relieve the Contractor from providing quality materials, products, and equipment during construction. The owner has the option to review, test, approve, or disapprove any phase of the construction or maintenance as the work progresses. It is understood that some materials for the project will require mixing. Therefore, these materials after mixing may be reviewed, tested, and approved as Stated within these general notes.

Mulch materials

1. Mulch material for soil amendment required in the backfill mix shall be 100% organic composted material, factory blended to contain non-defoliated (arsenic acid free) weed free, and containing an approximate non-leachable N-P-K analysis of 2.0-2.0-2.0 with trace elements.

Example: Sweet soil, soil amendment
Manufactured by:

Organic Compost Inc.
Box 1637
Edinburg, Texas 78504
(956) 383-1121
(or approved equal)

2. All mulch for surface application shall be shredded pine bark. The texture shall correspond to the Type I, Class B classification of the Federal Specification Q-P-166E, with particles ranging between the size from 3/8 inch to about 1 inch, with a minimum (not over 25% by volume) of

SECTION 02900 Planting and Establishment

finer particles and dust. Mulch of this type and class shall be free of sticks, stones, clay, or other foreign matter.

3. One cubic foot (1 CF) samples of each type of ingredient along with a label from the manufacturer's packages shall be submitted to the owner for approval. If bulk materials are used, typical samples of each type of material shall be provided to the Architect for approval prior to the preparation of the planting mix. These samples, if approved by the owner, shall be used as the standard by which other materials shall be judged. Any material that, in the judgment of the owner, is below the quality of these samples may be tested in accordance with the specifications set forth herein. Any rejected material shall be immediately removed from the site at the Contractor's expense. Payment for any testing required under this section shall be the responsibility of the Contractor.

Planting soil mix

Backfilling of all plant pits shall be done with a planting soil mix as specified herein. Native soil removed from the planting pits and beds shall be used to form the watering basins. Excess soil shall be removed from the site or distributed and leveled on the site by the Contractor as directed by the owner. Watering basin shall be formed using the soil mix and raked smooth.

Planting soil mix used for backfilling planting pits shall be prepared in the following proportions by volume:

60% sandy loam topsoil (pH 7.0-7.8). Soil shall be typical of the area with no noxious weeds, grasses, sticks, roots, or stones present and shall be consistent in texture. (maximum lump size is 1").
40% mulch as listed above.

The owner may require the Contractor to mix all ingredients of the planting soil mix in the presence of the owner.

All ingredients shall be thoroughly blended to provide a homogeneous mixture. Mixing shall be in one cubic yard or greater batches using mechanical mixing one in a designated on-site area or it may be accomplished off-site if approved by the owner and the finished material transported to the site.

Samples of at least one cubic foot (1 CF) for each ten cubic yards (10 CY) of planting soil mix used on the site shall be submitted to the owner for approval. In the event deficiencies are found in the planting

SECTION 02900 Planting and Establishment

mix they shall be corrected immediately. If the material is rejected on the project site by the owner for any reason, all of the rejected material shall be immediately removed from the site and disposed of by the Contractor at his expense. If any of the rejected material has been used in the planting operations, the owner, at his discretion, may require the Contractor to remove and replace the soil mix with an approved mixture. Any testing required by the owner shall be the responsibility of the Contractor and shall be considered subsidiary to the work and no additional compensation shall be awarded.

Fertilizer application at planting

All plants shall be fertilized with an approved slow release tablet applied at the rate shown on the plans, or at a comparable rate for an approved substitute. The Contractor shall submit complete Manufacturer's literature and analysis data for approval of the owner prior to beginning work on the project.

Application shall be as follows:

- (1) gallon material - one (1) tablets
- (5) gallon material - two (2) tablets
- (10)gallon material - two (2) tablets
- (15)gallon material - three (3) tablets
 - Palms - eight (8) tablets each
 - Trees - one (1) tablet per ½ inch caliper

Placement of tablets are as designated on the plans.

Staking and guying shall be considered subsidiary to landscape plantings and the Contractor shall not be entitled any additional compensation.

Staking of plant material locations

All trees and palms shall be staked in the field by the Contractor and approved by the owner prior to any excavation of plant pits. Stakes shall be color coded to denote tree locations at the time when tree locations have been staked, the owner shall have the right to make adjustments to the plant locations to meet field conditions. These changes shall be considered incidental and the Contractor shall not be entitled to any additional compensation.

Staking and guying

SECTION 02900 Planting and Establishment

The Contractor shall install and maintain the guying material as detailed on the plans or as directed by the owner.

Water and watering

Water for all planting and a 90 day maintenance operations shall be the responsibility of the Contractor. Water shall be clean, clear, and free of industrial wastes or other substances harmful to plants. The Contractor shall provide all required facilities, to make connections and convey the water to the places where it will be used and to increase the water pressure if required. At the Pre-construction Conference, the Contractor should be prepared to identify the source of water and the means for delivery and distribution of water on the site.

During the planting operations, the Contractor shall provide a quantity and frequency of water application to keep the ground and backfill material moist to a depth of at least twelve inches (12") below the root ball and for the duration of the 90-day maintenance period as a part of this contract. The Contractor shall be required to meet the minimum watering requirement stated above by a method approved by the owner or, if applicable, in the event the irrigation system fails.

Pruning

Any necessary pruning shall be done at the time of planting as directed by the owner and in accordance with approved horticultural methods. All pruning shall be accomplished with clean sharp tools specifically designed for these purposes. Pruning and selective thinning equal to Class I, "Fine Pruning" shall be accomplished as needed during the contract period. The removal of sucker growth shall be required to keep the plant material free of sucker growth.

Plant basin maintenance

During the installation and 90 day maintenance period all plant basins and planting beds shall be maintained weed free. Nylon string trimmers shall not be used within the plant basins or planting beds. A two inch (2") layer of pine bark mulch or shredded cypress mulch, fine grade and free of debris, shall be established and maintained at all times within the basins and beds. Existing mulch shall be worked as to eliminate mulch compaction.

Watering basins shall be maintained as per details. Back fill material listed above, free of weed seed or other undesirable debris, shall be used to build basins and shall be compacted to adequately reduce erosion during watering or excessive rainfall.

Tree bracing and wrapping

SECTION 02900 Planting and Establishment

Tree bracing will be required under this contract, as detailed on the plans.

Tree wrapping will not be required for this contract.

Plant wrapping

Plant wrapping will not be required under this contract.

Plant material

As directed by the Architect, the Contractor shall be required to furnish and install the following plants within the project limits as needed. The quantity of each plant type listed within the estimate summary sheet and within the project proposal may be increased or decreased as necessary. The Contractor shall be paid for the actual number of plants installed based on the unit price bid for each type. Replacement plant material shall meet or exceed the following specifications:

Plant installation shall include all back fill, mulch, fertilizer, staking and guying, water, labor etc. to install and establish plant material, complete and in place.

Plants shall be subject to inspection and approval by the owner at the place of growth and upon delivery to the project site for conformity to the specifications. Such approval shall not impair the right of inspection and rejection during progress of the work. The owner reserves the right to refuse inspection at any time if in his judgment a sufficient quantity of plants is not available for inspection.

All plants inspected at the place of growth by the owner shall be tagged with serialized self-locking tags. Plants delivered to the site without these tags or with broken tags may be sufficient reason for rejection. Tags shall be furnished by the Contractor and approved by the owner.

The Contractor shall submit for approval a plan to the owner for transplanting plant material from the place of growth to the site. Such a plan shall include: date of pick-up, place of growth, nursery or place of storage, type of vehicle used for shipping, method of protecting plants during transit, date of delivery to site, projected date of installation, a means of storage and care. Watering and shading used between delivery and planting which shall be subject to review by the owner. Do not store plant materials on hard surfaces and immediately untie material upon delivery.

The following considerations for product handling by the Contractor shall be evaluated during hot weather and when practical:

SECTION 02900 Planting and Establishment

- 1) The Contractor may be required to transport plant materials between sunset and sunrise if transported in an open trailer or un-refrigerated van.
- 2) Dug material shall be maintained and watered as required at the nursery to guarantee their vitality and health until installation.
- 3) Protect trunks, stems, branches, and root balls from all damage during digging, handling, tying, wrapping, loading, unloading, and untying operations.
- 4) Load containers onto transport vehicle and secure in a manner that protects the structural integrity of the root balls and branches.
- 5) The Contractor shall be solely responsible for the safe transportation of plants to the site and their condition upon arrival.
- 6) Plants damaged, dehydrated or abused during transit and storage will be rejected.
- 7) Plant materials shall not be stored on concrete or left exposed to the sun.
- 8) Protect the root balls and water regularly until planting.
- 9) If plants are left in storage over the weekend or holiday a means of periodically watering and inspecting root ball moisture shall be provided.

The owner may inspect any phase of product handling and may reject any plant material improperly handled during any point of this operation.

Where specified to be nursery-grown, either in containers or in the field, such plants shall be nursery-grown in accordance with horticultural practices under climatic conditions similar to those of the project for at least twelve (12) months, unless specifically otherwise authorized by the owner in writing. Unless specifically noted otherwise, all plants shall be heavy, symmetrical, tightly knit, so

trained or favored in development and appearance as to be superior in form, number of branches, compactness and symmetry.

Plants shall be sound, healthy and vigorous, well branched and densely foliated, when in leaf. They shall be free of disease, insect infestation, eggs, or larvae, and shall have healthy, well-developed root

SECTION 02900 Planting and Establishment

systems. They shall be free from physical damage or adverse conditions that would prevent thriving growth.

Plants that meet the measurements specified but do not possess a normal balance between height and spread shall be rejected.

All plants specified in containers shall be provided in structurally sound, nursery plant containers with the minimum size as specified. Container dimensions shall be as recommended by the "American Standard for Nursery Stock", (current edition). If a container is not listed in the "American Standard for Nursery Stock", then the owner will have final approval of container dimensions.

Samples must prove no root bound conditions exist. No container plants that have cracked or broken balls of earth when taken from container shall be planted. Container stock shall not be pruned before delivery. Field grown plants recently transplanted into containers will not be accepted.

The Contractor shall neither work subsoil for planting operations when moisture content is so great that excessive compaction will not occur nor when it is so dry that the clods will not break readily. Water shall be applied, if necessary.

Canned stock shall be removed carefully after cans have been cut on two or three sides with an approved tool. Do not use spade to cut cans. Do not lift or handle container plant by tops, stems, or trunks at any time.

Do not bind or handle any plant with wire or rope at any time so as to damage bark or break branches. Lift and handle plants only from bottom of ball.

The Contractor shall follow these steps for the installation of pit planted materials:

- 1) Scarify the walls and bottom of all plant pits immediately prior to the placement of plant and backfill mix to insure the removal of all glazing caused by an auger or mechanical hole digger.
- 2) Fill plant pits with backfill mix to compact depth to receive root ball, so that the top of the root ball is two inches (2") above finished grade.

SECTION 02900 Planting and Establishment

- 3) For boxed material, break vertical bands and remove top and bottom of container. Carefully lower plant into pit with backhoe or approved method and adjust elevation, cut horizontal bands and remove sides.
- 4) Prune away girdled roots and tease root hair masses. Carefully fill pit with backfill mix and compact by watering in to support root ball.
- 5) Smooth planted areas to conform to specified grades after full settlement has occurred. Create watering basins as shown on the plans. Water all plants immediately after planting.
- 6) Spread mulch in required areas to the compacted depth of three inches (3") or as specified in the details or by the owner.
- 7) Trees should be staked for support during the same day as planting. Plants shall stand plumb after staking. The Contractor shall be responsible for material remaining plumb and straight for all given conditions throughout the contract period. Free support shall be done as outlined in the details.

Replacement of Material

If at any time during the contract period and a 180-maintenance period, a plant is found to be dead, it shall be replaced to the satisfaction of the owner, and within the period specified in the formal written notification from the owner. Failure to accomplish replacement of plant materials during the specified time period will be considered non-performance of the guarantee and maintenance requirements included in this contract and the owner may withhold payment until the required replacement has been accomplished.

Planting Requirement for Plant Replacement

The Contractor shall utilize the same process for replacement of planting or materials as used in the original installation process.

END OF SECTION

SECTION 02900 Planting and Establishment

32 90 00 - Planting
32 91 00 - Planting Preparation
32 91 13 - Soil Preparation

All shrub beds shall be prepared for installation of plant material in the following manner:

1. Apply round-up @ herbicide 20 days and again 10 days before plant bed preparation in accordance with manufactures label.
2. Apply three inches (3") of mulch material for soil amendments as described in general notes to backfill material.
3. Till beds to a depth of 18 inches.
4. Level and re-grade to bring level with the sidewalks and raked smooth prior to planting.
5. The Owner shall inspect the beds prior to and after back filling.

END OF SECTION

32 90 00 - Planting
32 91 00 - Planting Preparation
32 91 19.13 - Topsoil Placement and Grading

Topsoil required for this item to be from a pre-approved contractor obtained source. Topsoil shall be easily cultivated, fertile loam (pH 6.8-7.6), typical of the area, with no noxious weeds, grasses, sticks, or stones present and shall be consistent maximum lump size of 1". The contractor shall provide soil test prior to placement for approval by the engineer by a certified soil-testing laboratory.

Texas Plant & Soil Lab, Inc. (or equivalent)
5115 West Monte Cristo Road
Edinburg, Texas
(956)-383-0730

Soil test shall provide a standard soil analysis, micro-nutrient soil determination and interpretation with recommendations.

Topsoil shall have a soil texture rating of '3' (loam) or less (sandy loam) in accordance with standard soils testing. Soil source shall also test for sodium levels of 180 or less.

Before soil placement the contractor shall prepare all areas by applying an approved postemergent herbicide in accordance with the product label and as required by the Texas Commission on Environmental Quality.

Fusilade II turf and ornamental herbicide (or equivalent)
Syngenta Crop Protection, Inc.
P.O. Box 18300, Greensboro, NC 27419

Upon approval of the topsoil source the contractor shall apply an activated charcoal (humane) at a rate of 250 lbs. per acre on the site(s) specified. Topsoil then to be placed and tilled till into the existing soil to a depth of 6 inches by approved mechanical methods. The contractor shall then bring topsoil mix to grade as provided in the plans and specifications then raked to a smooth even finish. Contractor to finish work by watering and rolling with a light roller or other suitable equipment.

Earthwise Organics (or equivalent)
Composted Products
P.O. Box 533816
Harlingen, Texas 78553

In the event that irrigation systems exist at the project site(s) the contractor shall locate and protect all irrigation valves, irrigation heads and controllers. The contractor shall contact and determine wiring and piping depth for verification of possible conflicts in the work. A licensed irrigator shall provide repair to

SECTION 02900 Furnishing and Placing Topsoil

100% DD Set

Edinburg, Texas

any damage to existing irrigation systems. Irrigation protection or repairs shall be considered subsidiary to the various bid items and shall not be paid for separately.

END OF SECTION

SECTION 02900 Planting and Establishment

32 90 00 Planting
32 92 00 Turf and Grasses
32 92 13 Hydro-Mulching

Cellulose fiber mulch seeding shall be applied in areas designated on the plans or as directed by the Engineer. This work shall not be performed until all construction and planting activities have been completed. Prior to seeding, the areas designated shall be finished to a smooth surface for a uniform application of seed.

Seeding shall be accomplished by the Hydromulch Method in two applications as shown below:

- 1st application -
 Grass seed and Fertilizer
- 2nd application -
 Cellulose fiber mulch Minimum pure live seed required 85%.

Fertilizer shall be applied at the rate of 100 pounds of nitrogen per acre. Fertilizer shall be homogenized.

Cellulose Fiber Mulch shall be applied a rate of 2000 lbs. per acre.

Re-seeding

Areas requiring re-seeding due to the non-establishment of sufficient vegetative cover, shall be re-seeded with in a 90-day time frame. The cost for re-seeding shall be paid for by the owner provided that the Contractor has followed the seeding and watering requirements as specified.

Seed mixture

Seed mixture shall be as specified

Bermudagrass 'cynodon dactylon' a rate of 65 lbs. Pure live seed per acre.

Fertilizer:

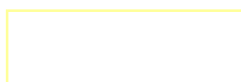
Fertilizer rate is based on a rate of 100 lbs. of Nitrogen per acre. The Nitrogen-Phosphorous-Potassium (NPK) ratio shall include a minimum of 19 percent Nitrogen-19 percent Phosphorous and 19 percent Potassium.

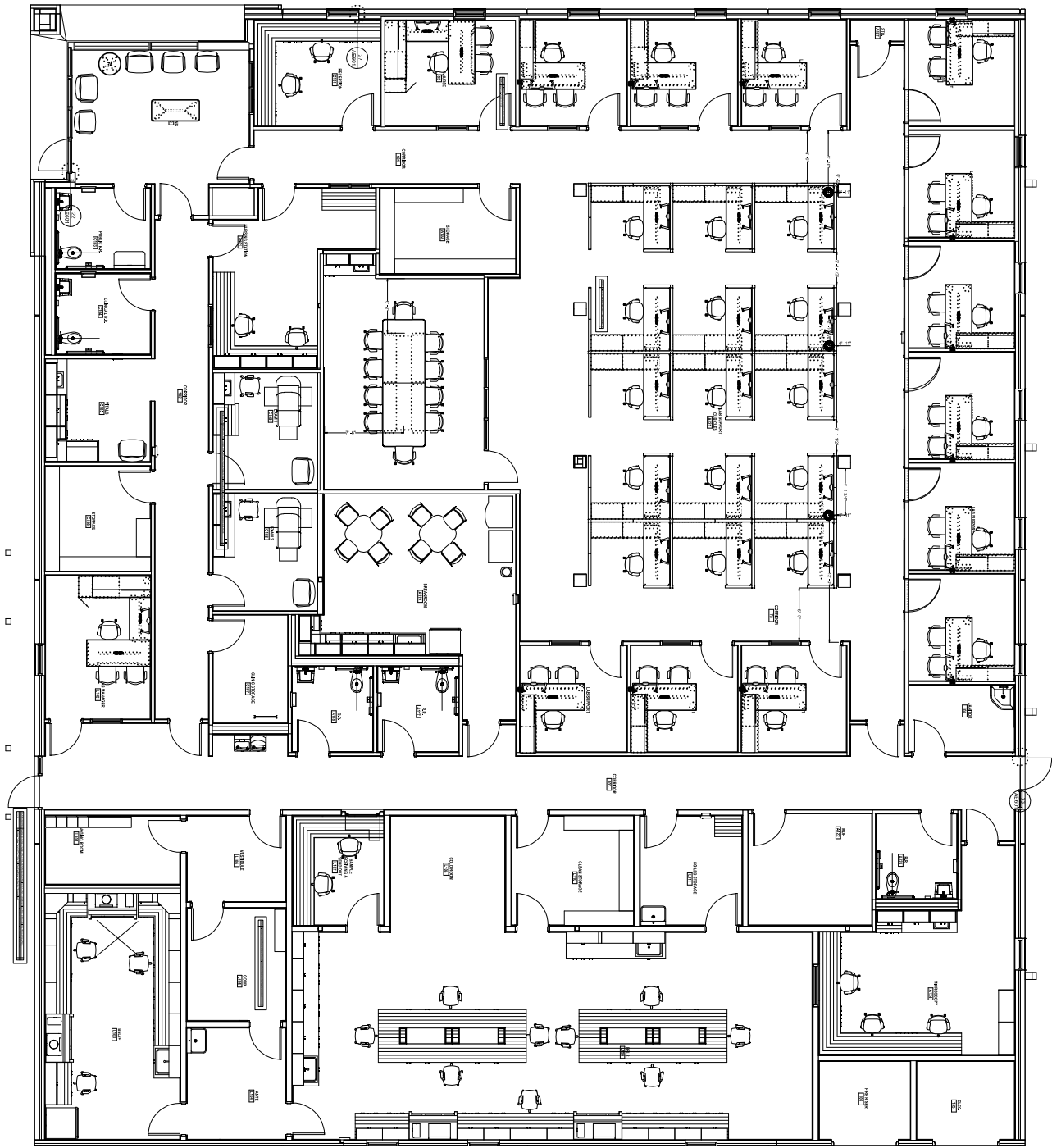
Areas to receive fertilizer are same as shown for Item, "Cellulose Fiber Mulch Seeding".

Note: All areas to be irrigated shall be seeded as noted in this contract.

See plan sheets for areas to be seeded.

END OF SECTION





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Biosafety Lab

Hidalgo County

Furniture Proposal

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FURNITURE PROPOSAL

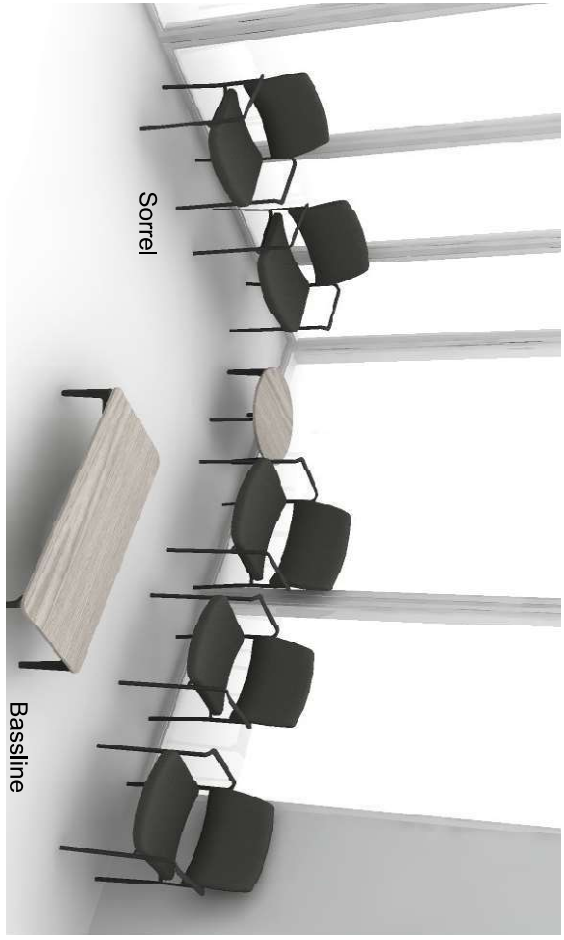


Series 1

- Nurse's Station Seating
- Microscopy Seating
- Reception Seating
- Sample Room Seating

- Series 1 Task Chair
- Matching Frame & Base in Seagull
- 3D Microknit Back-grade 1 finish in Graphite
- Seat fabric is Buzz2-Tornado
- Arms adjust height, width, depth & pivot
- Adjustable lumbar
- Soft Casters

See finish guide at end of presentation



Sorrel

Bassline

Waiting Area

- Sorrel Seating (Single 22" w & Bariatric)
- Back & Seat in Foundation-Seal (100% vinyl)
- Textured Paint Legs in Merle
- Soft felt glides
- (Qty-3 Singles/Qty-2 Bariatric)
- Bassline Occasional Tables
- Rectangle Coffee Table 4'6" l x 2' d
- Round End Table 25" w
- Laminate tops in Clay Noce
- Textured Paint Legs in Merle

See finish guide at end of presentation

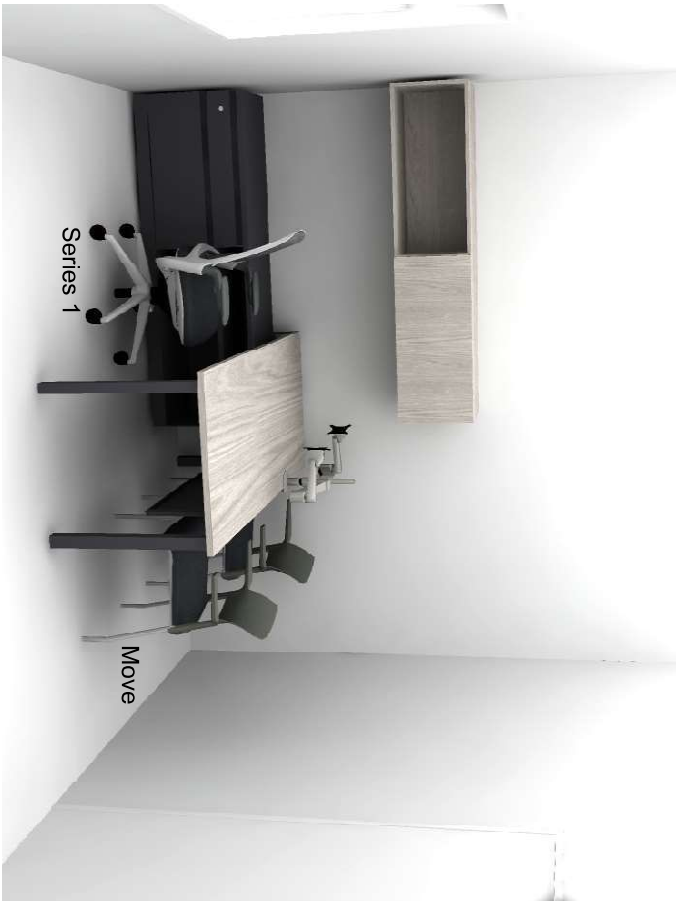
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Hidalgo County
Furniture Proposal**

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FURNITURE PROPOSAL



Lab Support Office

- Series 1 Task Chair
- Matching Frame & Base in Seagull
 - 3D Microknit Back-grade 1 finish in Graphite
 - Seat fabric is Buzz2-Tornado
 - Arms adjust height, width, depth & pivot
 - Adjustable lumbar
 - Soft Casters

- Move Chairs
- Seat fabric in Buzz2-Tornado
 - Shell back in Midnight (Polypropylene)
 - Platinum Metallic paint legs
 - Soft glides



Head Nurse & Lab Manager

- Series 1 Task Chair
- Matching Frame & Base in Seagull
 - 3D Microknit Back-grade 1 finish in Graphite
 - Seat fabric is Buzz2-Tornado
 - Arms adjust height, width, depth & pivot
 - Adjustable lumbar
 - Soft Casters

- Move Chairs
- Seat fabric in Buzz2-Tornado
 - Shell back in Midnight (Polypropylene)
 - Platinum Metallic paint legs
 - Soft glides

See finish guide at end of presentation

See finish guide at end of presentation

Biosafety Lab Hidalgo County Furniture Proposal

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FURNITURE PROPOSAL



Kart



Sorrel

Exam Room

- Kart Chair with Arms
- 4-prong caster base
- Soft casters
- Black frame with Midnight seat and back,
- injection-molded glass-filled polypropylene
- Height adjustable from 16" - 21"h to seat height

- Sorrel Seating (Bariatric)
- Back & Seat in Foundation-Seal (100% Vinyl)
- Merle Textured Paint Legs
- Soft Glides

See finish guide at end of presentation



Exam Table for Exam Room

- Exam Table
- Manufacturer: Brewer
- Style: 5000 Access Manual Exam Table w/o Pelvic Tilt
- Upholstery Type: Standard
- Material: Standard Vinyl
- Upholstery Color: Satin Black

- Weight capacity of 500 lbs.
- Fully adjustable 4-leg patient step
- Pass through side drawers allow left or right access
- Drawer stops allow drawer to open from one side if desired
- Adjustable ergonomic stirrups
- Storage for up to 6 additional paper rolls
- Pneumatic backrest for patient positioning
- Plastic debris tray
- Leg extension
- Easy to clean, seamless upholstery
- Standard Table Upholstery Colors
- Special and California fire code options available
- Proudly made in the USA

See finish guide at end of presentation

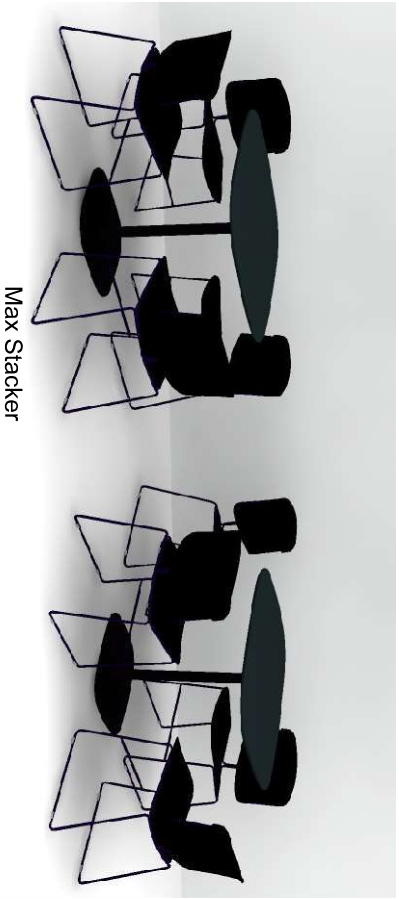
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FURNITURE PROPOSAL

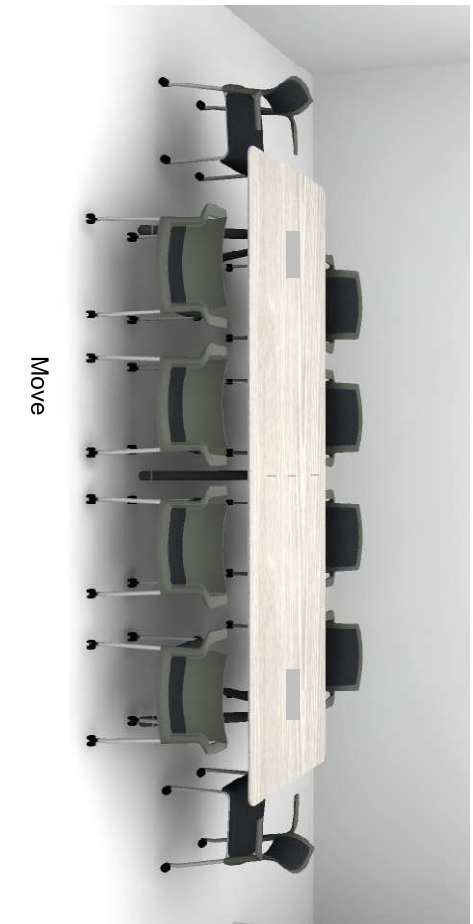


Max Stacker

Break Room

- Max Stacker Chairs
- Plastic shell seat and back in Black
- Smooth paint sled base in Black
- Soft glides
- Enea Cafe Table
- 36" w rectangle top with 30" h
- Metal frame base in Black

See finish guide at end of presentation



Move

Conference Room

- Portero Table
- 48" d x 144" l
- Laminate top (Clay Noce)
- Metal legs in Graphite Matte paint finish
- 2 Power units on left and right end. Interface G2
- Infeed will be corded (Additional information is provided under the power suggestions for this room in subsequent pages)
- Move Chairs with Arms
- Upholstered Back and Seat fabric in Buzz2-Tornado
- Shell back in Midnight (Polypropylene)
- Platinum Metallic paint legs
- Soft casters

See finish guide at end of presentation

Biosafety Lab Hidalgo County Furniture Proposal

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DRAWINGS NOT FOR CONSTRUCTION

FURNITURE PROPOSAL



Series 1

Lab Support Cubicles

- Answer Panel System
 - 48" panels with fabric skins (Pianista-Stone) laminate skins (Clay Noce) & Midnight paint trim work
 - Power at face of each workstation with 3 receptacles per seat
 - 30"D x 72"W Clay Noce laminate workstation (fixed height)
 - 22" h x 36" w side storage with 1 drawer and 1 lateral file in Midnight
 - 22" h x 42" w side storage with open shelving in Midnight
 - Dual monitor system with a c-clamp. Supports up to 27" monitors.
- Series 1 Task Chair
- Matching Frame & Base in Seagull
 - 3D Microknit Back-grade 1 finish in Graphite
 - Seat fabric is Buzz2-Tornado
 - Arms adjust height, width, depth & pivot
 - Adjustable lumbar
 - Soft Casters

See finish guide at end of presentation



FURNITURE PROPOSAL



Kart Stool

Bio Safety Lab Seating for L 109 & L 103

- Kart Stool with Arms
- 5-star caster base with 25" span
- Soft casters
- Black Frame with Midnight Seat and Back,
- Injection-molded glass-filled polypropylene
- Height adjustable from 21" - 28 1/2" to seat height

See finish guide at end of presentation



Sorrel

Vitals Room Seating

- Sorrel Seating (Bariatric)
- Back & Seat in Foundation-Seal (100% Vinyl)
- Merle Textured Paint Legs
- Soft Glides

See finish guide at end of presentation

**Biosafety Lab
Hidalgo County
Furniture Proposal**

7/12/2021 9:36:38 AM
Scale: X/X" = 1'-0"
Sales[Sales person #1, Name]
Design[Sales person #2, Name]
DRAWINGS NOT FOR CONSTRUCTION

Drawing Approved By: _____

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DRAWINGS NOT FOR CONSTRUCTION

FURNITURE PROPOSAL

Locker Room



- Antimicrobial Lockers**
- Overall Dimensions: 36" w x 12" d x 80" h & 12" w x 12" d x 80" h
 - Opening Dimensions: 12" w x 36" h
 - Handle Type: Recessed Lift Handle
 - Gauge: 16-Gauge Doors and Frame/ 24-Gauge Body
 - Includes: Antimicrobial Coating in Monorail Gray
 - Smooth Front (no louvers)
 - Integral Sloping Top
 - 4" h E-Zee Style Locker Base

Aluminum Bench:
Same as Gown Room

See finish guide at end of presentation

Gown Room



- Aluminum Bench**
- Constructed entirely of aluminum
 - Ideal for industrial, office or recreational locker room facilities
 - Combine a traditional look with strength and durability
 - Anodized aluminum seating area features rounded edges for comfortable seating
 - Available in lengths ranging from 36" to 96" (in 1 foot increments) and are easily assembled
 - Each bench is 18" high and 10" deep
 - Include two 3" diameter bolt mounted pedestals in an aluminum powder coated finish
 - Benches are delivered unassembled - minor assembly required

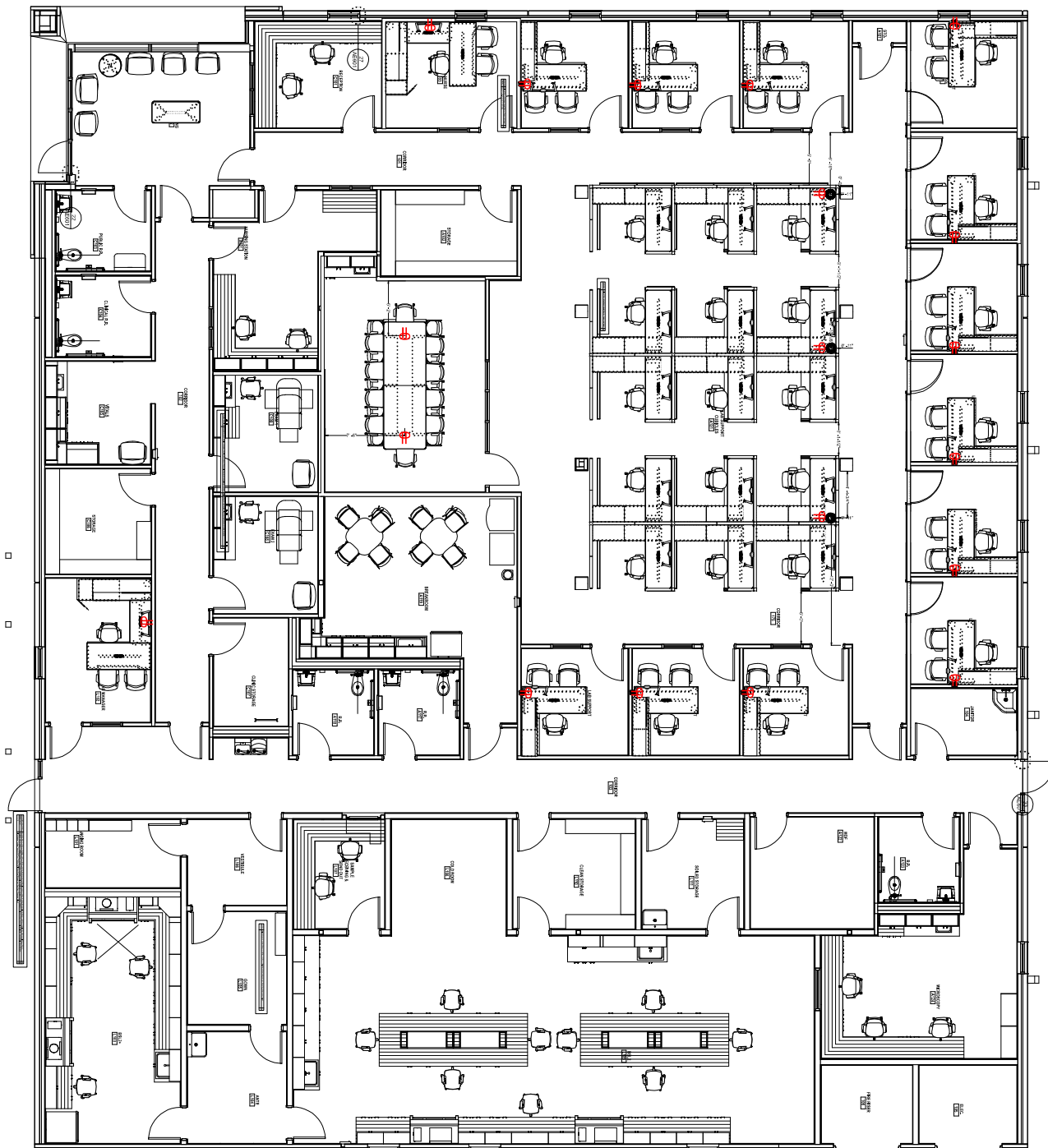
Biosafety Lab Hidalgo County Furniture Proposal

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Designer #2, Name
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Drawing Approved By: _____

DRAWINGS NOT FOR CONSTRUCTION

POWER LOCATION-SUGGESTIONS



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Design[Sales person #2, Name]

DRAWINGS NOT FOR CONSTRUCTION

Drawing Approved By: _____

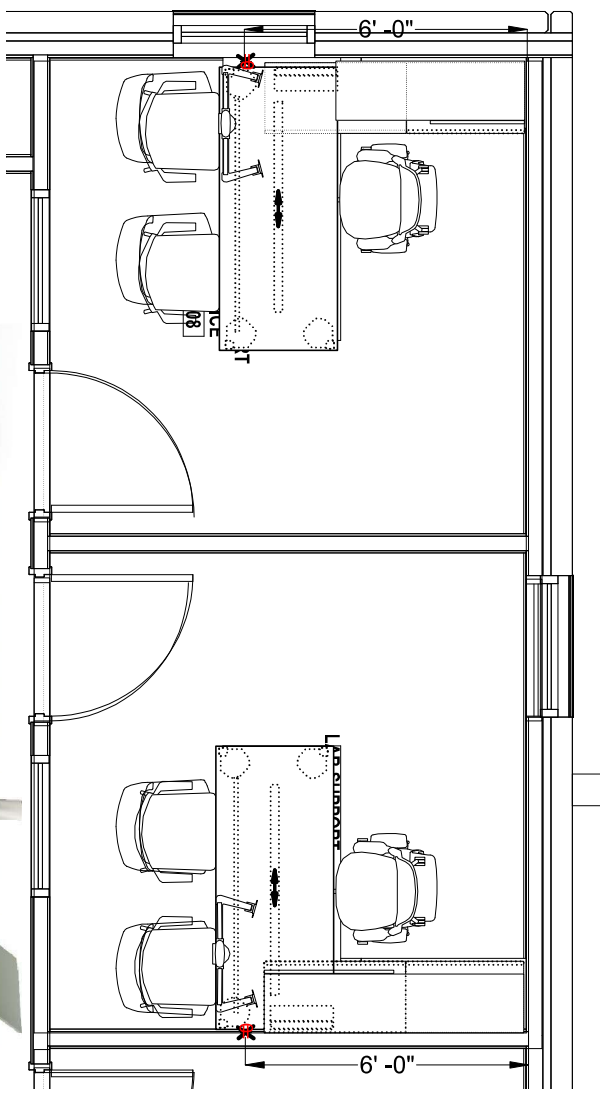
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Biosafety Lab
Hidalgo County
Furniture Proposal

DRAWINGS NOT FOR CONSTRUCTION

POWER LOCATION-SUGGESTIONS

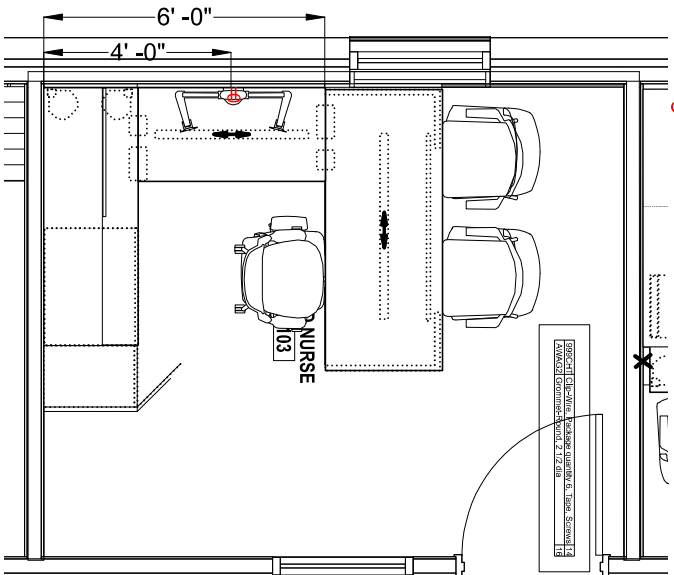
Lab Sport Offices



Instead of having power behind these cabinets and having them pulled away from the wall a few inches, we can shrink the base by 6" and install power roughly 6' from the back wall. The power will be located roughly under the grommet location and the modesty panel will cover some of the wiring.



Manager Offices

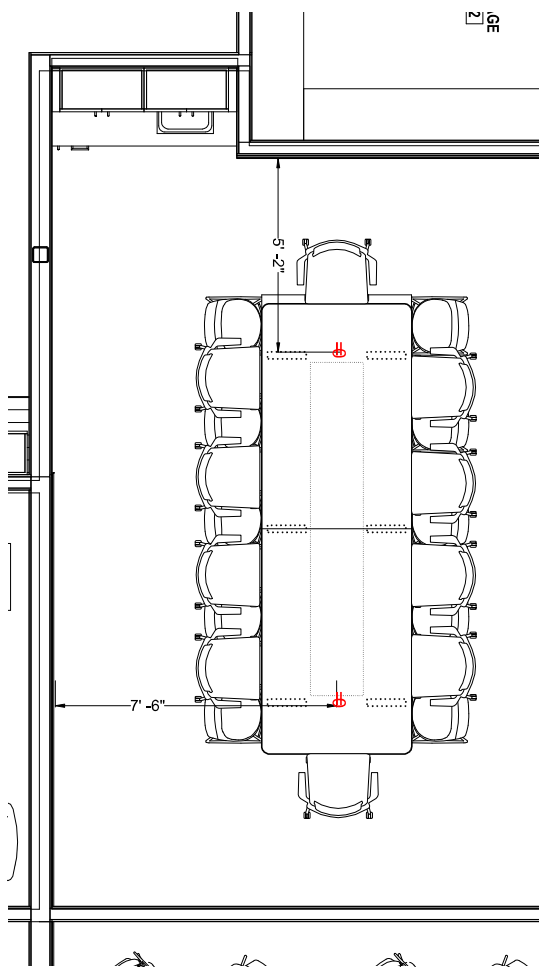


Power will work anywhere along the window wall as long as the power location doesn't go past 6'.

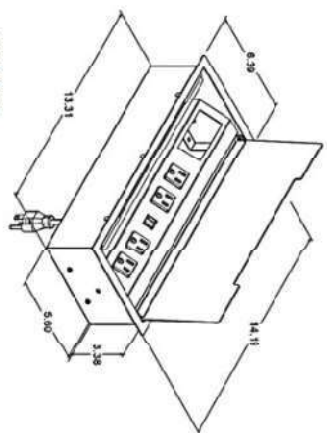


POWER LOCATION-SUGGESTIONS

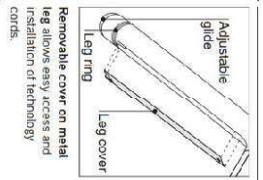
Conference Room



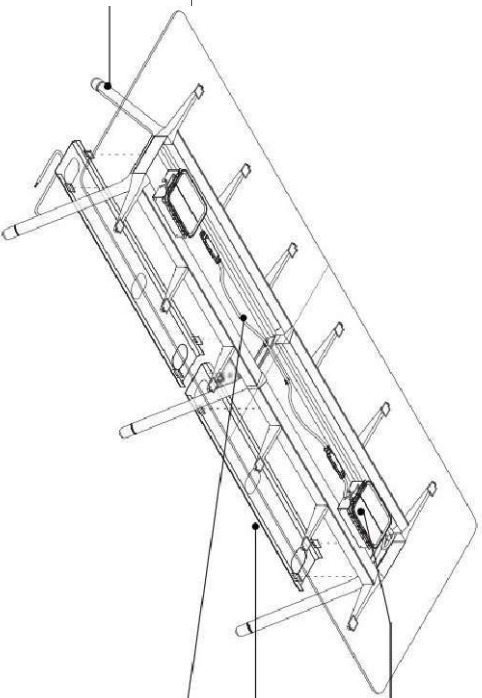
INTERFACE G2 | POWER, USB, DATA, & CONVENIENCE OUTLET



- CONNECTIVITY**
- 15A/20V AC Power Receptacles
 - 2.1A/5V Shared Dual USB Charging Ports - Available On Select Models
 - Convenience Outlet
 - Fully Customizable Telecom Plate Knockouts - Plates Purchased Separately
 - Corded & Hardwired Options



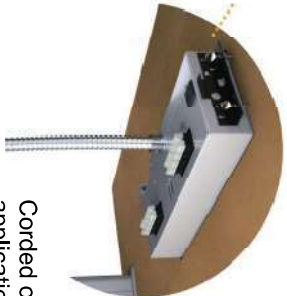
Removable cover on metal leg allows easy access and installation of technology cords.



Accommodates 3 Telecom plates. They are pending selection.



Corded option in this application.



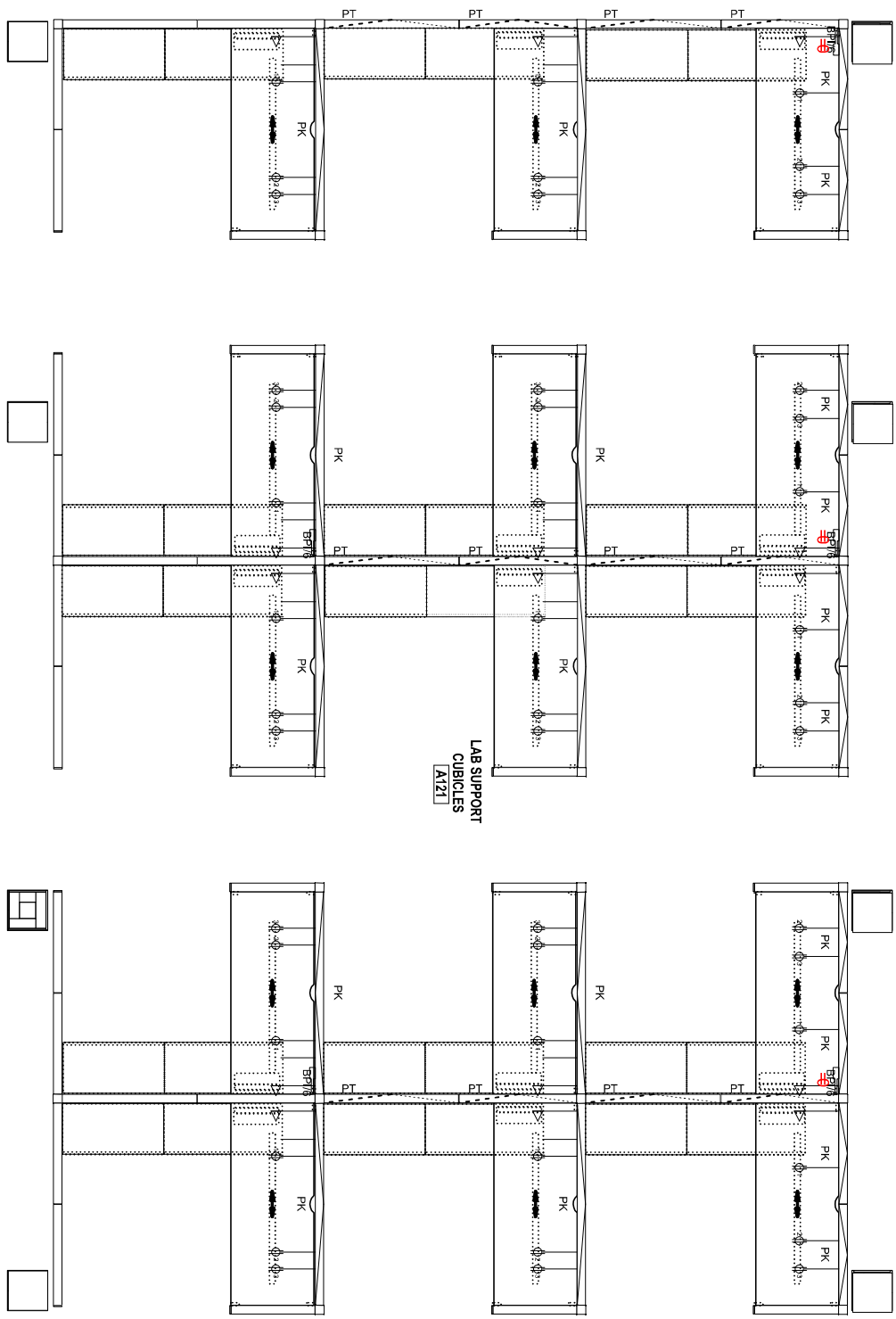
Surface mounted technology devices are available and support power, data and technology needs.

Bottom tray conceals all cords, cables and conduit.

A power harness is concealed within the bottom tray. Drop in technology devices plug into the power harness receptacles.

POWER LOCATION-SUGGESTIONS

Lab Support Cubicles



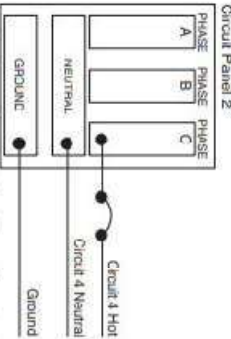
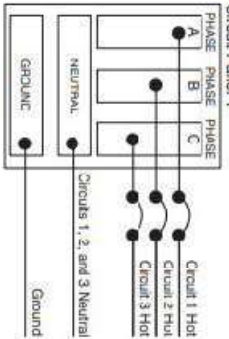
These cubicles are currently on a 3+1 Wiring Schematic. Image below. Each workstation will have 3 receptacles, each receptacle tied to LINE 1, 2 and 3. We will leave LINE 4 alone.

Each LINE provides a total of 15 amps of power per connection to the building. If we plan on one BPI for the 3 pack and one BPI for each 6 pack, the stations should be sufficiently powered.

One caveat, Texas Wilson cannot speak to how those BPI's are wired to the building or tied to themselves. Please consult your electrical team.

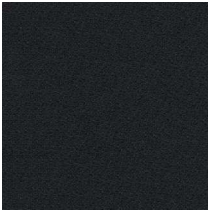
Please let me know if you have a different Wiring plan in the building, like a 2+2 or if you want us to only use certain lines.

Four-Circuit, 3+1

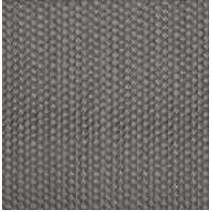


In the four-circuit 3+1 schematic, circuits 1, 2, and 3 are distributed from the first circuit panel and are supported with one shared neutral and one shared ground. Circuit 4 is distributed from a second circuit panel and is supported with a separate neutral and ground.

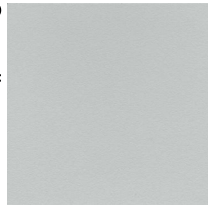
FINISH GUIDE



Buzz2-Tornado
 All Series 1 chairs-seat
 All Move chairs-seat & back
 All Conference chairs-seat & back



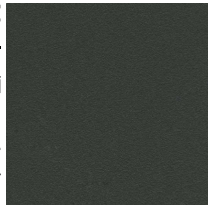
3D Microknit-Graphite
 All Series 1 chairs-mesh back



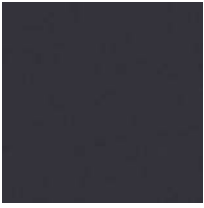
Seagull
 All Series 1 chairs- frame & base



Foundation-Seal
 All Sorrel chairs- seat & back



Merle (Txt paint)
 All Sorrel chairs- frame/legs
 All Baseline tables- legs



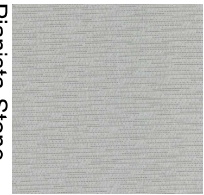
Midnight (txt paint)
 All support legs, end panels and modesty panels in all offices.
 All metal storage in Lab support offices.
 All Cubicle trim and storage pieces.



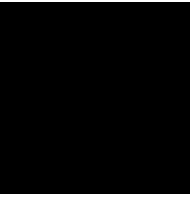
Platinum Metallic
 All Move chairs-metal legs



Clay Noce
 All cubicles- worksurfaces
 All lab support office-overheads & worksurfaces
 Head nurse & Lab Mgr- worksurfaces, overheads & storage
 Conference room-table
 All baseline tables-table tops



Pianista-Stone
 All Answer fabric panels



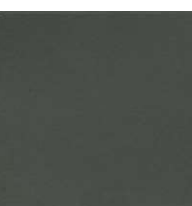
Black
 All Max stackers-plastic back & painted legs
 All Kart chairs in Labs & Exam Rms- base
 All Breakroom tables-Painted base & laminate top



Monorail Gray
 Antimicrobial Lockers



Black Satin
 Exam table vinyl



Midnight Plastic
 All Move chairs-plastic back
 All Kart chairs in Labs & Exam Rms- seat & back

HC Biosafety Lab

County of Hidalgo

S 25th Ave, Edinburg, TX 78542



100% DESIGN DEVELOPMENT

EROS PROJECT #20030

OWNER: County of Hidalgo



COUNTY OF HIDALGO
EDINBURG, TX 78542
TEL: (956) 313-2438

CONSULTANT TEAM:



STRUCTURAL ENGINEER:

ERO ARCHITECTS
10000 W. WYATT
EDINBURG, TX 78542
TEL: (956) 814-0000
WWW.EROSARCHITECTS.COM



MEP ENGINEER:

TRINITY MEP ENGINEERING
10000 W. WYATT
EDINBURG, TX 78542
TEL: (956) 814-0000
WWW.TRINITYMEP.COM



LABORATORY CONSULTANT:

SUPERIOR LABORATORY SERVICES, INC.
10000 W. WYATT
EDINBURG, TX 78542
TEL: (956) 814-0000



CIVIL ENGINEER:

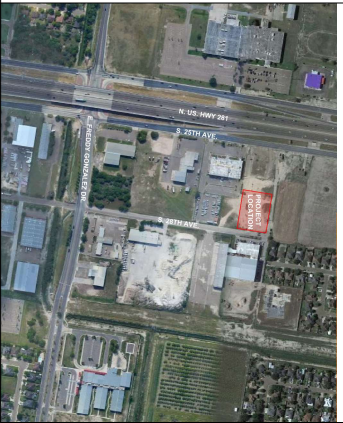
SAMES, INC.
10000 W. WYATT
EDINBURG, TX 78542
TEL: (956) 814-0000
WWW.SAMESINC.COM



LANDSCAPE ARCHITECT:

GRANDVIEW LLC
10000 W. WYATT
EDINBURG, TX 78542
TEL: (956) 304-1113

LOCATION: S 25th Ave, Edinburg, TX 78542



HC Biosafety Lab

County of Hidalgo
S 25th Ave, Edinburg, TX 78542



300 S. 10th Street, Austin, TX 78701
796-8811 | info@eroservices.com



No.	Date	Description

Drawn by: JMM
Checked by: JMM
Reviewed by: JMM
Scale: AS SHOWN
Sheet Name: COVER SHEET
Sheet Number: G1001
Project Name: 100% DESIGN DEVELOPMENT

CODE SUMMARY

PROJECT TITLE: HIDALGO COUNTY BIOSAFETY LAB

BUILDING LOCATION: EDINBURG, TEXAS

PROJECT DESCRIPTION: 4-STORY OFFICE BUILDING WITH LABORATORY FACILITIES.

APPLICABLE CODES

- CITY OF EDINBURG, TX - CODE OF ORDINANCE
- 2018 INTERNATIONAL BUILDING DEVELOPMENT CODE (IBDC)
- 2018 INTERNATIONAL EXISTING BUILDING CODE (IEBC)
- 2018 INTERNATIONAL MECHANICAL CODE (IMC)
- 2018 INTERNATIONAL PLUMBING CODE (IPC)
- 2018 INTERNATIONAL FIRE CODE (IFC)
- 2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
- 2017 NATIONAL ELECTRICAL CODE
- CITY OF EDINBURG UNIMBED DEVELOPMENT CODE - 2007
- 2017 INTERNATIONAL BUILDING DEVELOPMENT CODE - 2007
- 2017 INTERNATIONAL MECHANICAL CODE - 2007
- 2017 INTERNATIONAL PLUMBING CODE - 2007
- 2017 INTERNATIONAL FIRE CODE - 2007
- ALL OTHER APPLICABLE STANDARDS

BUILDING OCCUPANCES

PERMANENT OCCUPANCY: PER SECTION 304.1, BUSINESS GROUP B INCLUDES MECHANICAL, ELECTRICAL, IDF AND IDF ROOMS THAT ARE USED FOR THE PROPERLY FUNCTION OF THE PRINCIPAL OCCUPANCY)

ACCESSORY OCCUPANCY: S-1 (INCLUDES STORAGE LARGER THAN 100 S.F.)

NON-SEPARATED OCCUPANCY: NONE

CONSTRUCTION TYPE: IB

ALLOWABLE BUILDING HEIGHTS AND AREAS

TABULAR ALLOWABLE AREA
 • BUSINESS: 92,000 SF (IBC TABLE 502.2)
 ACTUAL AREA: 10,143 SF
 • BUSINESS

TOTAL ALLOWABLE STORIES (PER 504.4): 4

ACTUAL STORIES: 1

FIRE RESISTANCE RATINGS

OCCUPANCY SEPARATION: NO SEPARATION REQUIRED (509.3)
 CORRIDORS: 0 HR (IBC TABLE 1020.1)
 EXTERIOR WALL RATINGS: NONE (IBC TABLE 802 / TABLE 706.8)
 • REQUIRED FOR FIRE SEPARATION DISTANCE

INTERIOR FINISH RATINGS (IBC 903.13)

EXIT STAIRWAYS, RAVINGS, PASSAGEWAYS: CLASS A OR B
 CORRIDORS: CLASS A, B OR C
 ROOMS AND ENCLOSED SPACES: CLASS A, B OR C

FIRE SAFETY SYSTEMS

AUTOMATIC SPRINKLERS: NOT REQUIRED
 • BUILDING WILL BE EQUIPPED WITH AUTOMATIC SPRINKLER SYSTEM
 STANDPIPE SYSTEM: NOT REQUIRED (IBC 905.3)
 OCCUPANT NOTIFICATION FIRE ALARM SYSTEM: NOT REQUIRED (IBC 907.2.2)
 • BUILDING WILL BE EQUIPPED WITH MANUAL FIRE ALARM SYSTEM

FIRE EXTINGUISHERS: LIMITED AREA COVERAGE
 • MINIMUM RATING: 2.4
 • MAXIMUM AREA PER 4 A EXT.: 11,299 SF
 • MAXIMUM TRAVEL DISTANCE: 75 FT

OCCUPANT LOAD CALCULATIONS FACTORS (IBC TABLE 1004.5)
 BUSINESS: 150 SF / OCCUPANT (GROSS)
 ASSEMBLY (UNCONCENTRATED): 15 SF / OCCUPANT (NET)
 LOCKER ROOMS: 50 SF / OCCUPANT (GROSS)
 STORAGE / MECHANICAL: 300 SF / OCCUPANT (GROSS)
 OCCUPANT LOAD BY CODE: 115

REQUIRED EGRESS WIDTH FACTORS

LEVEL EXITS: 0.15 IN./OCC. (IBC 1005.3.2 EXCEPTION 1)

MINIMUM CLEAR WIDTH

LEVEL EXITS: 32 IN. (IBC 1010.1.1)

CORRIDORS: 44 IN. (IBC TABLE 1020.2)

MEANS OF EGRESS CONCENTRATION

MINIMUM EXIT SEPARATION: IBC 1007.1.1
 • 75 DIAGONAL OF AREA SERVED

MEANS OF EGRESS MARKING ILLUMINATION

EXIT SIGNAGE:
 • CHANGES IN DIRECTION: IBC 1013.1
 • ROOMS WITH 2 OR MORE EXITS: IBC 1013.1
 • SIGNAGE FOR ROOMS: IBC 1013.1
 SIGNAGE ILLUMINATION: INTERNAL / 90 MIN. (IBC 1013.3)

MEANS OF EGRESS ILLUMINATION

INDOOR EXITS: MIN. 1 FOOTCANDLE (IBC 1008.2.1)
 • FLOOR: 0.6 FOOT CANDLE AVG. / 0.06 FOOTCANDLE MIN. (IBC 1008.3.5)
 • DURATION: 90MIN (IBC 1008.3.4)

MAX. TRAVEL DISTANCES

BUSINESS OCCUPANCY:
 • COMMON PATH-OF-TRAVEL: 100FT (IBC TABLE 1008.2.1)
 • TOTAL TRAVEL DISTANCE: 300FT (IBC TABLE 1017.2)

PLUMBING FIXTURE COUNT

RESTROOM CALCULATIONS BY FLOOR	TOTAL NUMBER OF OCCUPANTS	GENDER EQUAL DISTRIBUTION	WATER CLOSETS		LAVATORIES		DRINKING FOUNTAINS	SERVICE SINK
			MALE	FEMALE	MALE	FEMALE		
TOTAL FIXTURE NEEDED (BUSINESS)	115	57.5	2	2	2	2	2	1
TOTAL FIXTURE PROVIDED			2	3	2	3	2	1

PARKING LOT CALCULATION (CITY OF EDINBURG UNIMBED DEVELOPMENT CODE - TABLE 3.201)

(GENERAL 3 SPACES / 1,000 S.F.)
 (MEDICAL OFFICE / CLINIC 5 SPACES / 1,000 S.F.)
 OFFICE AREA: 8,483 S.F.
 PARKING REQUIRED: 26 SPACES
 CLINIC AREA: 1,149 S.F.
 PARKING REQUIRED: 6 SPACES
 TOTAL PARKING REQUIRED: 32 SPACES
 PARKING PROVIDED: 39 SPACES
 ACCESSIBLE PARKING REQUIRED: 2 SPACES
 ACCESSIBLE PARKING PROVIDED: 5 SPACES
 TOTAL PARKING PROVIDED: 44 SPACES



300 S. 29th Street, Austin, TX 78701
 512.966.6100 | ero@erocomm.com

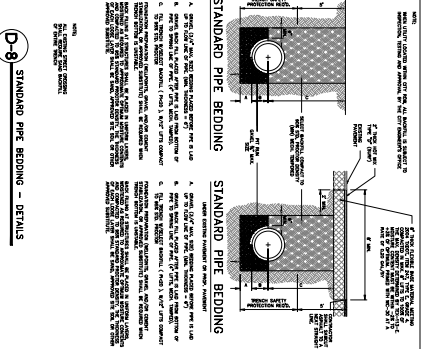
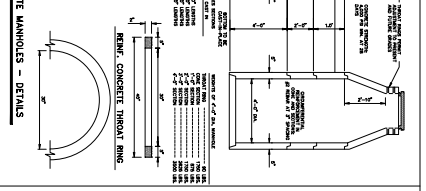
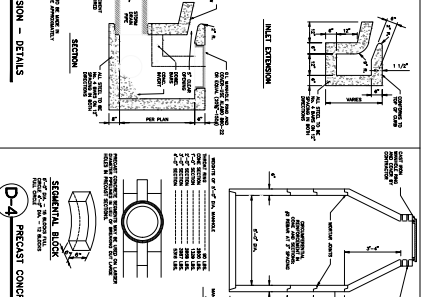
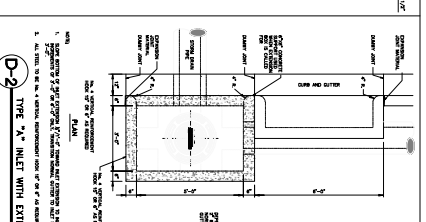
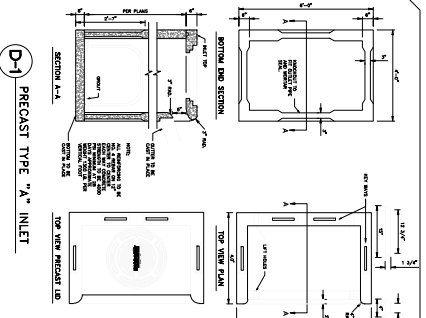
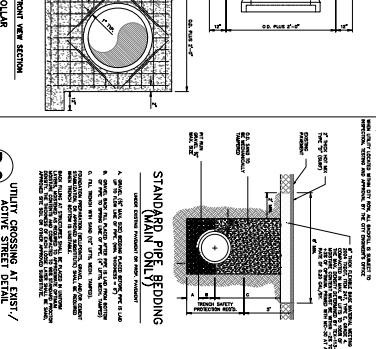
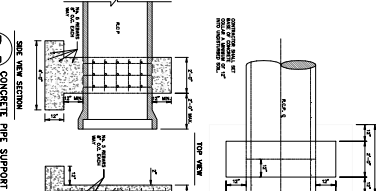
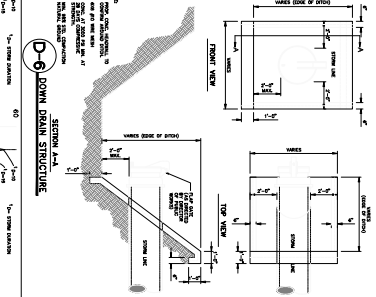
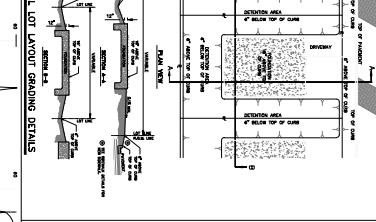
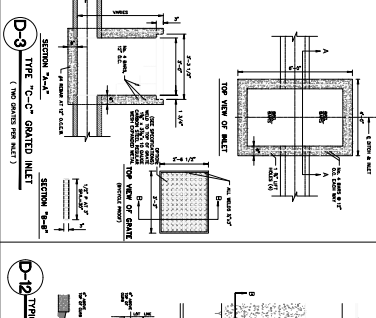
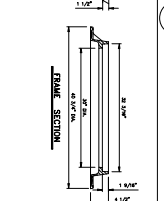
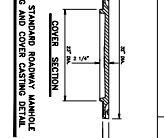
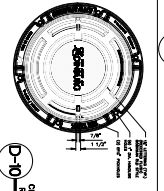
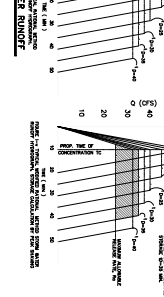
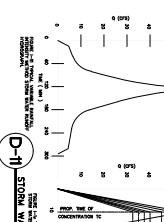
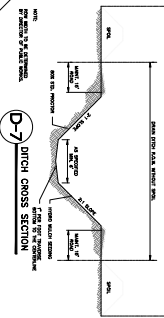
HC Biosafety Lab

County of Hidalgo
 525th Ave, Edinburg, TX 78542

61100

100% EGRESS DEVELOPMENT

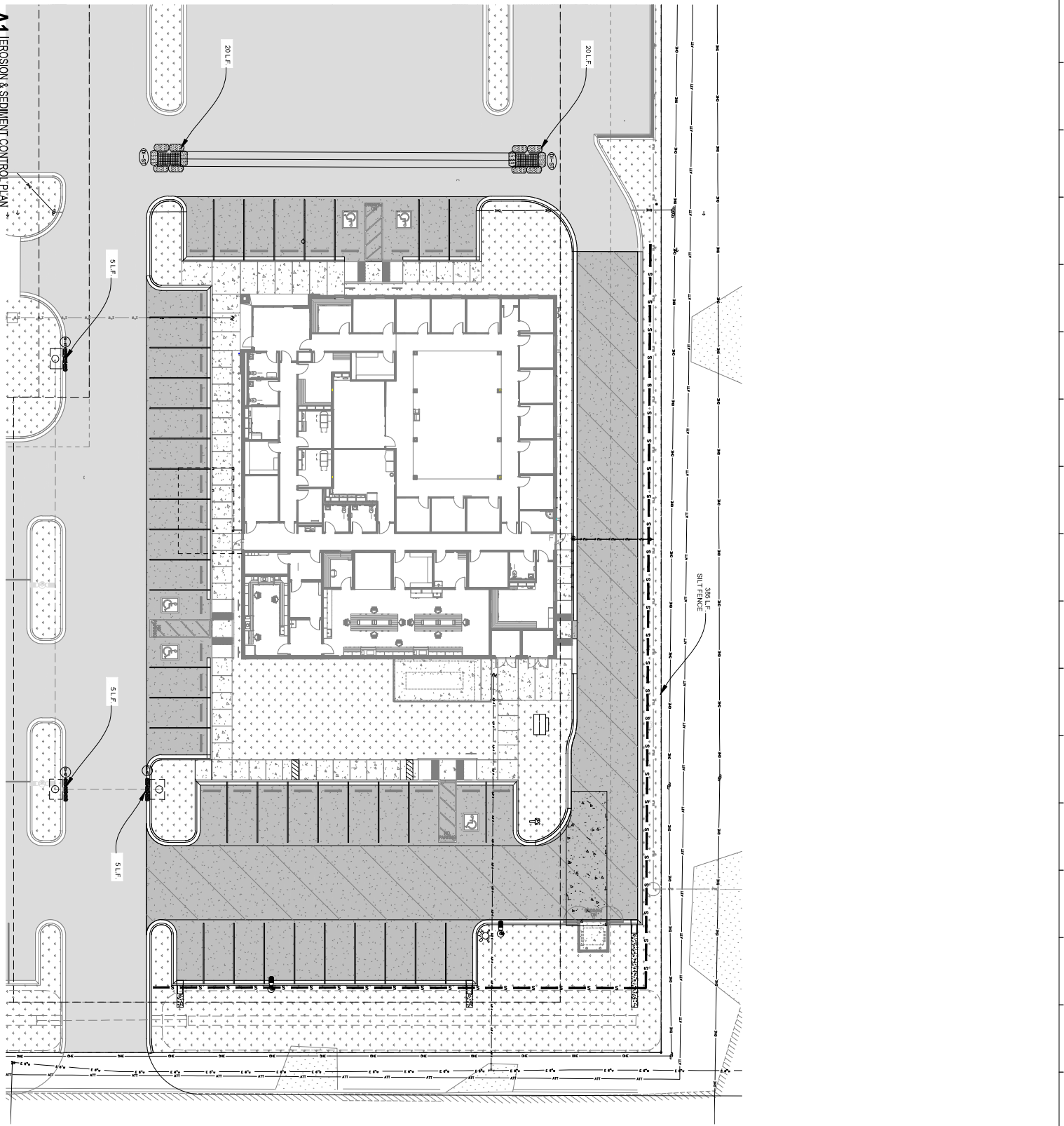
A1 DRAINAGE DETAILS



DATE: MAY 2014
 DRAWN BY: JLN
 CHECKED BY: JLN
 PROJECT NO. 17-10

DRAINAGE SYSTEM
 STANDARD DETAILS

A1 EROSION & SEDIMENT CONTROL PLAN



LEGEND

- SILT FENCE
- STORM WATER PROTECTION
- STORM WATER PROTECTION

SCALE

North Arrow

PROJECT: HC BIOSAFETY LAB
 DATE: 4/25/2021
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

ero

300 E. South, Austin, TX 78701
 799-6611 / 6001 / 6000

S&M Engineering & Surveying, Inc.

10000 Katy Road, Suite 100
 Houston, TX 77024
 281-461-1111

No.	Date	Description

Revised:

6.0

NO. EROSION CONTROL PLAN

LEGEND

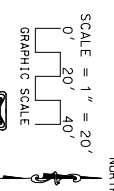
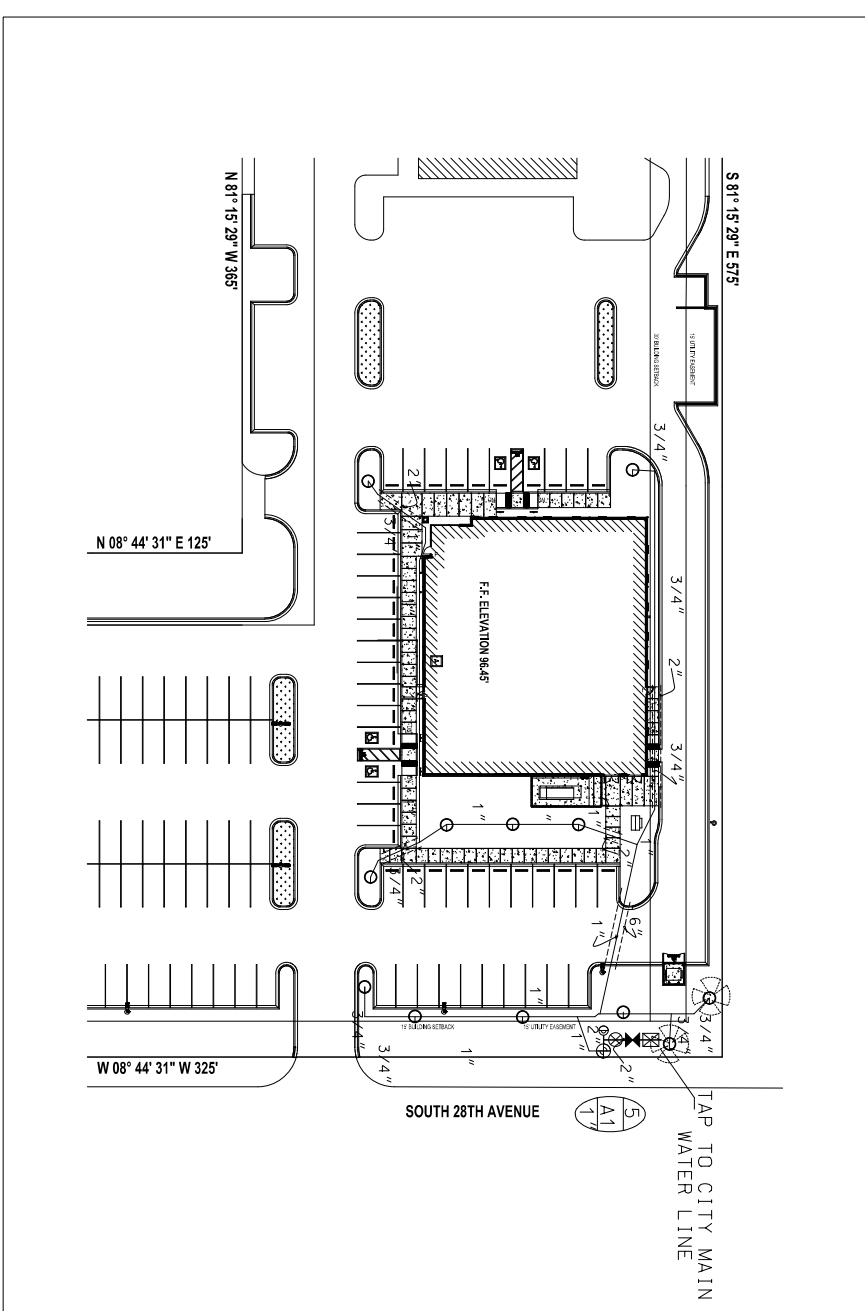
- ☒ 1.5" WATER METER
- ☒ 2" RP BACKFLOW PREVENTION DEVICE WITH GUARDSHACK ENCLOSURE (SEE DETAIL SHEET)
- ⊗ 2" MAIN SHUT-OFF VALVE
- ⊕ RAINBIRD PEB 1" - 2" ELECTRIC REMOTE CONTROL VALVE
- ⊕ RAINBIRD PEB 150-PEB, 150-PEB, 200-PEB
- ⊕ RAIN BIRD SLRC QUICK COUPLING VALVE
- ⊕ RAINBIRD MDC-50 IRRIGATION CONTROLLER WITH WALL MOUNT METAL CABINET AND RAIN SENSOR W/ RAINBIRD DECODER CONTROLLERS TWO WIRE SYSTEM
- ⊕ FD-101TURF TO FD-601TURF AS NEEDED AT EACH VALVE GROUP
- ⊕ FINAL LOCATION TO BE APPROVED BY THE OWNER
- CITY MAIN
- MAINLINE PIPE: CLASS 200 PVC (1 - 3" INCH SIZE)
- LATERAL PIPE: CLASS 200 PVC (SIZED AS SHOWN)
- ⊕ INDICATES LATERAL DISCHARGE IN GPM
- ⊕ INDICATES CONTROLLER AND CONTROLLER STATION NUMBER
- ⊕ INDICATES REMOTE CONTROL VALVE SIZE
- BORING WITH 6" SCH 40 SLEEVE BY CONTRACTOR

CONTRACTOR TO VERIFY 55 PSI STATIC WATER PRESSURE.

○ BUBBLER GPH AT EACH TREE WELL (OR EQUIV.)

NAME	GPH
LIVE OAK	30
MONTEZUMA BALD CYPRESS	30
BUR OAK	30
ROYAL POINCIANA	30
MEXICAN WILD OLIVE	15
TEXAS MT. LAUREL	15
TEXAS PERSIMMON	15
GRAPE MYRTLE	15

PCN - .50
.5 GPM
PCN - .25
.25 GPM



HC Biosafety Lab

Hidalgo County Health Department
S 25th Ave, Edinburg TX 78542



THE ENGINEER HAS REVIEWED THE PLANS AND SPECIFICATIONS AND FINDS THEM TO BE IN ACCORDANCE WITH THE CITY OF EDINBURG SPECIFICATIONS AND STANDARDS. THE ENGINEER'S REVIEW IS LIMITED TO THE TECHNICAL ASPECTS OF THE PLANS AND DOES NOT CONSTITUTE A GUARANTEE OF THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED HEREON.

NEIL D. OBERLANDER
Professional Engineer
Mechanical
License No. 10422
State of Texas

INVESTIGATION REPORT
L105

LEGEND

- ☒ 1" WATER METER
- ☒ 1" RP BACKFLOW PREVENTION DEVICE WITH GUARDSHACK ENCLOSURE (SEE DETAIL SHEET)
- ☒ 1" MAIN SHUT-OFF VALVE
- ☒ RAINBIRD PER 1" ELECTRIC REMOTE CONTROL VALVE 100-PEB
- ☒ RAIN BRD SLRC QUICK COUPLING VALVE
- ☒ RAINBIRD ESP-LX IRRIGATION CONTROLLER TWO WIRE SYSTEM W/S STATIONS EXPANDABLE WITH WALL MOUNT METAL CABINET, RAIN-CLICK RAIN SENSOR AND VALVE DECODERS VERIFY FINAL LOCATION WITH OWNER.
- CITY MAIN
- MAINLINE PIPES: CLASS 200 PVC (1" - 3" INCH SIZE)
- LATERAL PIPES: CLASS 200 PVC (SIZED AS SHOWN)
- Ⓜ INDICATES LATERAL DISCHARGE IN GPM
- Ⓜ INDICATES CONTROLLER AND CONTROLLER STATION NUMBER
- Ⓜ INDICATES REMOTE CONTROL VALVE SIZE
- BORING WITH 2", 4" OR 6" SCH. 40 SLEEVE BY CONTRACTOR

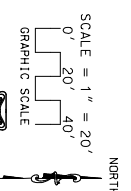
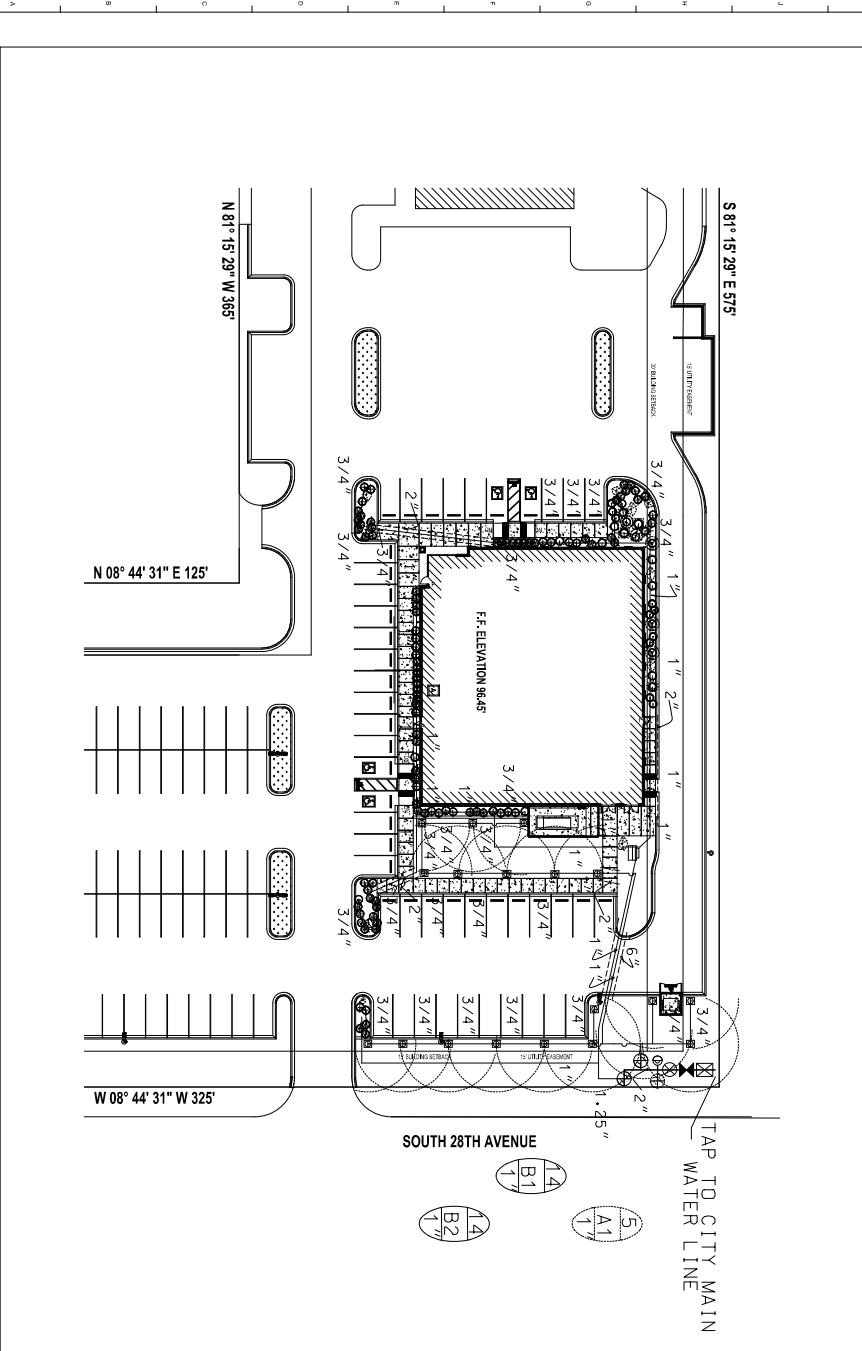
☉ BUBBLER GPH AT EACH TREE WELL (FOR EQUIL)

NAME	GPH
YAUPON HOLL Y	5
ESPERANZA	5
SOPHOMED TUCCA	5
GREEN CLOUD SEGE (GENIZO)	5
DWARF POWDER PUFF	5
RED TUCCA	5
TEXAS LANTANA	5
MEX. FRETCHACKER	5
ROSMARY	5

PN - 25
.25 GPM
1401 RAINBIRD



CONTRACTOR TO VERIFY 55 PSI STATIC WATER PRESSURE.



HC Biosafety Lab

Hidalgo County Health Department
S 25th Ave, Edinburg TX 78542



Project Name: **L106**

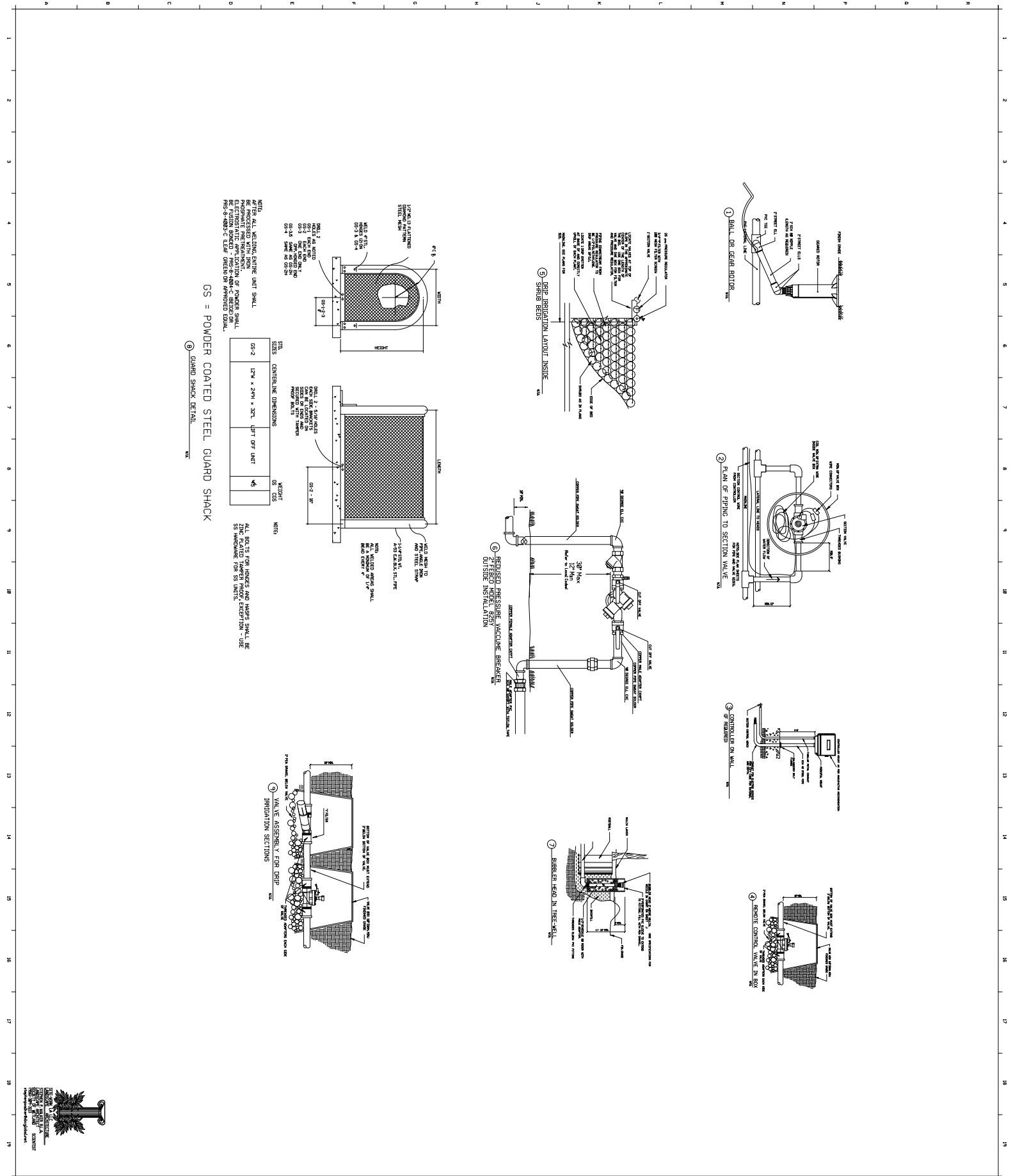
Project Location: **HC Biosafety Lab**

Project Description: **IRRIGATION LAYOUT**

Scale: **1" = 20'**

Revision History:

Rev	Date	Description



Date	Description

Sheet Number: **L107**

Project: **HC Biosafety Lab**

Revision: **10/20/2018**

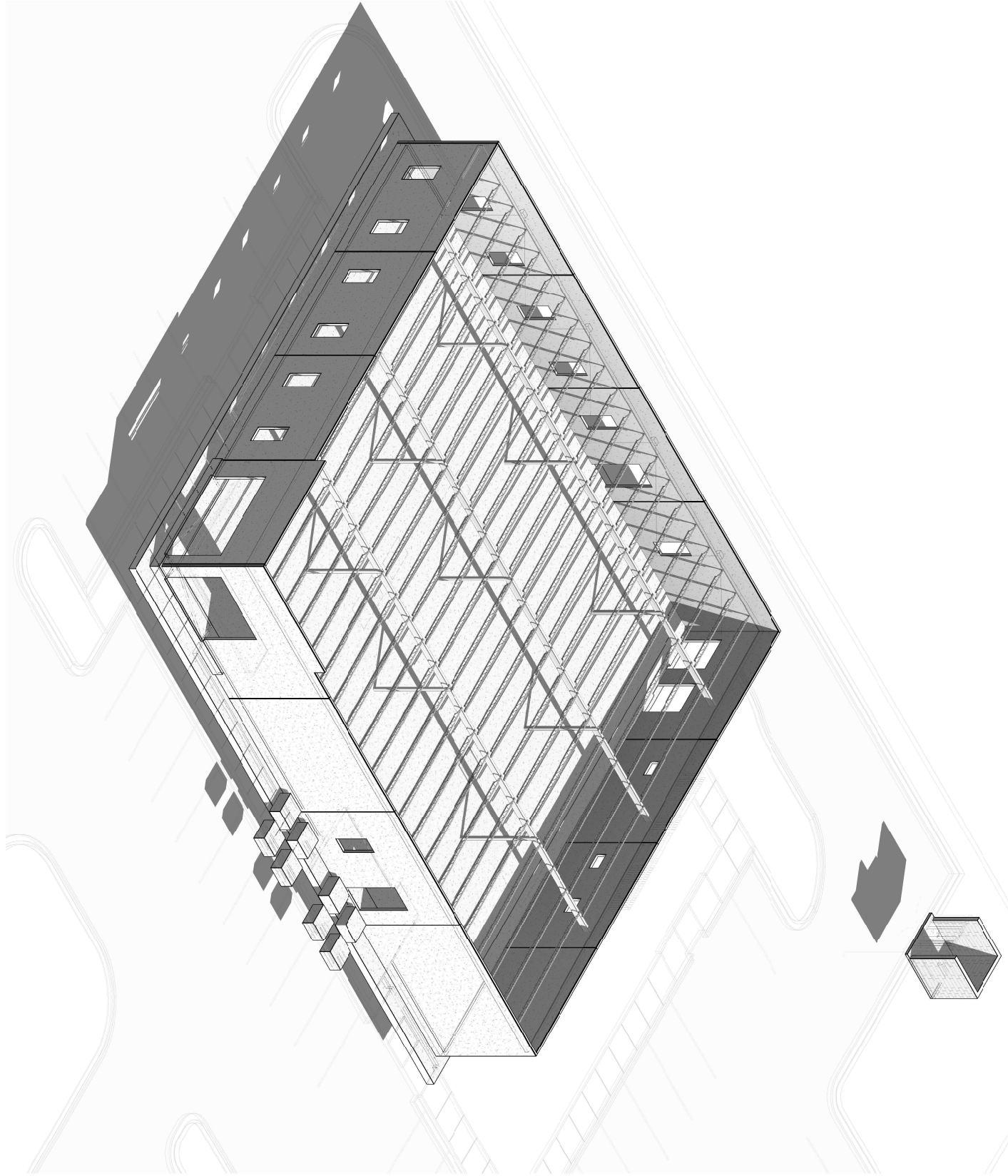
HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg TX 78542

WELDON CONSULTING
 10000 WELDON DRIVE
 WELDON, TEXAS 77882
 TEL: 361-250-1100
 WWW.WELDONCONSULTING.COM

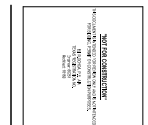


A1 | COVER SHEET



HC Biosafety Lab

County of Hidalgo
S 25th Ave, Edinburg, TX 78542



Revised	By	Description
4		

Final Review: _____
 Prepared by: **SG000**
 Project Name: "HC Biosafety Lab"
 Project Location: "COUNTY OF HIDALGO"
 Date: _____
 Scale: _____
 Drawing Title: COVER SHEET

A1 | LIVE LOAD PLAN



LIVE LOAD LEGEND:

- 4000
- 3000
- 2000
- 1000
- 500
- 0

Revision	Date	Description

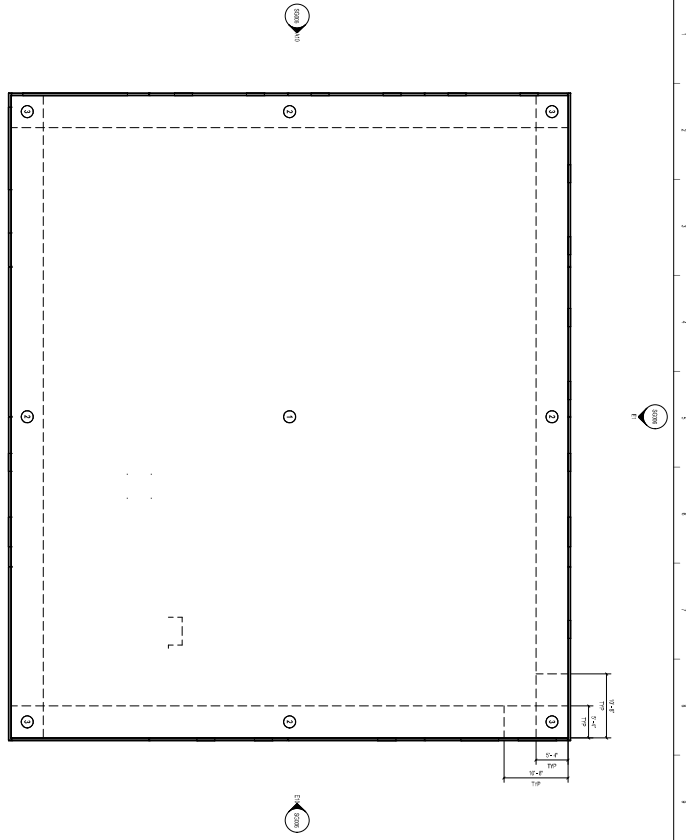
Project Name: **HC005**
 Project Location: **HC Bio Safety Lab**
 Project Number: **000-000-000-000-0000**
 Project Date: **01/23/23**
 Project Status: **05**
 Project Type: **STRUCT**
 Project Description: **LIVE LOAD PLAN**

HC Biosafety Lab

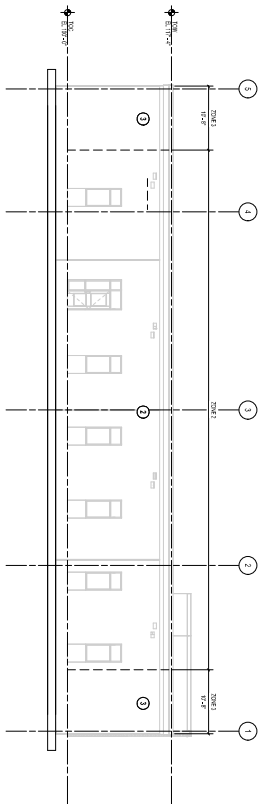
County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

ARCHITECT
 PROJECT ARCHITECT
 PROJECT NUMBER
 PROJECT DATE
 PROJECT STATUS

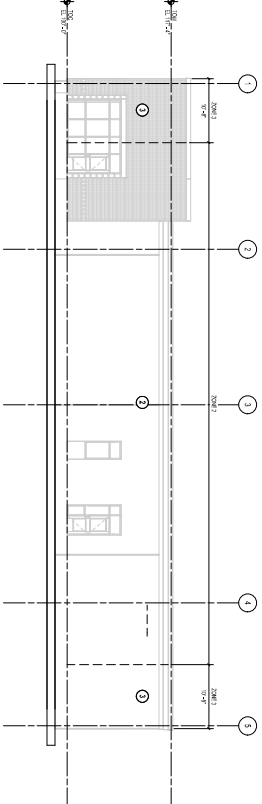
ero
 2024 So. Pearl, Austin, TX 78702
 P: 512.480.1111
 F: 512.480.1111
 E: info@erodesign.com



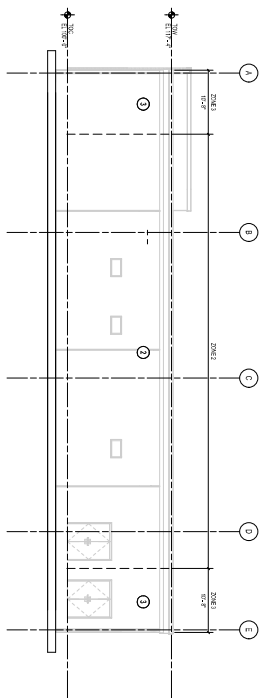
J1 | WIND LOAD DIAGRAM



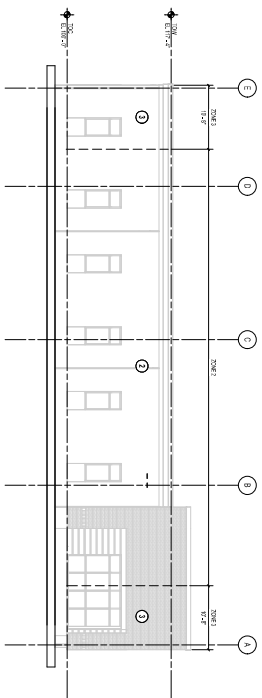
E1 | NORTH ELEVATION



A1 | SOUTH ELEVATION



E10 | EAST ELEVATION



A10 | WEST ELEVATION

HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

ARCHITECT
 HOK
 10000 Katy Road, Suite 1000
 Houston, TX 77058
 (713) 865-1000
 www.hok.com

ero
 2024 So. Pecos, Midland, TX 79701
 (409) 584-8444 | erteam.com

Final Review
 Project Name: **SC006**
 100% DESIGN DEVELOPMENT

Date	Description

PROJECT NO: 2020-000000
 PROJECT NAME: HC BIOSAFETY LAB
 SHEET NO: 05
 DATE: 03/03/2023
 WIND LOAD DIAGRAM

HC Biosafety Lab

County of Hidalgo
S 25th Ave, Edinburg, TX 78542

D1 TYPICAL STANDARD HOOKS AND BENDS

D5 TYPICAL DEVELOPMENT OF WELDABLE REINFORCING

REINFORCEMENT SCHEDULE

BAR SIZE	BAR NUMBER	BAR SPACING	BAR LENGTH	BAR WEIGHT
#4	1	12"	12.00'	1.66
#4	2	12"	12.00'	1.66
#4	3	12"	12.00'	1.66
#4	4	12"	12.00'	1.66
#4	5	12"	12.00'	1.66
#4	6	12"	12.00'	1.66
#4	7	12"	12.00'	1.66
#4	8	12"	12.00'	1.66
#4	9	12"	12.00'	1.66
#4	10	12"	12.00'	1.66
#4	11	12"	12.00'	1.66
#4	12	12"	12.00'	1.66
#4	13	12"	12.00'	1.66
#4	14	12"	12.00'	1.66
#4	15	12"	12.00'	1.66
#4	16	12"	12.00'	1.66
#4	17	12"	12.00'	1.66
#4	18	12"	12.00'	1.66
#4	19	12"	12.00'	1.66
#4	20	12"	12.00'	1.66
#4	21	12"	12.00'	1.66
#4	22	12"	12.00'	1.66
#4	23	12"	12.00'	1.66
#4	24	12"	12.00'	1.66
#4	25	12"	12.00'	1.66
#4	26	12"	12.00'	1.66
#4	27	12"	12.00'	1.66
#4	28	12"	12.00'	1.66
#4	29	12"	12.00'	1.66
#4	30	12"	12.00'	1.66
#4	31	12"	12.00'	1.66
#4	32	12"	12.00'	1.66
#4	33	12"	12.00'	1.66
#4	34	12"	12.00'	1.66
#4	35	12"	12.00'	1.66
#4	36	12"	12.00'	1.66
#4	37	12"	12.00'	1.66
#4	38	12"	12.00'	1.66
#4	39	12"	12.00'	1.66
#4	40	12"	12.00'	1.66
#4	41	12"	12.00'	1.66
#4	42	12"	12.00'	1.66
#4	43	12"	12.00'	1.66
#4	44	12"	12.00'	1.66
#4	45	12"	12.00'	1.66
#4	46	12"	12.00'	1.66
#4	47	12"	12.00'	1.66
#4	48	12"	12.00'	1.66
#4	49	12"	12.00'	1.66
#4	50	12"	12.00'	1.66

G1 TYPICAL FACE BAR PLACEMENT SCHEDULE FOR CONCRETE BEAMS GREATER THAN OR EQUAL TO 3 FEET

REINFORCEMENT SCHEDULE

BEAM WIDTH	FACE BAR SIZE	FACE BAR NUMBER	FACE BAR SPACING	FACE BAR LENGTH	FACE BAR WEIGHT
12"	#4	2	12"	12.00'	1.66
14"	#4	2	12"	12.00'	1.66
16"	#4	2	12"	12.00'	1.66
18"	#4	2	12"	12.00'	1.66
20"	#4	2	12"	12.00'	1.66
22"	#4	2	12"	12.00'	1.66
24"	#4	2	12"	12.00'	1.66
26"	#4	2	12"	12.00'	1.66
28"	#4	2	12"	12.00'	1.66
30"	#4	2	12"	12.00'	1.66
32"	#4	2	12"	12.00'	1.66
34"	#4	2	12"	12.00'	1.66
36"	#4	2	12"	12.00'	1.66
38"	#4	2	12"	12.00'	1.66
40"	#4	2	12"	12.00'	1.66
42"	#4	2	12"	12.00'	1.66
44"	#4	2	12"	12.00'	1.66
46"	#4	2	12"	12.00'	1.66
48"	#4	2	12"	12.00'	1.66
50"	#4	2	12"	12.00'	1.66
52"	#4	2	12"	12.00'	1.66
54"	#4	2	12"	12.00'	1.66
56"	#4	2	12"	12.00'	1.66
58"	#4	2	12"	12.00'	1.66
60"	#4	2	12"	12.00'	1.66
62"	#4	2	12"	12.00'	1.66
64"	#4	2	12"	12.00'	1.66
66"	#4	2	12"	12.00'	1.66
68"	#4	2	12"	12.00'	1.66
70"	#4	2	12"	12.00'	1.66
72"	#4	2	12"	12.00'	1.66
74"	#4	2	12"	12.00'	1.66
76"	#4	2	12"	12.00'	1.66
78"	#4	2	12"	12.00'	1.66
80"	#4	2	12"	12.00'	1.66
82"	#4	2	12"	12.00'	1.66
84"	#4	2	12"	12.00'	1.66
86"	#4	2	12"	12.00'	1.66
88"	#4	2	12"	12.00'	1.66
90"	#4	2	12"	12.00'	1.66
92"	#4	2	12"	12.00'	1.66
94"	#4	2	12"	12.00'	1.66
96"	#4	2	12"	12.00'	1.66
98"	#4	2	12"	12.00'	1.66
100"	#4	2	12"	12.00'	1.66

A1 TYPICAL CONCRETE REINFRANT CORNER

A4 TYPICAL SLAB-ON-GRADE PROFILE

A7 TYPICAL SLAB-ON-GRADE CONSTRUCTION JOINT

A10 TYPICAL SLAB-ON-GRADE CONTRACTION JOINTS

A13 TYPICAL GRADE BEAM CONSTRUCTION JOINTS

A17 TYPICAL STIRRUPS

NOTES

1. ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
3. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
4. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
6. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
8. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
9. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
10. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.

REVISIONS

NO.	DATE	DESCRIPTION
01	08/20/2020	ISSUE FOR PERMIT
02	08/20/2020	ISSUE FOR PERMIT
03	08/20/2020	ISSUE FOR PERMIT
04	08/20/2020	ISSUE FOR PERMIT
05	08/20/2020	ISSUE FOR PERMIT
06	08/20/2020	ISSUE FOR PERMIT
07	08/20/2020	ISSUE FOR PERMIT
08	08/20/2020	ISSUE FOR PERMIT
09	08/20/2020	ISSUE FOR PERMIT
10	08/20/2020	ISSUE FOR PERMIT

PROJECT INFORMATION

Project Name: HC Biosafety Lab
 Project Number: SC007
 Project Location: 25th Ave, Edinburg, TX 78542
 Project Status: ISSUED FOR PERMIT

PRE-ENGINEERED STEEL CONNECTIONS:

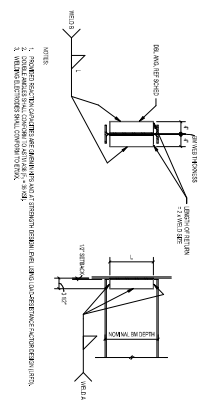
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4. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
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8. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
9. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
10. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.

SECTION	DESCRIPTION	UNIT	VALUE
GENERAL DIMENSIONS	DEPTH	INCHES	14
	WIDTH	INCHES	14
BOLT DIMENSIONS	DIAMETER	INCHES	1/2
	LENGTH	INCHES	3
WELD DIMENSIONS	WELD TYPE		E70
	WELD SIZE	INCHES	1/4



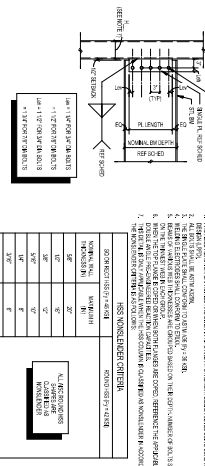
G12 TYPICAL NOMINAL BOLT-HOLE DIMENSIONS

G7 TYPICAL PRE-ENGINEERED ALL-WELDED DOUBLE ANGLE CONNECTION



SECTION	DESCRIPTION	UNIT	VALUE
GENERAL DIMENSIONS	DEPTH	INCHES	14
	WIDTH	INCHES	14
BOLT DIMENSIONS	DIAMETER	INCHES	1/2
	LENGTH	INCHES	3
WELD DIMENSIONS	WELD TYPE		E70
	WELD SIZE	INCHES	1/4

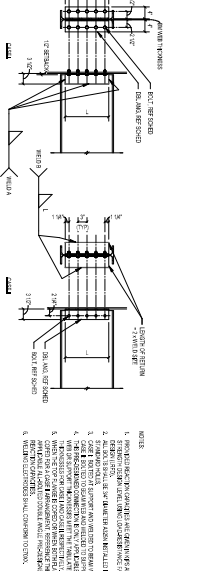
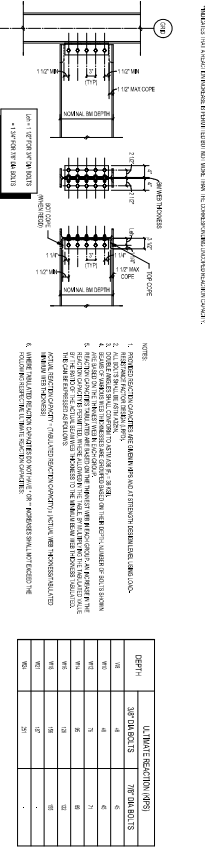
G1 TYPICAL PRE-ENGINEERED SINGLE PLATE AT HSS COLUMN CONNECTION



SECTION	DESCRIPTION	UNIT	VALUE
GENERAL DIMENSIONS	DEPTH	INCHES	14
	WIDTH	INCHES	14
BOLT DIMENSIONS	DIAMETER	INCHES	1/2
	LENGTH	INCHES	3
WELD DIMENSIONS	WELD TYPE		E70
	WELD SIZE	INCHES	1/4

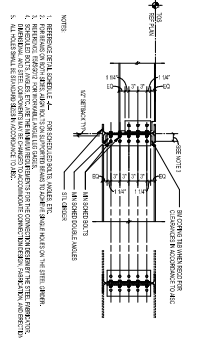
SECTION	DESCRIPTION	SHEAR BOLT		TENSION BOLT		TENSILE ANGLE		TENSILE PLATE	
		AREA	STRENGTH	AREA	STRENGTH	AREA	STRENGTH	AREA	STRENGTH
1
2
3
4
5
6
7
8
9
10

SECTION	DESCRIPTION	SHEAR BOLT		TENSION BOLT		TENSILE ANGLE		TENSILE PLATE	
		AREA	STRENGTH	AREA	STRENGTH	AREA	STRENGTH	AREA	STRENGTH
1
2
3
4
5
6
7
8
9
10

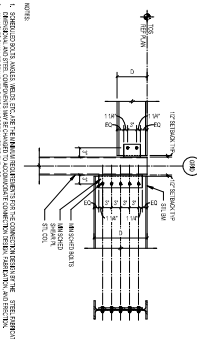


A9 TYPICAL PRE-ENGINEERED ALL-BOLTED DOUBLE ANGLE CONNECTION

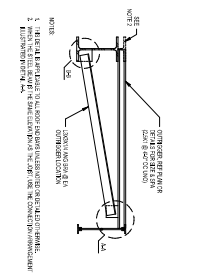
A1 TYPICAL PRE-ENGINEERED BOLTED WELDED DOUBLE ANGLE CONNECTION



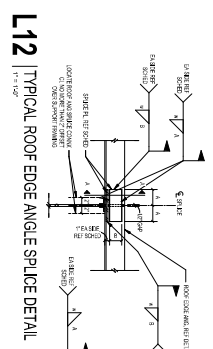
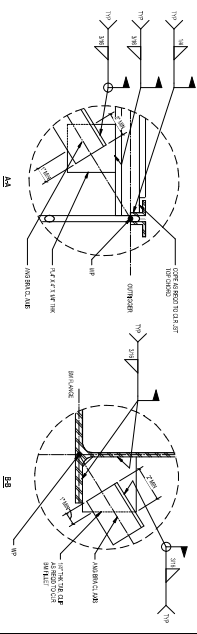
P1 TYPICAL STEEL BEAM TO STEEL GIRDER CONNECTION



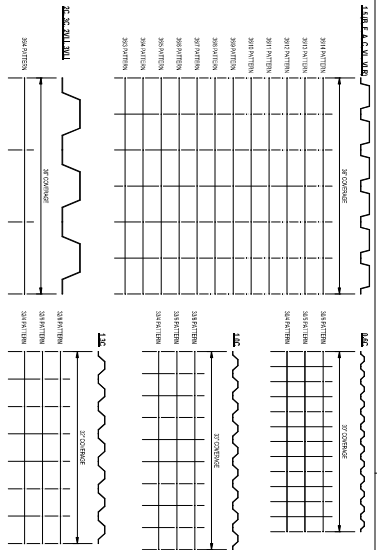
P6 TYPICAL STEEL BEAM TO COLUMN SIMPLE SHEAR PLATE CONNECTION



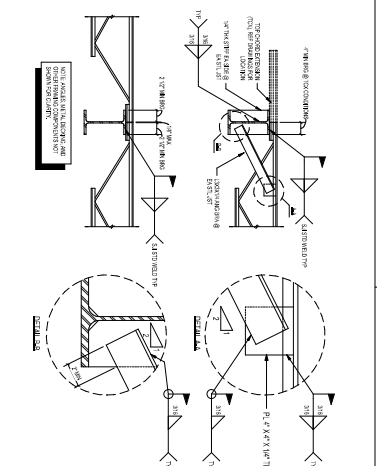
P10 TYPICAL END BAY STEEL JOIST PARALLEL TO STEEL BEAM OUTRIGGER CONNECTION



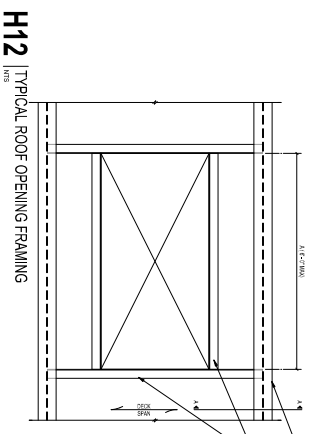
ROOF EDGE ANGLE SCHEDULE					
WELD	THICK	W/TH	W/HT	W/HT	W/HT
100	1/2"	1/2"	1/2"	1/2"	1/2"
125	3/8"	3/8"	3/8"	3/8"	3/8"
150	3/8"	3/8"	3/8"	3/8"	3/8"
175	3/8"	3/8"	3/8"	3/8"	3/8"
200	3/8"	3/8"	3/8"	3/8"	3/8"
225	3/8"	3/8"	3/8"	3/8"	3/8"
250	3/8"	3/8"	3/8"	3/8"	3/8"



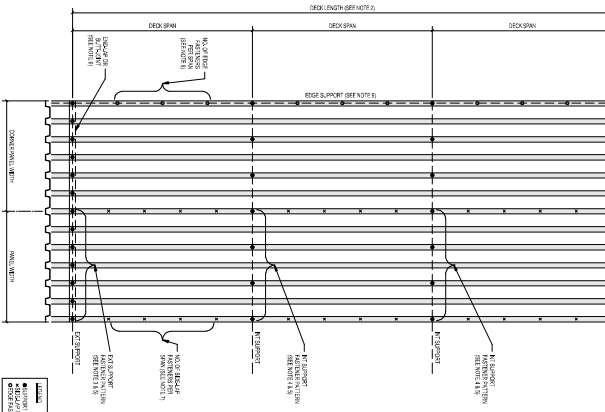
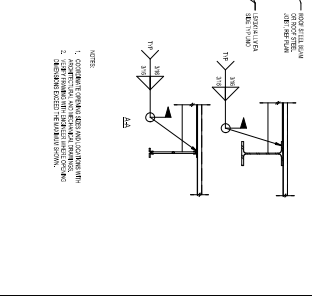
J1 TYPICAL METAL DECKING SUPPORT FASTENER PATTERNS



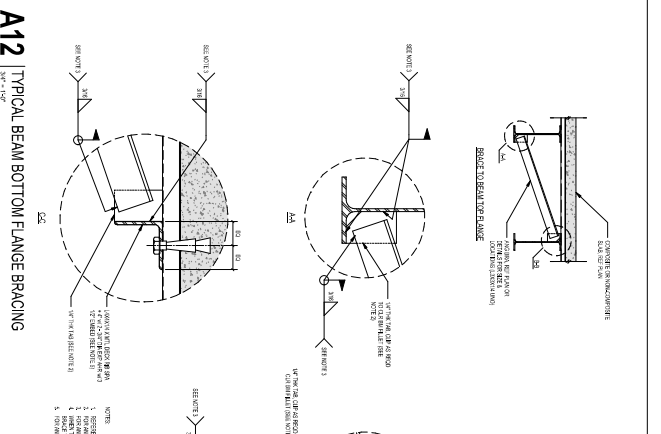
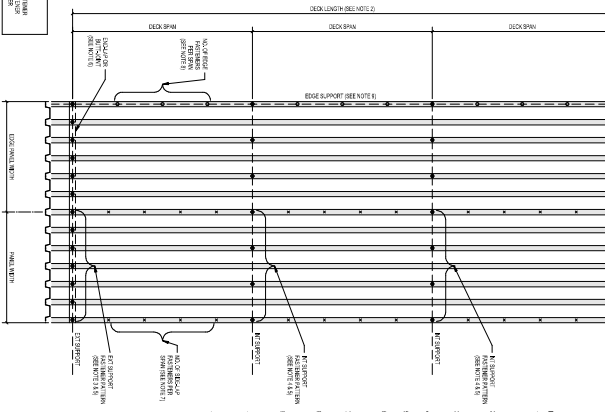
J7 TYPICAL STEEL JOIST TO STEEL BEAM CONNECTION



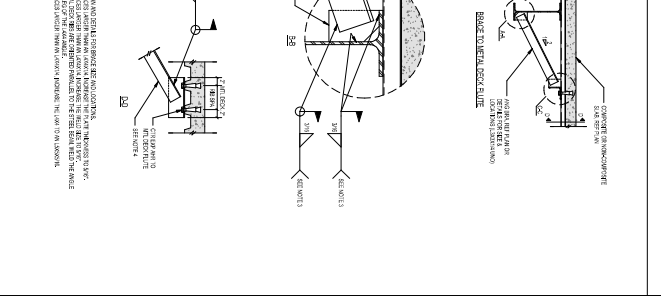
H12 TYPICAL ROOF OPENING FRAMING

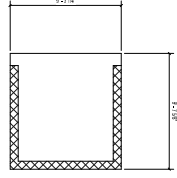


A1 TYPICAL METAL DECKING ATTACHMENT DIAGRAM

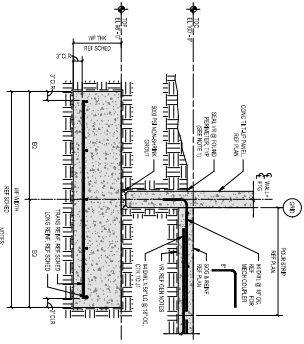


A12 TYPICAL BEAM BOTTOM FLANGE BRACING



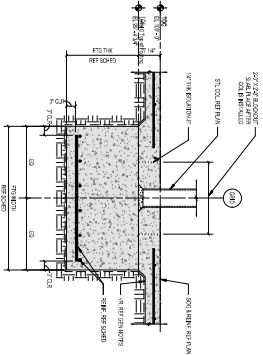


E1 | DUMPSTER ENCLOSURE FOUNDATION PLAN
 1/8" = 1'-0"

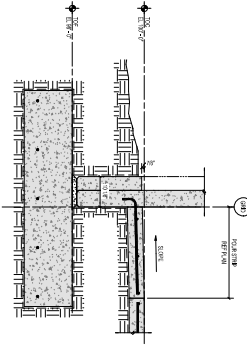


A1 | SB FS 01
 1/8" = 1'-0"

1. FOUNDATION SHALL BE CONCRETE ON GRAVEL. THE FOUNDATION SHALL BE CONCRETE ON GRAVEL. THE FOUNDATION SHALL BE CONCRETE ON GRAVEL.

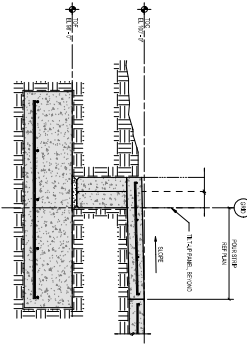


A5 | FOUNDATION SECTION
 1/8" = 1'-0"



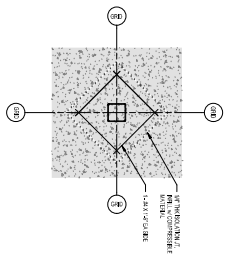
A9 | SB FS 02
 1/8" = 1'-0"

2. FOUNDATION SHALL BE CONCRETE ON GRAVEL. THE FOUNDATION SHALL BE CONCRETE ON GRAVEL. THE FOUNDATION SHALL BE CONCRETE ON GRAVEL.



A13 | SB FS 03
 1/8" = 1'-0"

2. FOUNDATION SHALL BE CONCRETE ON GRAVEL. THE FOUNDATION SHALL BE CONCRETE ON GRAVEL. THE FOUNDATION SHALL BE CONCRETE ON GRAVEL.



A17 | WALL LAYOUT PLAN DETAIL 1
 1/8" = 1'-0"

HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

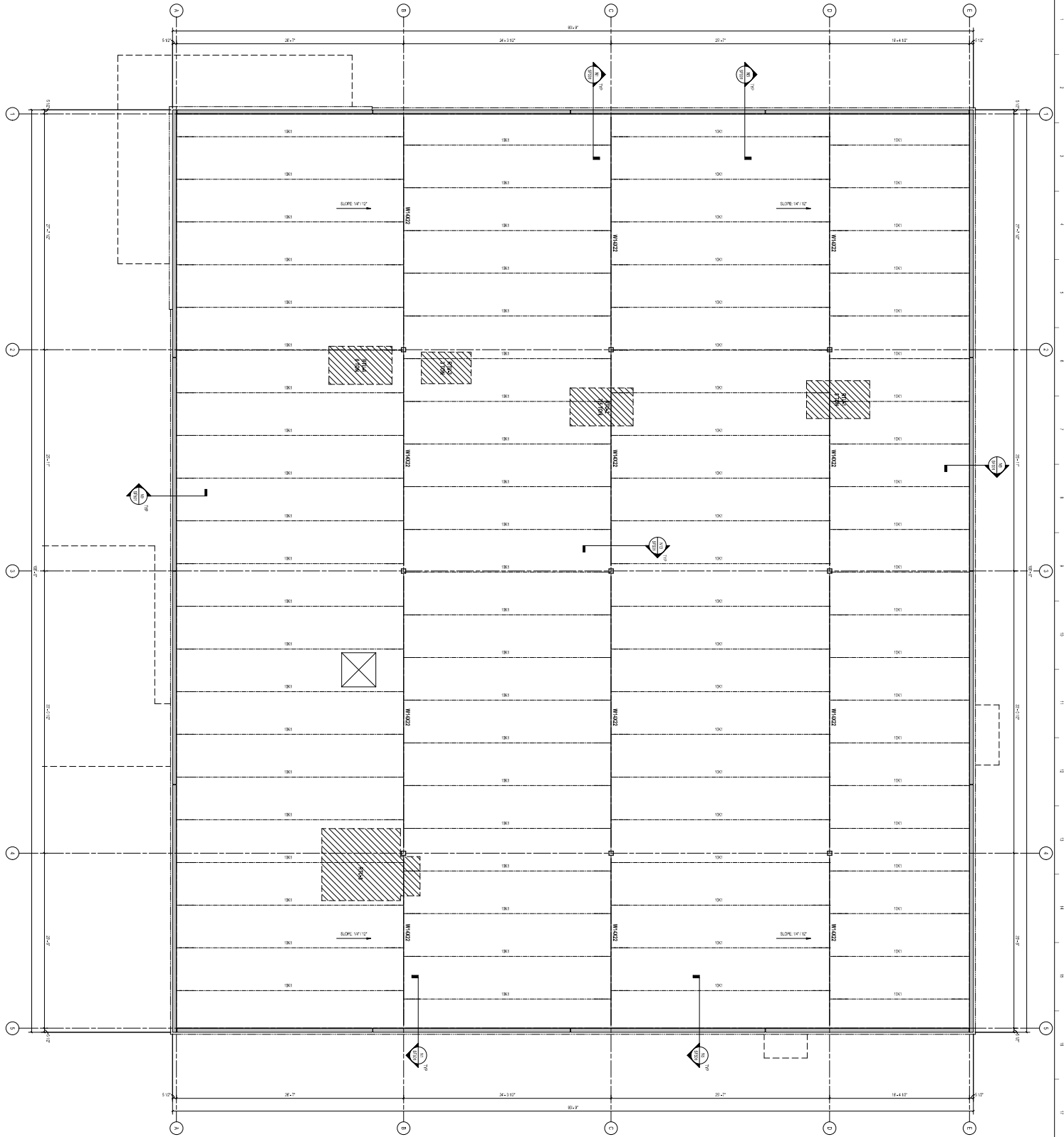


2024 E. Paul Mueller, TX 78704
 (737) 558-8844 | info@erocom.com

Final Number: **SB501**
 Project Name: 150A DESIGN OF ELEMENT

FOUNDATION DETAILS	DATE	DESCRIPTION
FOUNDATION DETAILS	03/08/2023	ISSUE FOR PERMIT
FOUNDATION DETAILS	03/08/2023	ISSUE FOR PERMIT
FOUNDATION DETAILS	03/08/2023	ISSUE FOR PERMIT

A1
 ROOF FRAMING PLAN



- FRAMING NOTES:**
1. JOIST AND RAFTER SPACING TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 2. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 3. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 4. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 5. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 6. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 7. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 8. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 9. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 10. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 11. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 12. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
 13. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.
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 15. ALL JOIST AND RAFTER END CONNECTIONS TO BE AS SHOWN UNLESS OTHERWISE NOTED.

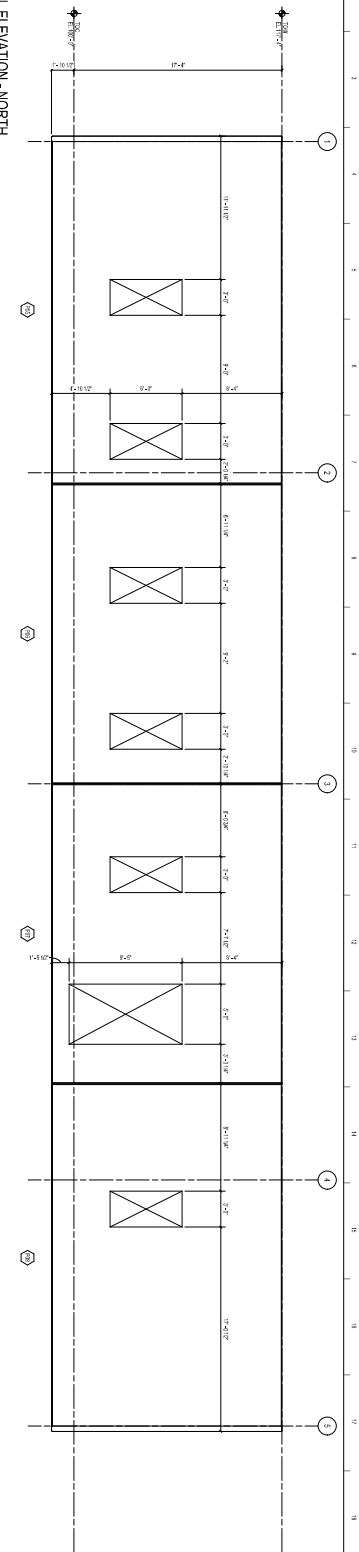
Project Name	HC Biosafety Lab
Project Location	Edinburg, TX
Client	HC Biosafety Lab
Architect	HC Biosafety Lab
Structural Engineer	HC Biosafety Lab
Scale	AS SHOWN
Revision	NO:0021-1-02.DWG
Drawn By	HC Biosafety Lab
Checked By	HC Biosafety Lab
Approved By	HC Biosafety Lab
Date	NO:0021-1-02.DWG
Sheet No.	SF101
Sheet Title	ROOF FRAMING PLAN

HC Biosafety Lab

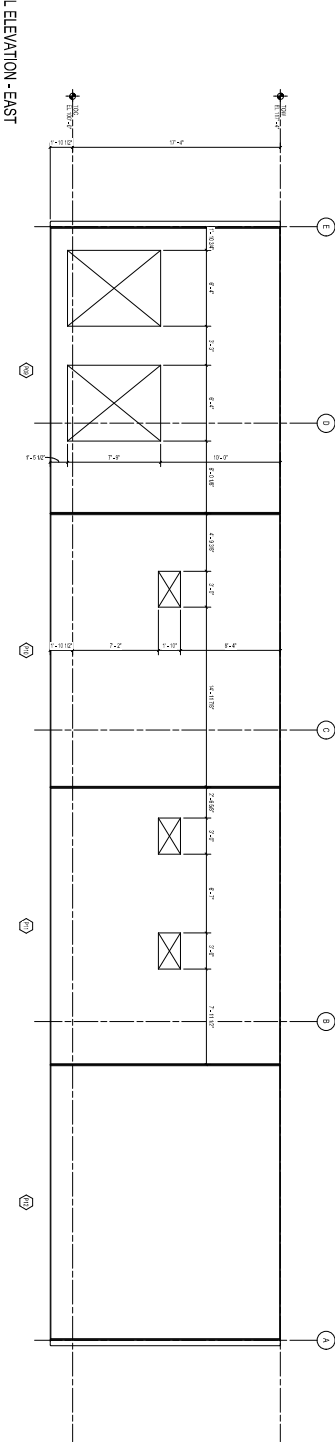
County of Hidalgo
 S 25th Ave, Edinburg, TX 78542



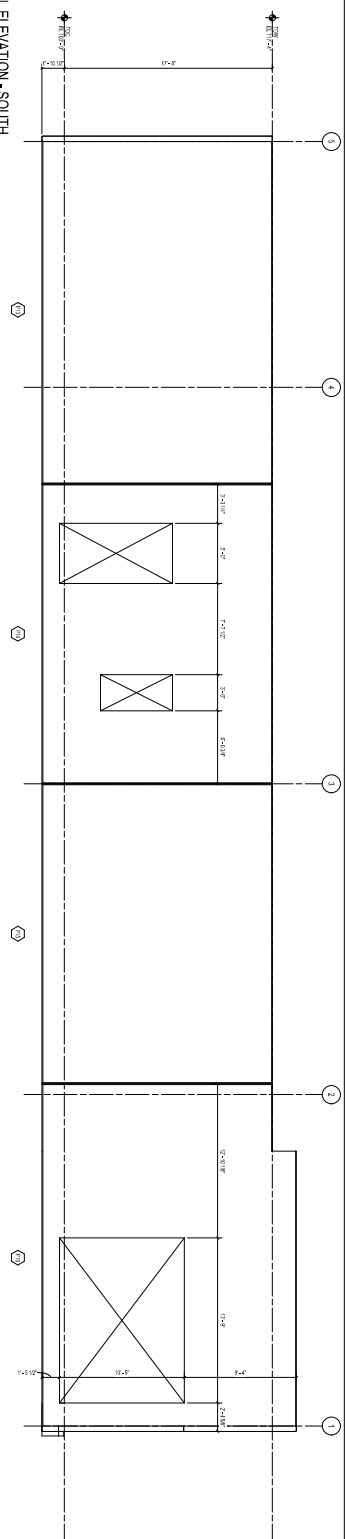
N1 | TTI-UP PANEL ELEVATION - NORTH
 1/8" = 1'-0"



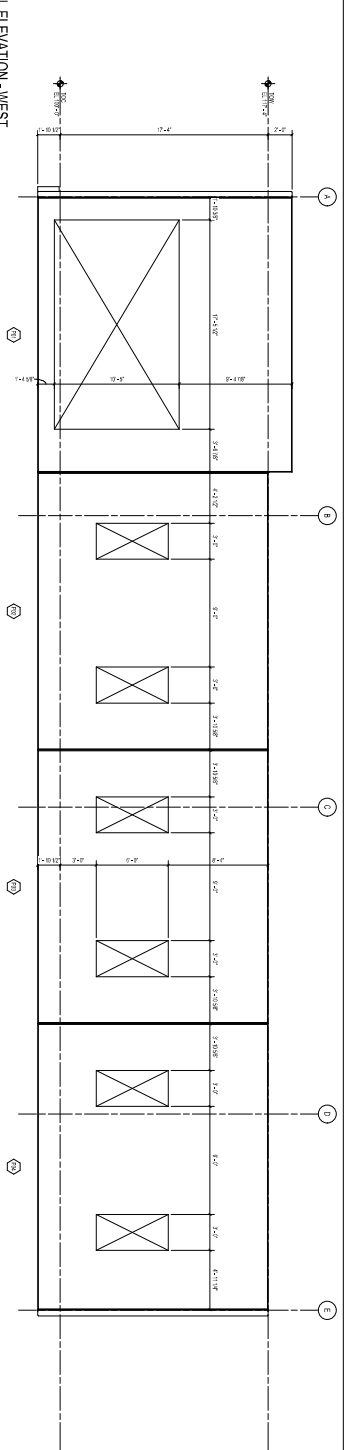
J1 | TTI-UP PANEL ELEVATION - EAST
 1/8" = 1'-0"



E1 | TTI-UP PANEL ELEVATION - SOUTH
 1/8" = 1'-0"



A1 | TTI-UP PANEL ELEVATION - WEST
 1/8" = 1'-0"



300 E. Park Avenue, TX 78201
 P: 512.484.4444 | f: 512.484.4444

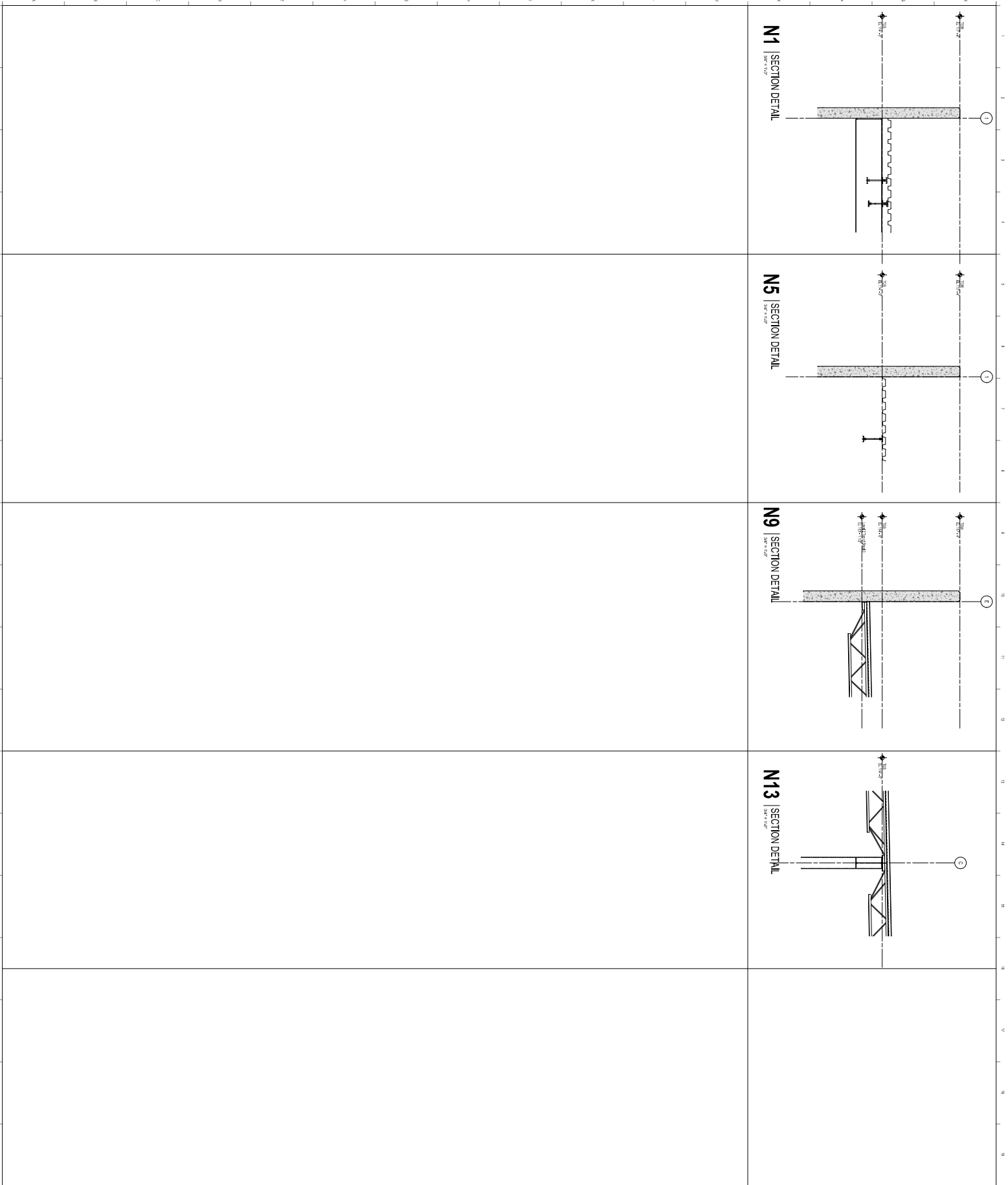


HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

Final Review
 Project Name: SF201
 Project Location: 1700 CEDAR CREST ELEMENT

DATE: 02/01/2020
 DRAWING NO: 000001-1-20-2018
 SHEET NO: 05
 TTI-UP PANEL ELEVATIONS



Revised	By	Description
4		

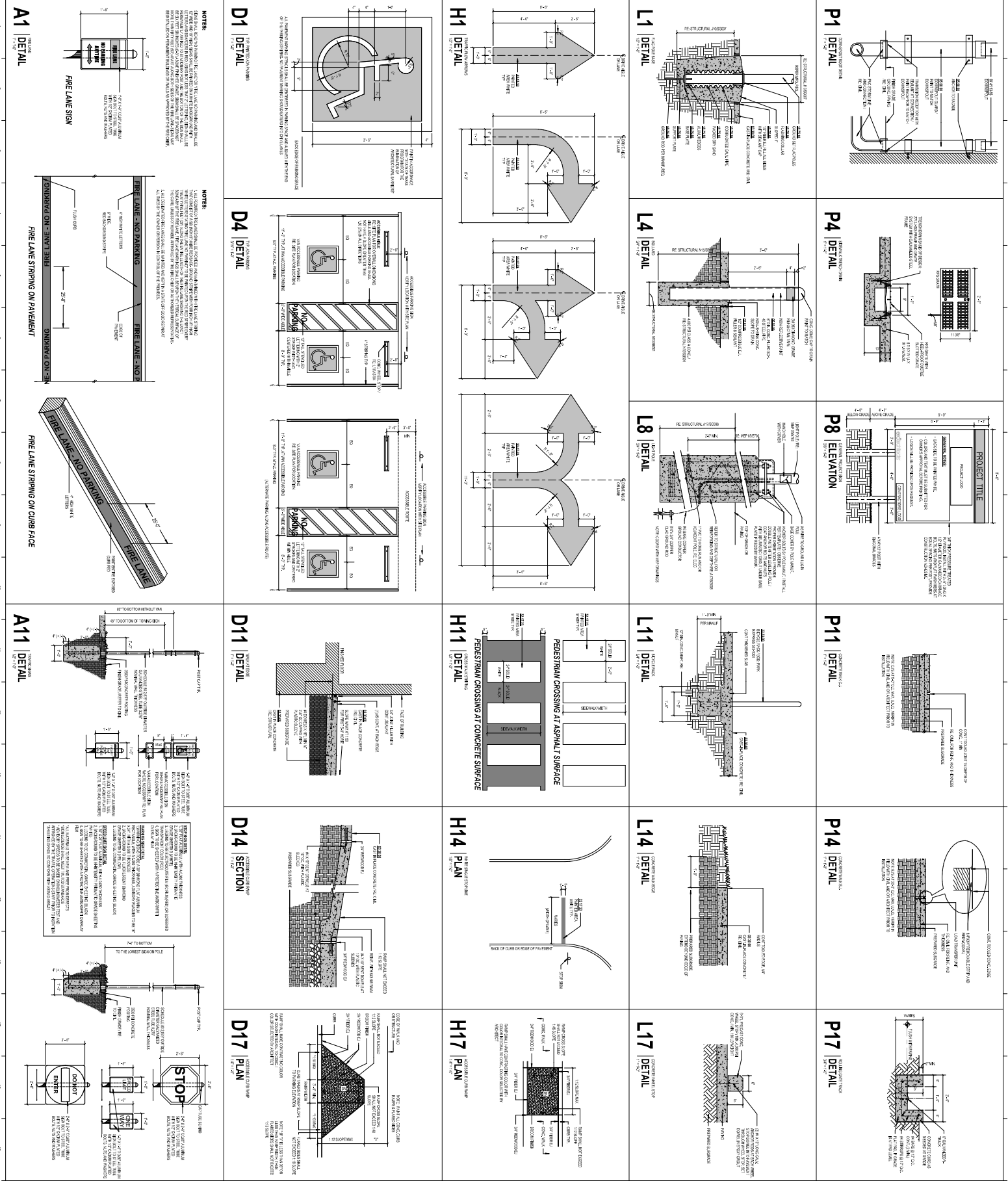
PROJECT: 2021
 ARCHITECT: SPECTRUM
 CONTRACTOR: S
 SCALE: 1/8" = 1'-0"
 DRAWING: FRAMING DETAILS

Final Review: _____
 Prepared by: **SFS01**
 100% DESIGN DEVELOPMENT

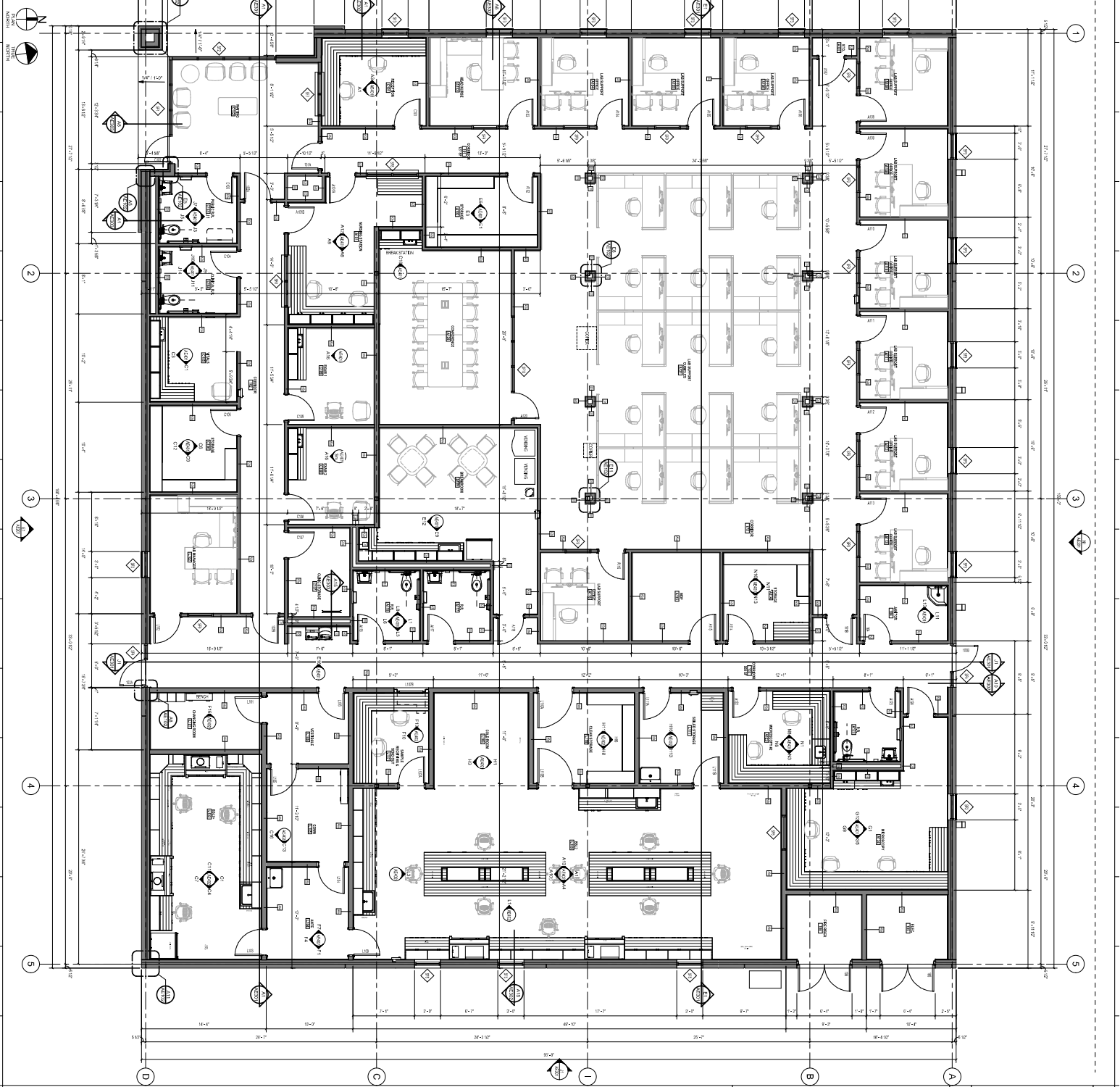
HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542





A1
 FLOOR PLAN



FLOOR PLAN GENERAL NOTES

1. ALL DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE.
2. ALL FINISHES ARE TO BE AS SHOWN ON THE FINISH SCHEDULE.
3. ALL MATERIALS AND METHODS SHALL BE APPROVED BY THE ARCHITECT PRIOR TO CONSTRUCTION.
4. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE BUILDING CODES AND REGULATIONS.
5. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE NATIONAL ELECTRICAL CODE (NEC) AND NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES.
6. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL MECHANICAL AND PLUMBING CODE (IMC) AND INTERNATIONAL PLUMBING AND MECHANICAL EXAMINERS' BOARD (IPMEB) CODES.
7. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL MECHANICAL AND PLUMBING CODE (IMC) AND INTERNATIONAL PLUMBING AND MECHANICAL EXAMINERS' BOARD (IPMEB) CODES.
8. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL MECHANICAL AND PLUMBING CODE (IMC) AND INTERNATIONAL PLUMBING AND MECHANICAL EXAMINERS' BOARD (IPMEB) CODES.
9. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL MECHANICAL AND PLUMBING CODE (IMC) AND INTERNATIONAL PLUMBING AND MECHANICAL EXAMINERS' BOARD (IPMEB) CODES.
10. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL MECHANICAL AND PLUMBING CODE (IMC) AND INTERNATIONAL PLUMBING AND MECHANICAL EXAMINERS' BOARD (IPMEB) CODES.

FLOOR PLAN KEYNOTES

1. ALL DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE.

2. ALL FINISHES ARE TO BE AS SHOWN ON THE FINISH SCHEDULE.

3. ALL MATERIALS AND METHODS SHALL BE APPROVED BY THE ARCHITECT PRIOR TO CONSTRUCTION.

4. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE BUILDING CODES AND REGULATIONS.

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6. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE INTERNATIONAL MECHANICAL AND PLUMBING CODE (IMC) AND INTERNATIONAL PLUMBING AND MECHANICAL EXAMINERS' BOARD (IPMEB) CODES.

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No.	Date	Description

PROJECT: HC Biosafety Lab
 SHEET: A1 FLOOR PLAN
 DATE: 10/20/22
 DRAWN BY: [Name]
 CHECKED BY: [Name]

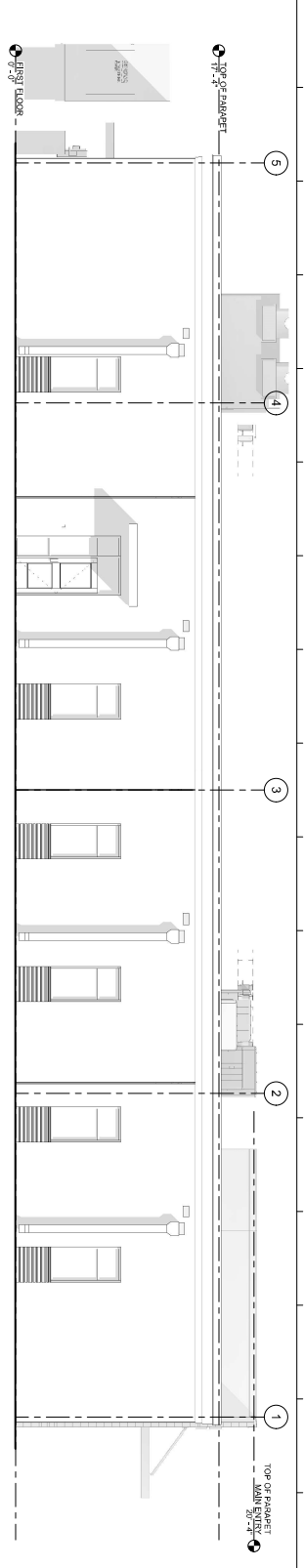
HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

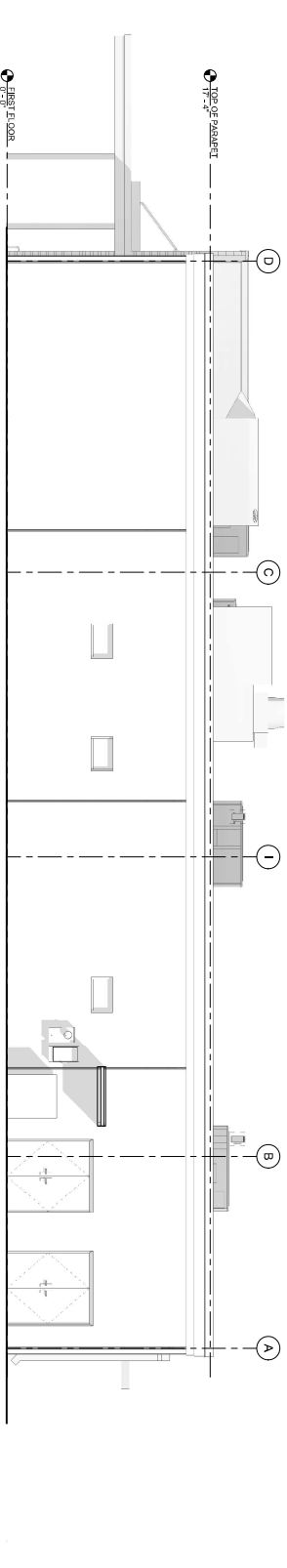


300 S. 25th Street, Edinburg, TX 78541
 361.966.8111 | ero.com

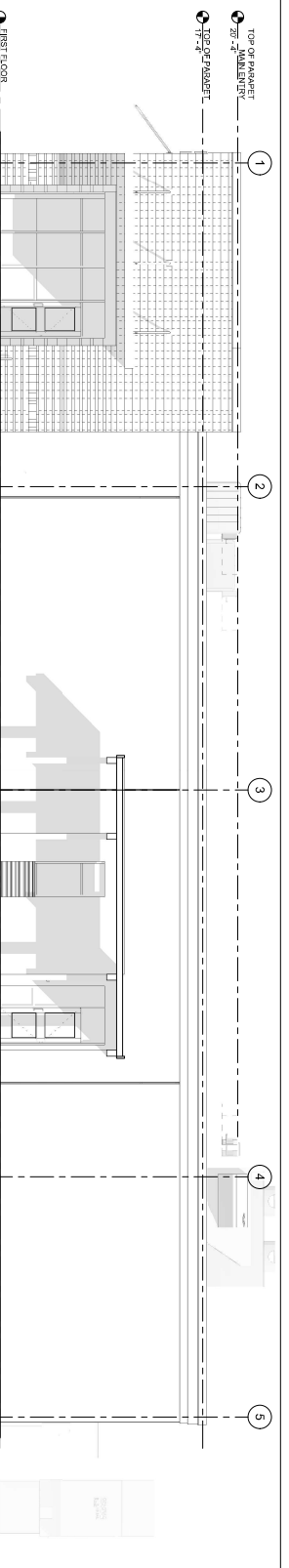
PROJECT: HC Biosafety Lab
 SHEET: A1 FLOOR PLAN
 DATE: 10/20/22
 DRAWN BY: [Name]
 CHECKED BY: [Name]



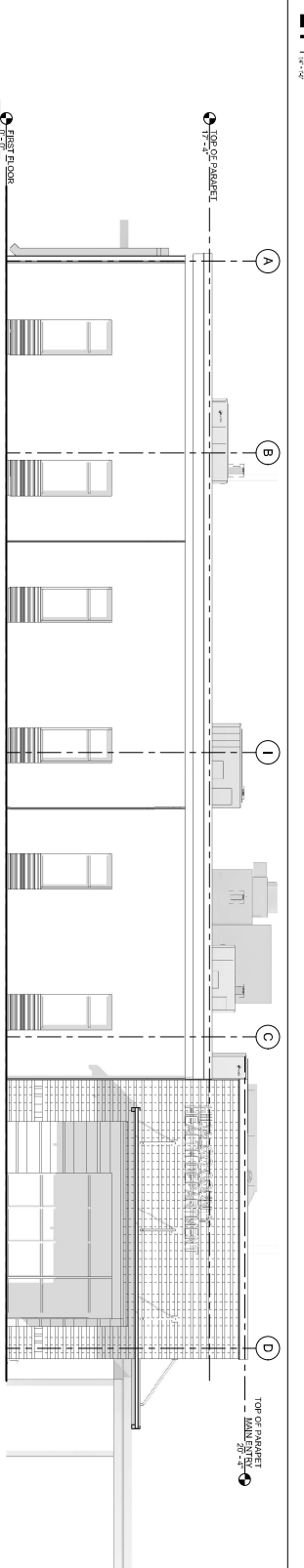
N1 ELEVATION



J1 ELEVATION



E1 ELEVATION

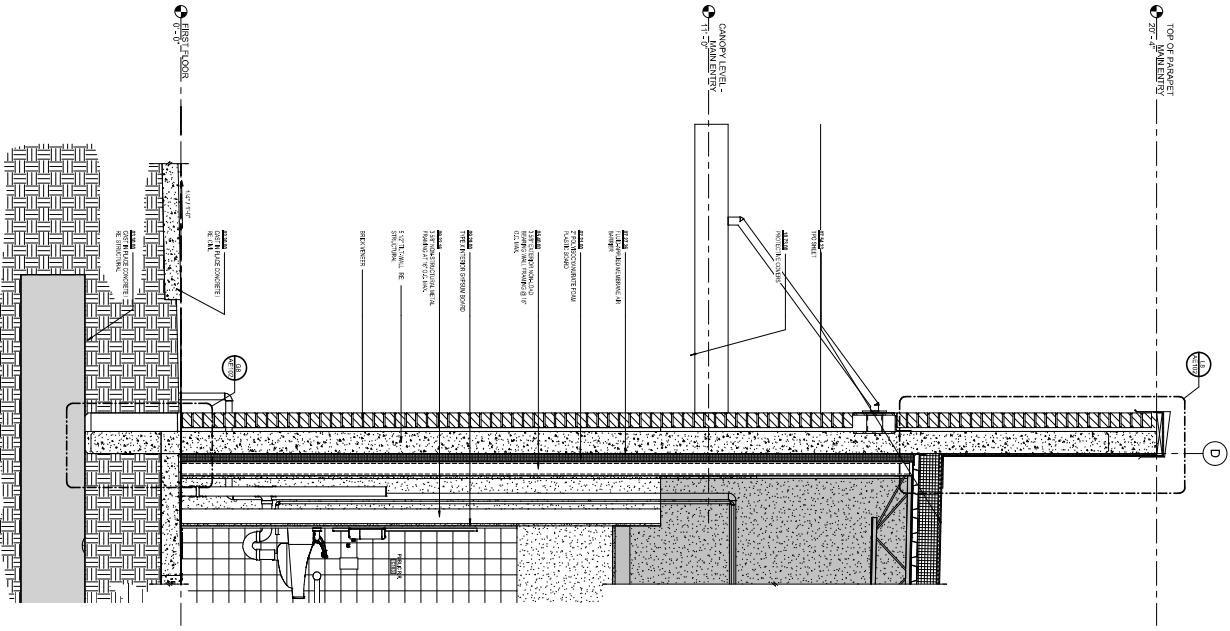


A1 ELEVATION

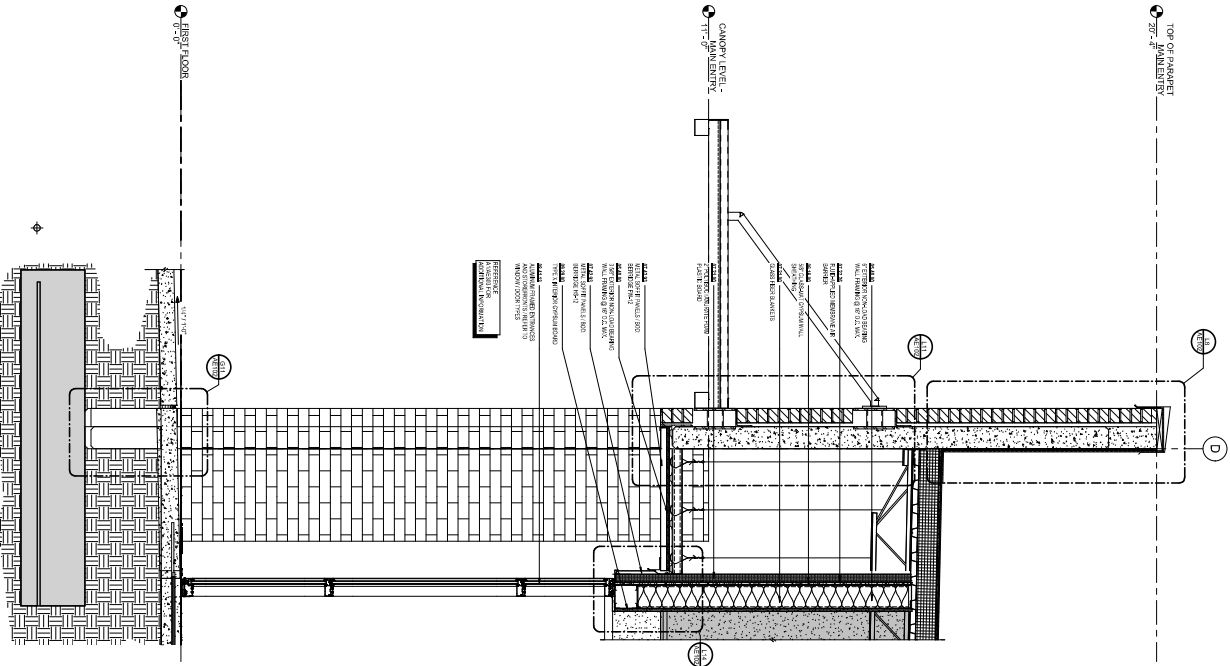
No.	Date	Description

Final Review: _____
 Prepared by: **AE201**
 100% DESIGN DEVELOPMENT

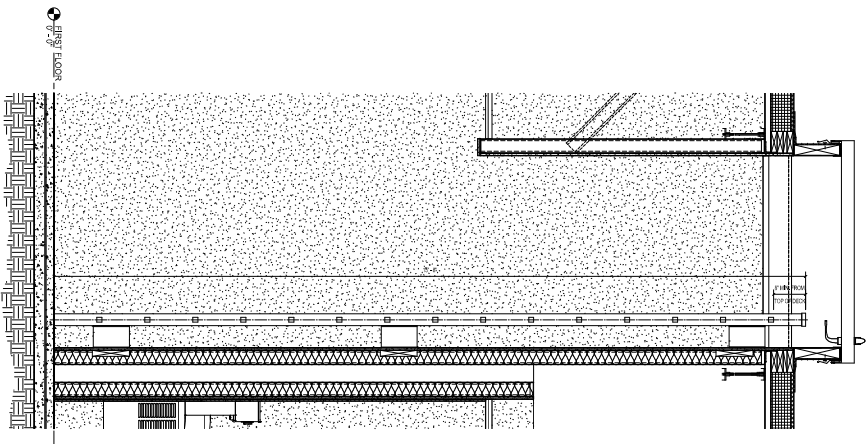
A1 SECTION



A8 SECTION



A15 SECTION



HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

SCALE: AS SHOWN
 PROJECT: HC BIOSAFETY LAB
 SHEET: ARCH-01
 DATE: 11/14/2022



200 E. 2nd Street, Austin, TX 78701
 512.476.8811 | info@erogroup.com

No.	Date	Description

PREPARED BY: [Name]
 CHECKED BY: [Name]
 DATE: [Date]
 SHEET NAME: [Name]
 SHEET NUMBER: [Number]

TITLE: HC BIOSAFETY LAB
 PROJECT NUMBER: [Number]

ARCHITECT: ero
 PROJECT: HC BIOSAFETY LAB
 SHEET: ARCH-01

TITLE SECTIONS
 AE303

GENERAL NOTES

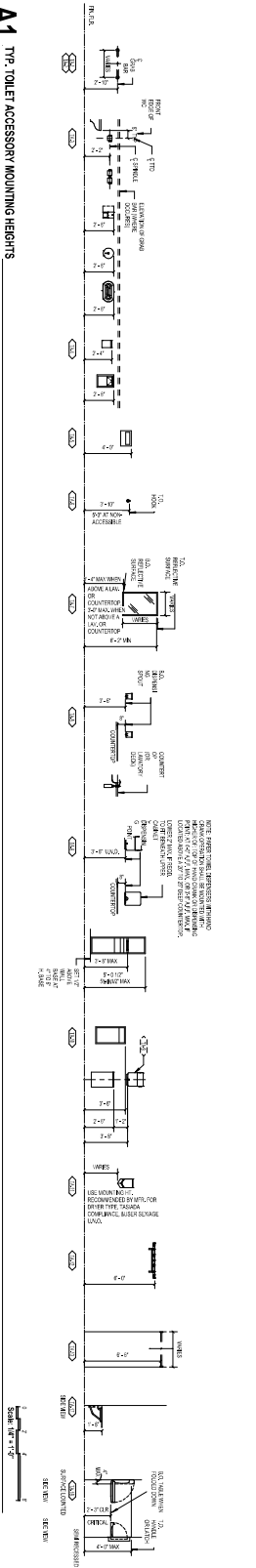
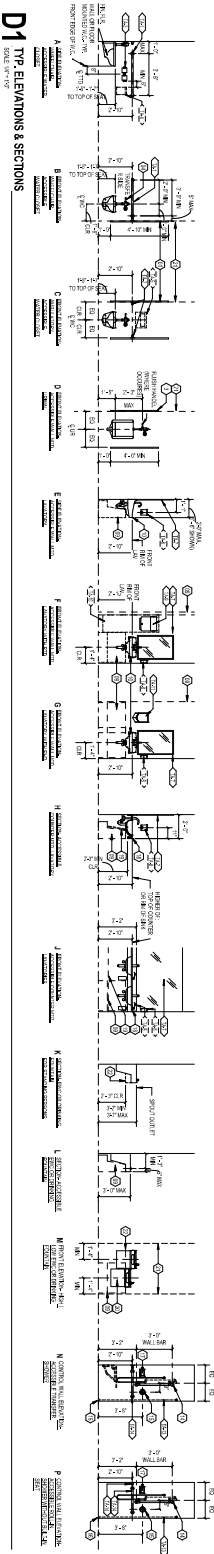
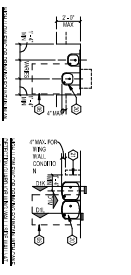
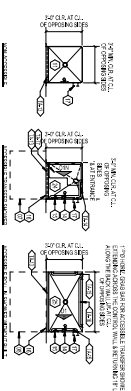
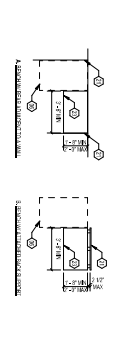
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2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
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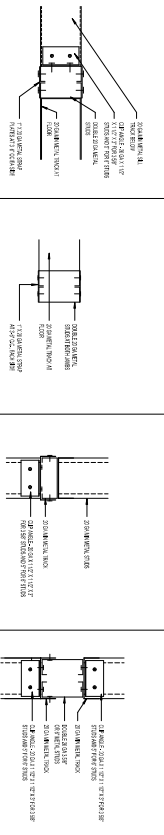
REVED NOTES

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2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
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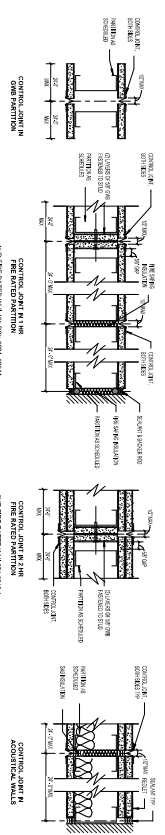
TOILET ACCESSORY LIST

ITEM NO.	DESCRIPTION	QTY	UNIT	PRICE	TOTAL
101	TOILET PAPER	1	ROLL	1.50	1.50
102	TOILET BRUSH	1	PC	2.00	2.00
103	TOILET SEAT	1	PC	1.00	1.00
104	TOILET ROLLER	1	PC	1.00	1.00
105	TOILET BRUSH	1	PC	2.00	2.00
106	TOILET SEAT	1	PC	1.00	1.00
107	TOILET ROLLER	1	PC	1.00	1.00
108	TOILET BRUSH	1	PC	2.00	2.00
109	TOILET SEAT	1	PC	1.00	1.00
110	TOILET ROLLER	1	PC	1.00	1.00
111	TOILET BRUSH	1	PC	2.00	2.00
112	TOILET SEAT	1	PC	1.00	1.00
113	TOILET ROLLER	1	PC	1.00	1.00
114	TOILET BRUSH	1	PC	2.00	2.00
115	TOILET SEAT	1	PC	1.00	1.00
116	TOILET ROLLER	1	PC	1.00	1.00
117	TOILET BRUSH	1	PC	2.00	2.00
118	TOILET SEAT	1	PC	1.00	1.00
119	TOILET ROLLER	1	PC	1.00	1.00
120	TOILET BRUSH	1	PC	2.00	2.00

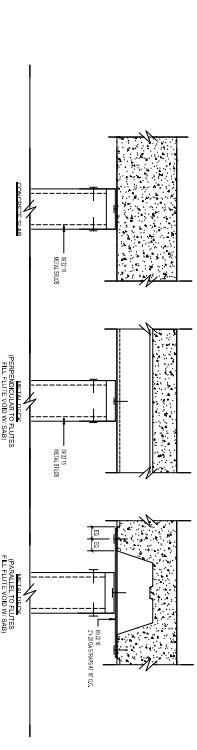




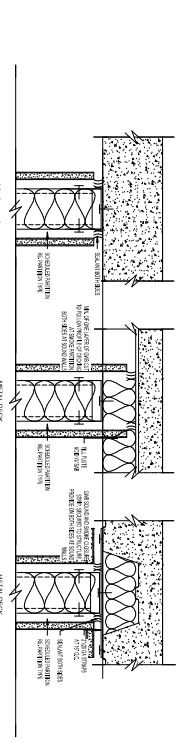
P1 DETAIL | FIRE-RATED WALL AND DOOR
P3 DETAIL | FIRE-RATED WALL AND DOOR
P5 DETAIL | FIRE-RATED WALL AND DOOR
P8 DETAIL | FIRE-RATED WALL AND DOOR



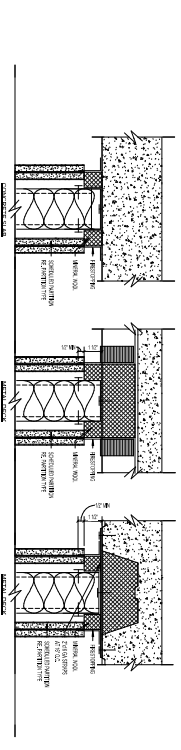
K1 DETAIL | FIRE-RATED WALL INTERSECTION
K10 DETAIL | FIRE-RATED WALL INTERSECTION
K13 DETAIL | FIRE-RATED WALL INTERSECTION



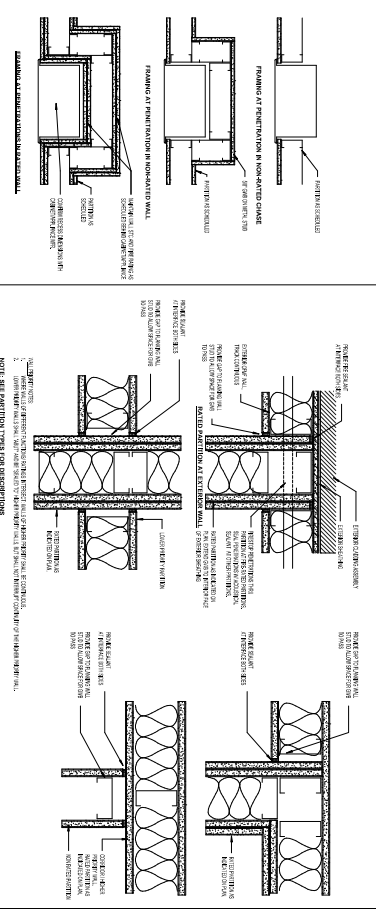
G1 DETAIL | FIRE-RATED WALL INTERSECTION



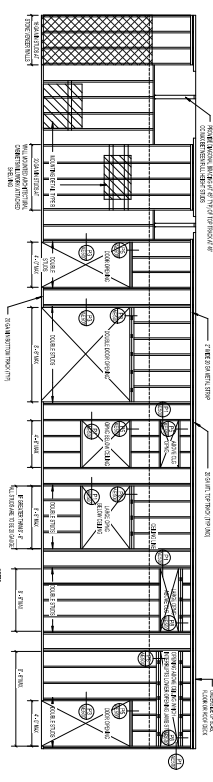
D1 DETAIL | FIRE-RATED WALL INTERSECTION



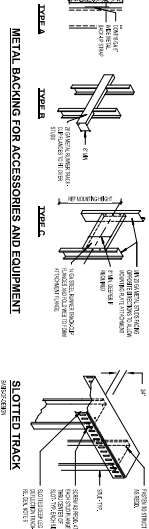
A1 DETAIL | FIRE-RATED WALL INTERSECTION



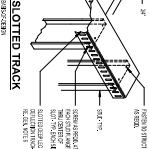
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F11 DETAIL | FIRE-RATED WALL INTERSECTION
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F13 DETAIL | FIRE-RATED WALL INTERSECTION
F14 DETAIL | FIRE-RATED WALL INTERSECTION
F15 DETAIL | FIRE-RATED WALL INTERSECTION
F16 DETAIL | FIRE-RATED WALL INTERSECTION
F17 DETAIL | FIRE-RATED WALL INTERSECTION
F18 DETAIL | FIRE-RATED WALL INTERSECTION



F10 DETAIL | FIRE-RATED WALL INTERSECTION



METAL BACKING FOR ACCESSORIES AND EQUIPMENT



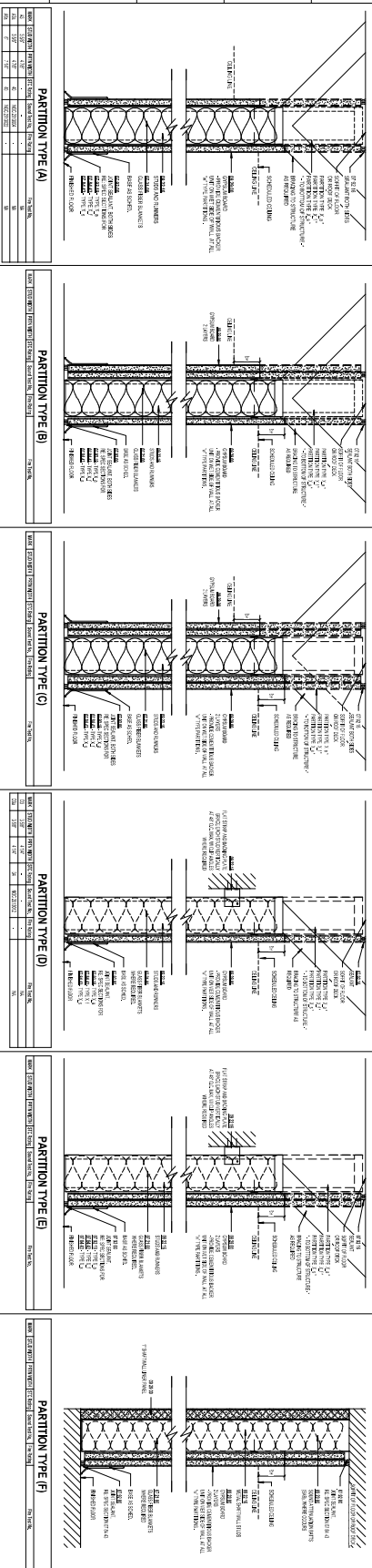
SLOTTED TRACK

1. ALL ACCESSORIES AND EQUIPMENT SHALL BE MOUNTED TO THE METAL BACKING OR SLOTTED TRACK.
2. ALL ACCESSORIES AND EQUIPMENT SHALL BE MOUNTED TO THE METAL BACKING OR SLOTTED TRACK.
3. ALL ACCESSORIES AND EQUIPMENT SHALL BE MOUNTED TO THE METAL BACKING OR SLOTTED TRACK.
4. ALL ACCESSORIES AND EQUIPMENT SHALL BE MOUNTED TO THE METAL BACKING OR SLOTTED TRACK.
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6. ALL ACCESSORIES AND EQUIPMENT SHALL BE MOUNTED TO THE METAL BACKING OR SLOTTED TRACK.
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9. ALL ACCESSORIES AND EQUIPMENT SHALL BE MOUNTED TO THE METAL BACKING OR SLOTTED TRACK.
10. ALL ACCESSORIES AND EQUIPMENT SHALL BE MOUNTED TO THE METAL BACKING OR SLOTTED TRACK.

A10 DETAIL | FIRE-RATED WALL INTERSECTION

PARTITION GENERAL NOTES

1. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
2. PARTITION TYPE (A) THROUGH (E) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
3. PARTITION TYPE (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
4. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
5. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
6. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
7. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
8. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
9. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
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14. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
15. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
16. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
17. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
18. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
19. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.
20. PARTITION TYPE (A) THROUGH (F) SHALL BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS.



NO.	DESCRIPTION	QTY	UNIT	REMARKS
1	1 SECTION			
2	2 SECTION			
3	3 SECTION			
4	4 SECTION			
5	5 SECTION			
6	6 SECTION			

AE501
 METAL STUD PARTITION TYPES
 100% DESIGN DEVELOPMENT

HC Biosafety Lab

County of Hidalgo
 525th Ave, Edinburg, TX 78542



<p>A1 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>D1 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>G1 DETAIL 1/2" SECTION - INTERIOR GLASS</p>		
	<p>D4 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>G4 DETAIL 1/2" SECTION - INTERIOR GLASS</p>		
<p>A7 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>D7 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>G7 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>K7 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	
<p>A10 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>D10 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>G10 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>K10 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	
<p>A13 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>D13 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>G13 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	<p>K13 DETAIL 1/2" SECTION - INTERIOR GLASS</p>	

No.	Date	Description

PROJECT: HC Bio Safety Lab
 SHEET: ARCH-01
 SHEET TITLE: DOOR & WINDOW DETAILS
 DRAWING NUMBER: AEB02
 100% DESIGN DEVELOPMENT

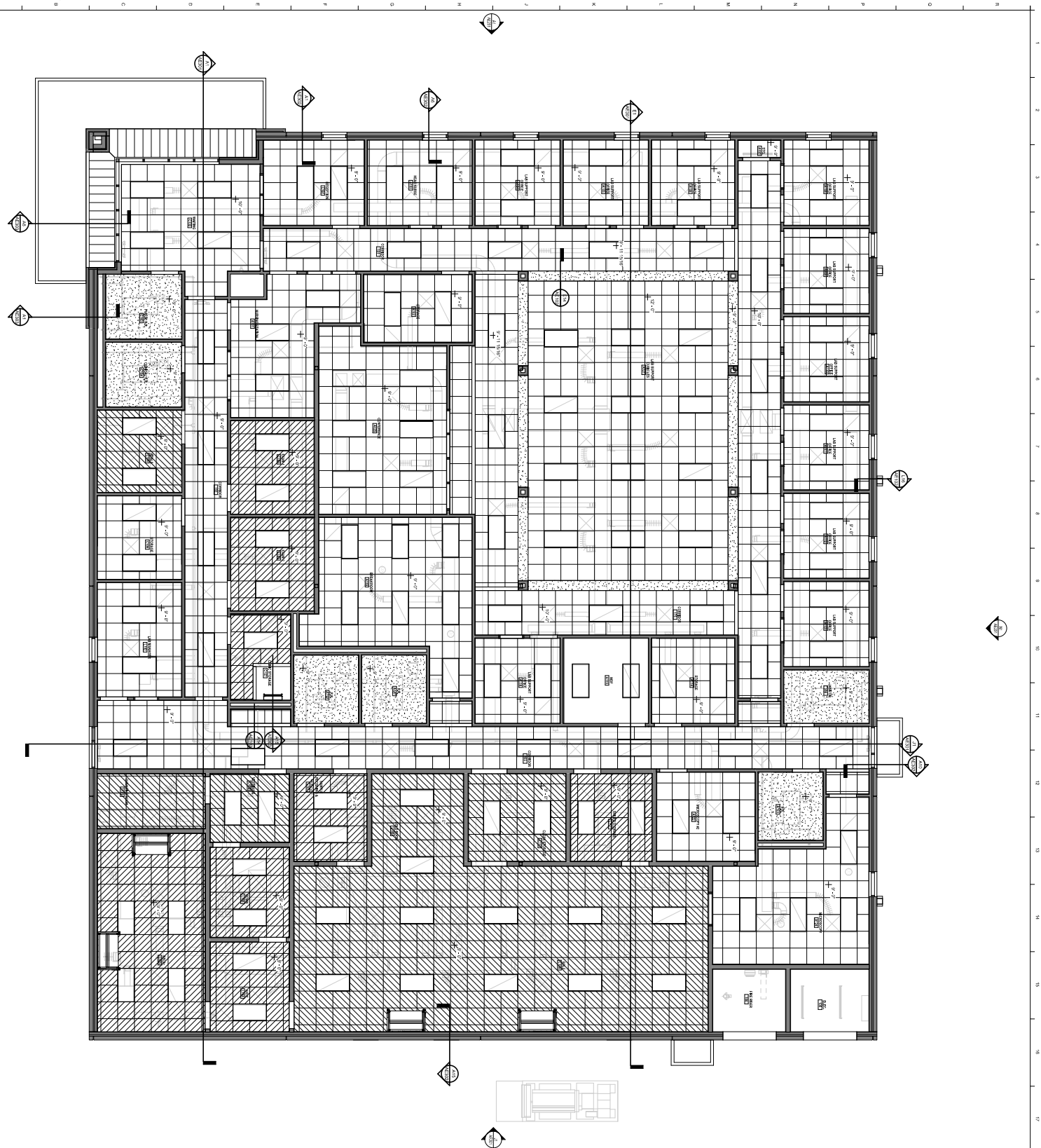
HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

100% DESIGN DEVELOPMENT
 PROJECT: HC Bio Safety Lab
 SHEET: ARCH-01
 SHEET TITLE: DOOR & WINDOW DETAILS
 DRAWING NUMBER: AEB02
 100% DESIGN DEVELOPMENT



A1 PLAN



- REFLECTED CEILING GENERAL NOTES**
1. ALL MATERIALS ARE TO BE APPROVED BY THE ARCHITECT AND THE LOCAL HEALTH DEPARTMENT.
 2. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 3. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.
 4. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.
 5. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.
 6. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.
 7. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.
 8. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.
 9. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.
 10. ALL MATERIALS ARE TO BE INSTALLED IN ACCORDANCE WITH THE LOCAL HEALTH DEPARTMENT'S REQUIREMENTS.

HC Biosafety Lab

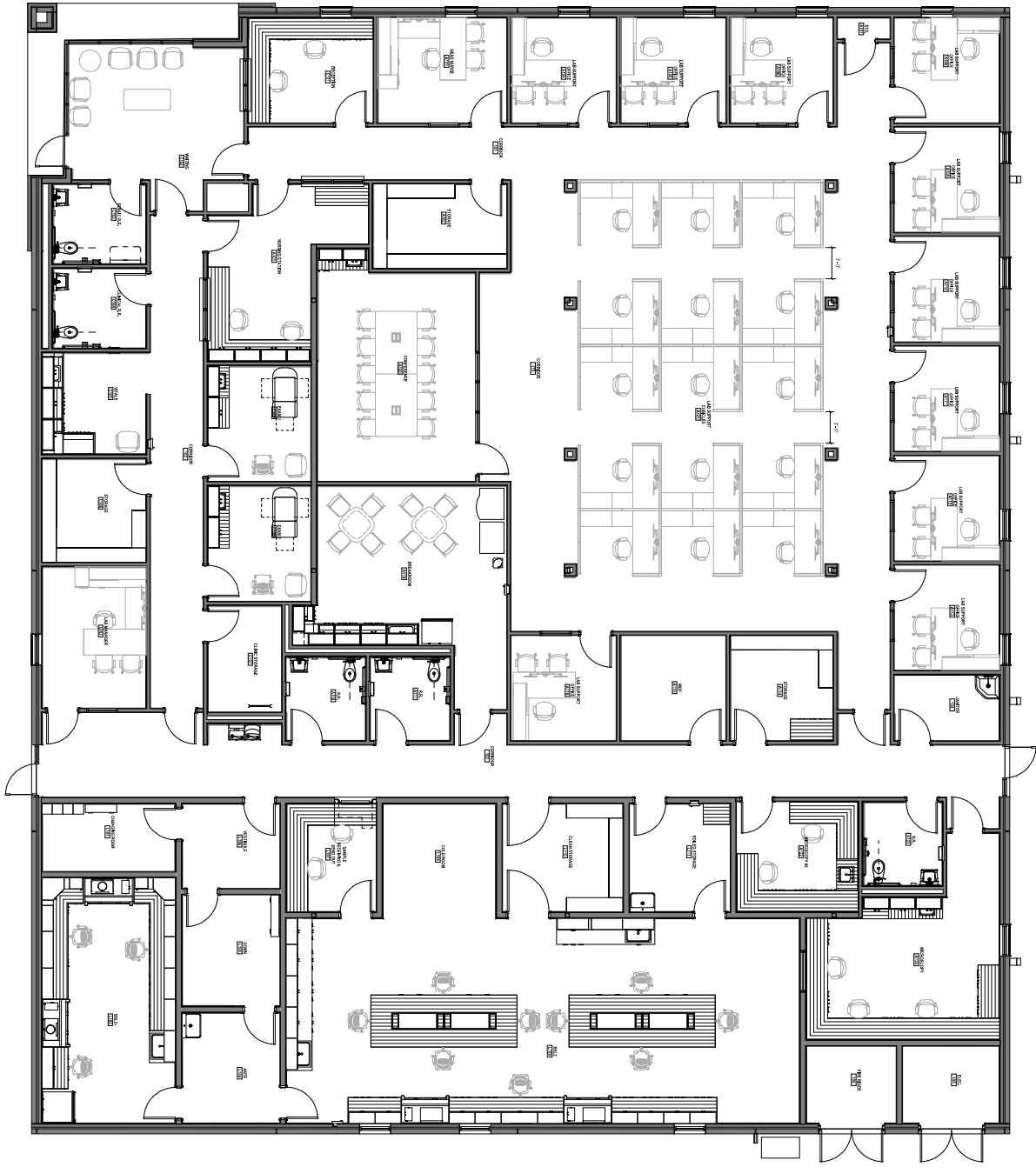
County of Hidalgo
 S 25th Ave, Edinburg, TX 78542



No.	Date	Description

PROJECT: HC Biosafety Lab
DATE: 08/14/2024
PROJECT NO: A1-PLAN
PROJECT LOCATION: HC Biosafety Lab
PROJECT OWNER: County of Hidalgo
PROJECT ARCHITECT: ERO
PROJECT ENGINEER: ERO
PROJECT CONTRACTOR: ERO
PROJECT SHEET NO: A1-PLAN
PROJECT SHEET TITLE: REFLECTED CEILING PLAN
PROJECT SHEET SCALE: 1/8" = 1'-0"
PROJECT SHEET DATE: 08/14/2024
PROJECT SHEET BY: ERO
PROJECT SHEET CHECKED BY: ERO
PROJECT SHEET APPROVED BY: ERO
PROJECT SHEET SCALE: 1/8" = 1'-0"
PROJECT SHEET DATE: 08/14/2024
PROJECT SHEET BY: ERO
PROJECT SHEET CHECKED BY: ERO
PROJECT SHEET APPROVED BY: ERO

1 FLOOR PLAN



HC Biosafety Lab

County of Hidalgo
 S 25th Ave, Edinburg, TX 78542

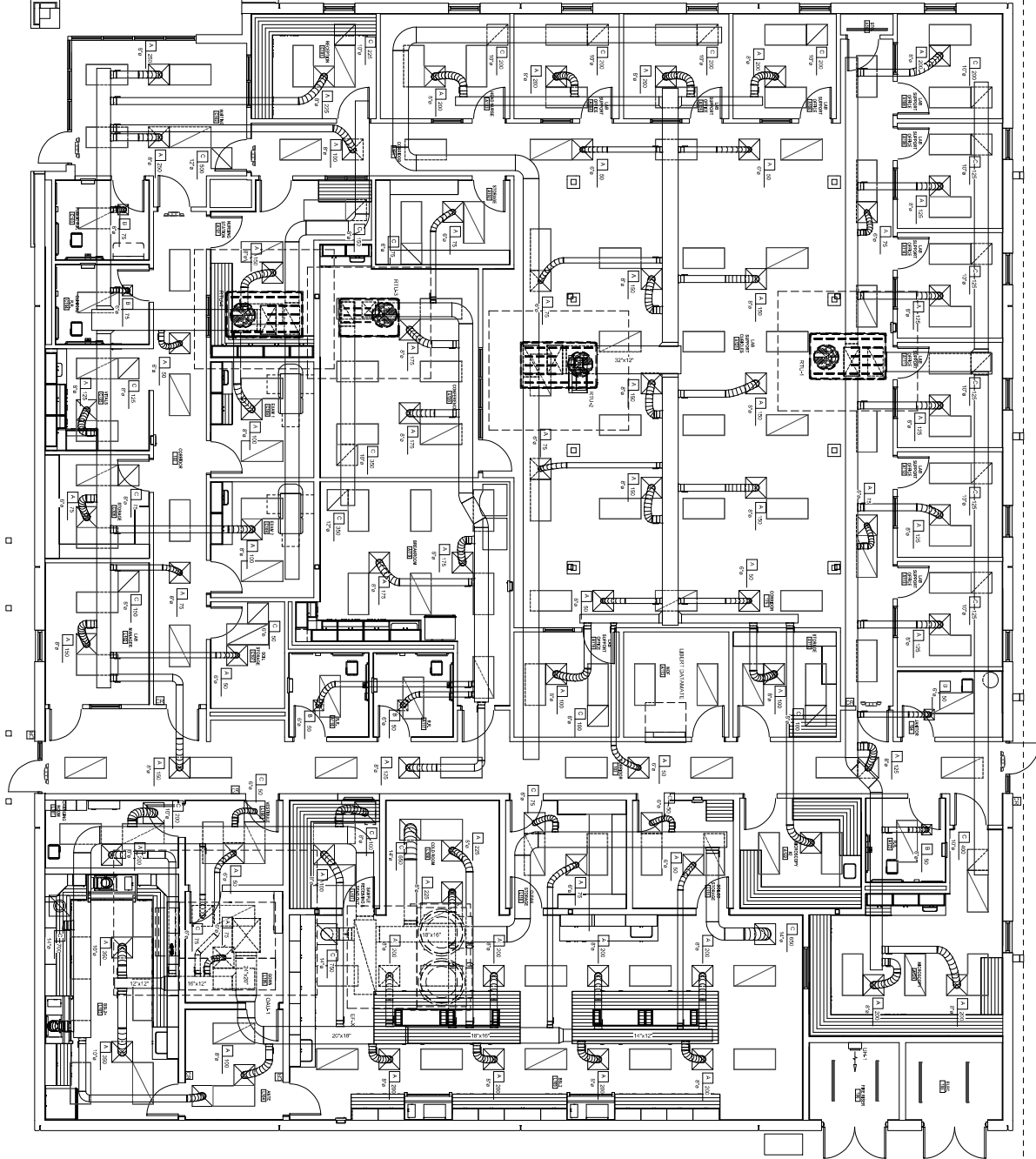
PROJECT: HC BIOSAFETY LAB
 ARCHITECT: ERO ARCHITECTURE
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No.	Date	Description

PROJECT: HC BIOSAFETY LAB
 ARCHITECT: ERO ARCHITECTURE
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 10/20/2021 4:27:27 PM
 SHEET NAME: FLOOR PLAN
 SHEET NO.: A1102
 TITLE BLOCK: 1001100000000-ARCH-1-10-10

A1
 Mechanical - Room Plan - 1/16" = 1'-0"



MECHANICAL REVISIONS

300 E. San Pedro, Houston, TX 77009
 281.755.6611 | info@erco.com



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 MEP ENGINEERING
 2000 W. UNIVERSITY & LINDALE BLVD
 HOUSTON, TEXAS 77057
 281.755.6611 | info@erco.com

MECHANICAL ROOM PLAN
 PROJECT: HC Biosafety Lab
 SHEET: MP01
 DATE: 05/2021

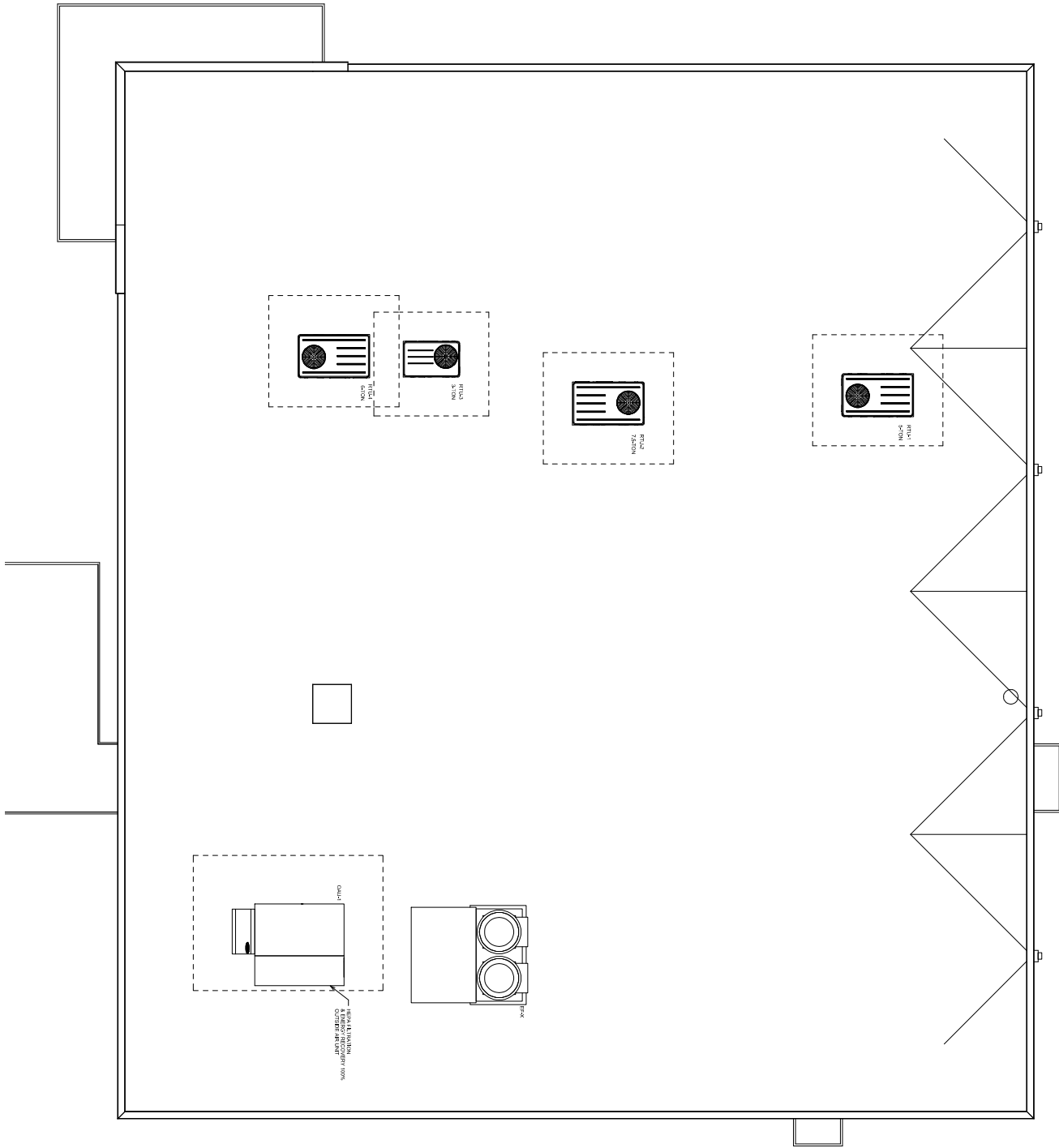
HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

Date	Description

PROJECT: HC Biosafety Lab SHEET: MP01 DATE: 05/2021	MECHANICAL ROOM PLAN
---	----------------------

A1 Mechanical Room Plan

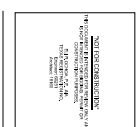


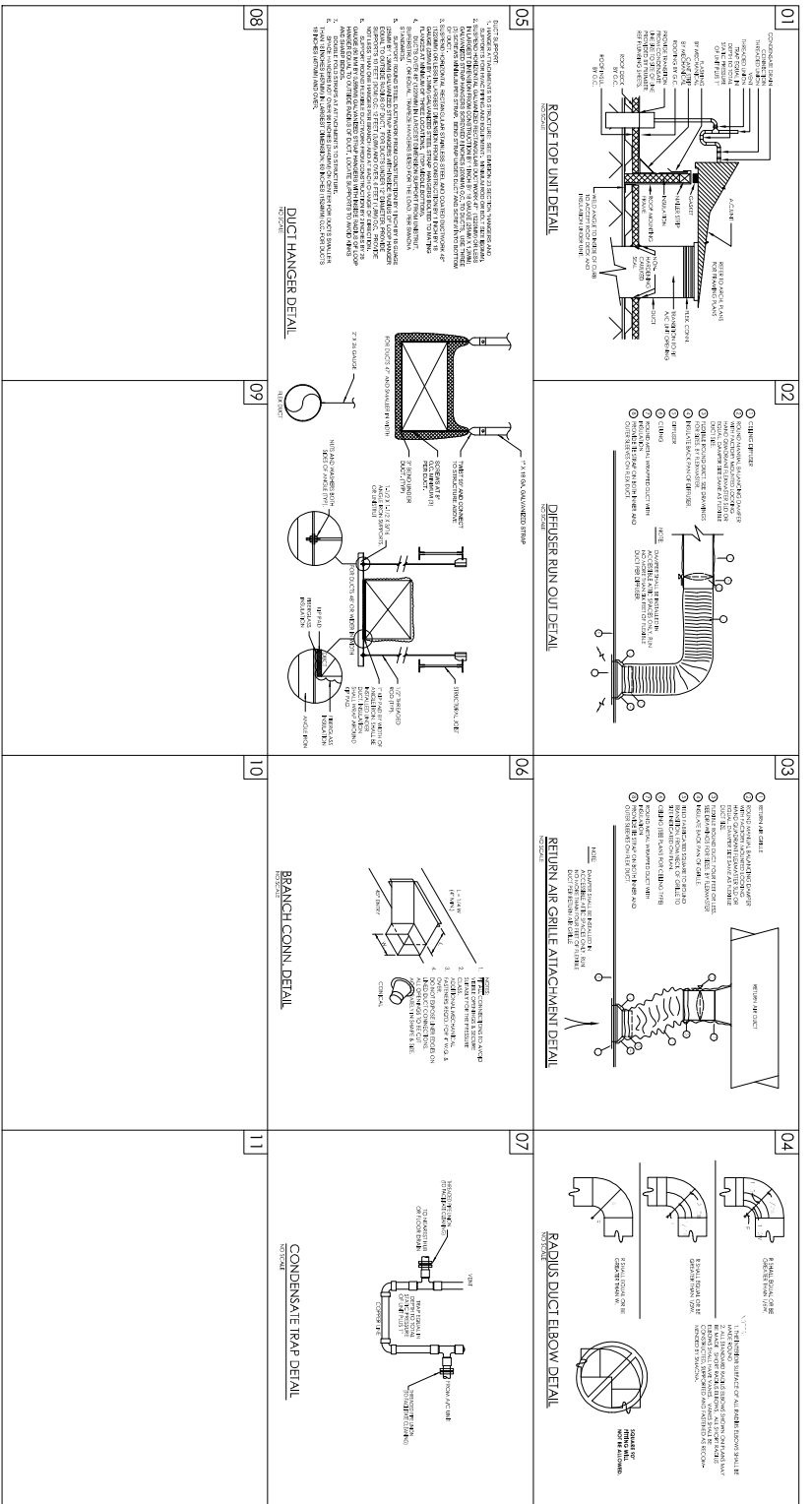
No.	Date	Description

MECHANICAL ROOM PLAN
 PROJECT: HC Bio Safety Lab
 SHEET NAME: MECHANICAL ROOM PLAN
 DRAWN BY: [Name]
 CHECKED BY: [Name]

HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542





No.	Date	Description

PROJECT: HC Bio Safety Lab
 SHEET: MDO1
 DATE: 05/2021
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

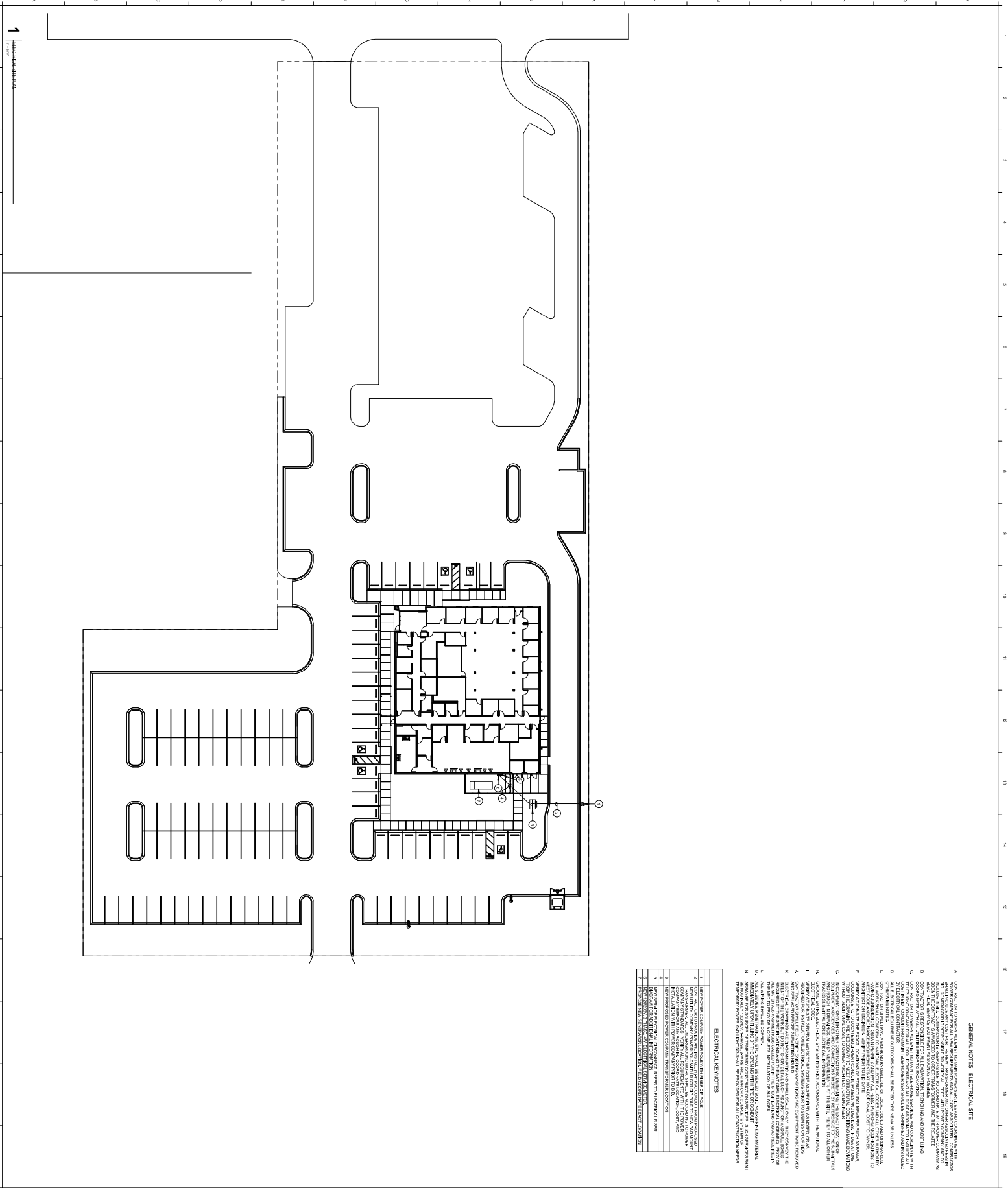
HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

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 Fax: (361) 251-1112
 Email: info@trinitymech.com

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 Email: info@eromechanical.com



GENERAL NOTES - ELECTRICAL SITE

- A. REFER TO THE GENERAL NOTES FOR ALL INFORMATION REGARDING PERMITS AND CONSTRUCTION FROM THE CITY OF EDINBURG AND ALL NEARBY REGULATORY AGENCIES. ALL NEARBY REGULATORY AGENCIES SHALL BE NOTIFIED AND APPROVED PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- B. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- C. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- D. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
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- F. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- G. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- H. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
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- J. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- K. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- L. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- M. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
- N. CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.

ELECTRICAL NOTES

1	SEE GENERAL NOTES FOR ALL INFORMATION REGARDING PERMITS AND CONSTRUCTION FROM THE CITY OF EDINBURG AND ALL NEARBY REGULATORY AGENCIES.
2	CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
3	CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
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6	CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.
7	CONTRACTOR SHALL VERIFY ALL ELECTRICAL UTILITY LOCATIONS, INCLUDING ALL EXISTING AND NEW ELECTRICAL UTILITY LOCATIONS, PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL NEARBY REGULATORY AGENCIES.



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 MEP ENGINEERING
 2000 W. 10th Street, Suite 100, Edinburg, TX 78541
 361.956.6661 | 361.956.6662 | www.trinitymepe.com

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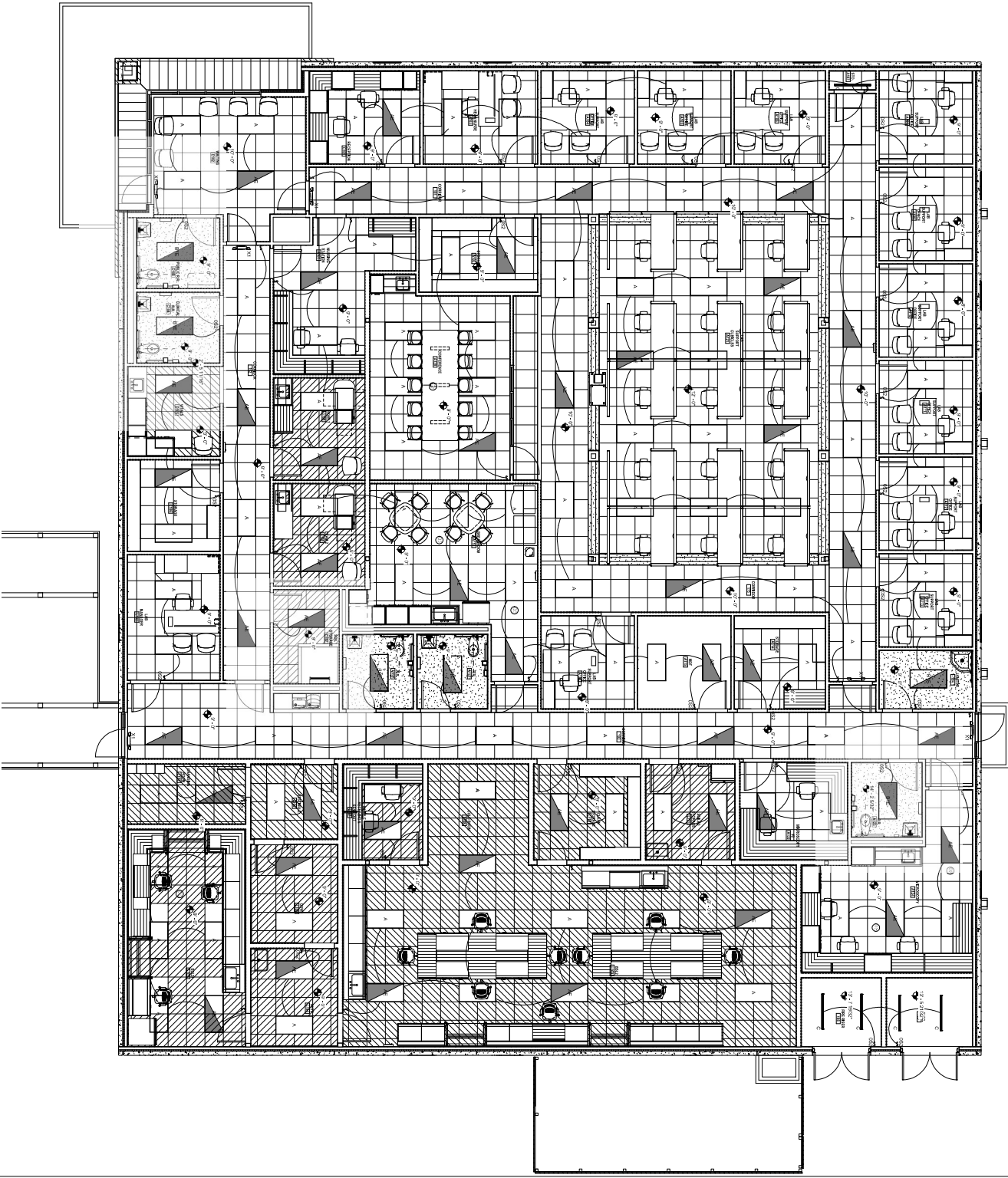
HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

No.	Date	Description

PREPARED BY: TRINITY
 CHECKED BY: TRINITY
 DESIGNED BY: TRINITY
 DRAWN BY: TRINITY
 SHEET NAME: ELECTRICAL SITE PLAN
 SHEET NUMBER: ESP01
 PROJECT NUMBER: 1001-EDINBURG-EDINBURG

1 Electrical Lighting Floor Plan



- GENERAL NOTES- LIGHTING**
- A. LIGHT FIXTURES SHALL BE CONFORMANT TO THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN HEALTH CARE FACILITIES (2015) AND THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN EDUCATIONAL FACILITIES (2015).
 - B. LIGHT FIXTURES SHALL BE CONFORMANT WITH THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN HEALTH CARE FACILITIES (2015) AND THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN EDUCATIONAL FACILITIES (2015).
 - C. LIGHT FIXTURES SHALL BE CONFORMANT WITH THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN HEALTH CARE FACILITIES (2015) AND THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN EDUCATIONAL FACILITIES (2015).
 - D. LIGHT FIXTURES SHALL BE CONFORMANT WITH THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN HEALTH CARE FACILITIES (2015) AND THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN EDUCATIONAL FACILITIES (2015).
 - E. LIGHT FIXTURES SHALL BE CONFORMANT WITH THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN HEALTH CARE FACILITIES (2015) AND THE IESNA RECOMMENDED PRACTICES FOR LIGHTING IN EDUCATIONAL FACILITIES (2015).

ELECTRICAL NOTES

No.	Date	Description

PROJECT: HC Biosafety Lab
 SHEET: ELO1
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 DATE: [Date]

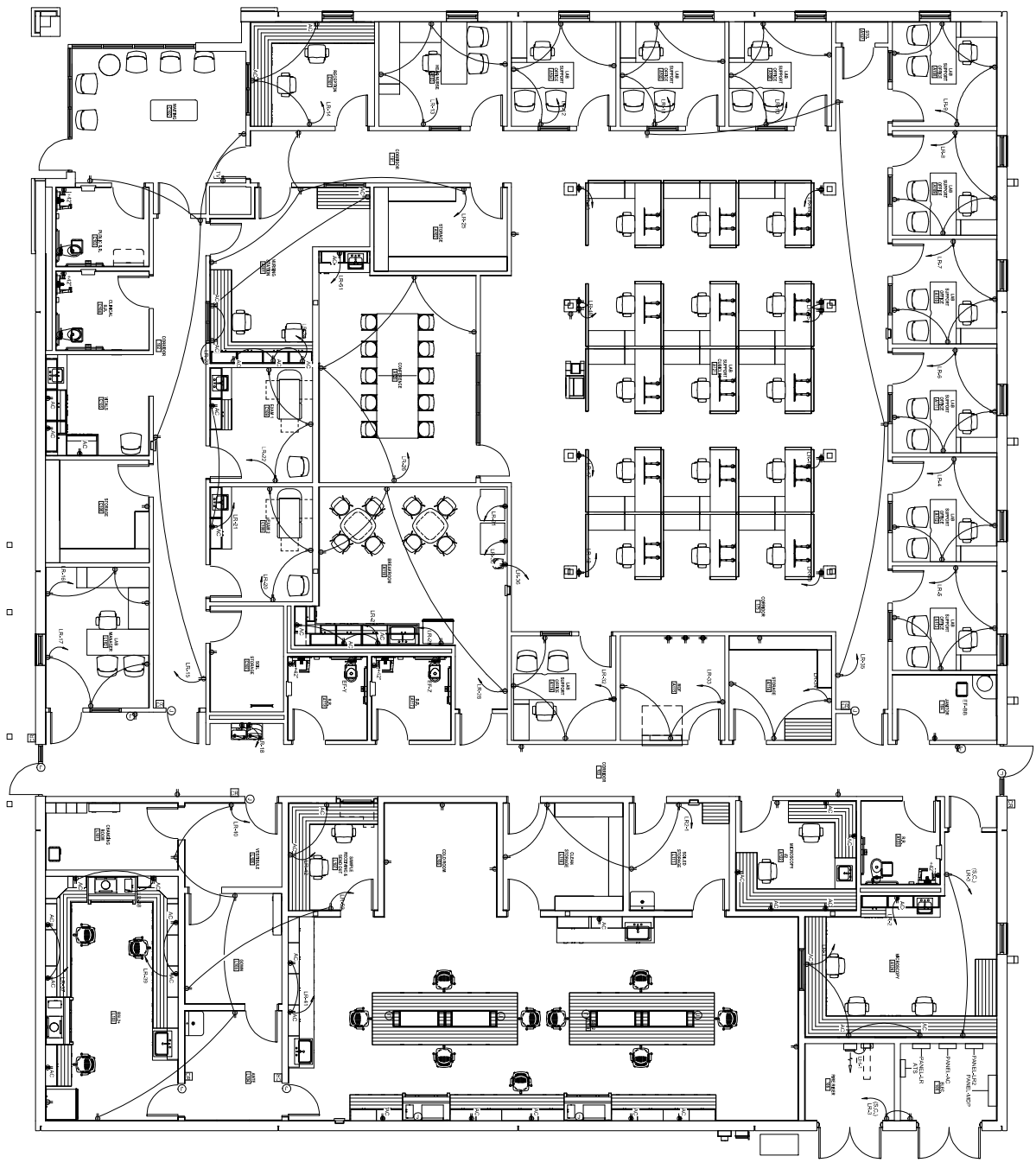
HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

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ero
 200 E. San Juan, Edinburg, TX 78541
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 Website: www.ero.com

1
 Electrical Power Distribution



- GENERAL NOTES-POWER**
- A. COORDINATE LIGHT FIXTURES AND ROOMING WITH ALL TRADES/CONTRACTORS.
 - B. ELECTRICAL CONTRACTOR SHALL VERIFY THAT ALL ELECTRICAL WORK IS IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE ALARM AND SIGNAL CODE (NFPA 72).
 - C. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE ALARM AND SIGNAL CODE (NFPA 72).
 - D. COORDINATE WITH ALL OTHER TRADES/CONTRACTORS TO VERIFY THE LOCATION AND DEPTH OF ALL CONDUIT AND RACEWAY INSTALLATIONS.
 - E. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE ALARM AND SIGNAL CODE (NFPA 72).
 - F. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE ALARM AND SIGNAL CODE (NFPA 72).
 - G. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE ALARM AND SIGNAL CODE (NFPA 72).
 - H. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE ALARM AND SIGNAL CODE (NFPA 72).
 - I. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE ALARM AND SIGNAL CODE (NFPA 72).

ELECTRICAL SERVICES



300 E. 5th Street, Oklahoma City, OK 73101
 405.521.1400 | www.ero.com

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 MEP ENGINEERING
 2000 W. UNIVERSITY BLVD. SUITE 100
 OKLAHOMA CITY, OKLAHOMA 73109
 405.521.1400 | www.trinitymepe.com

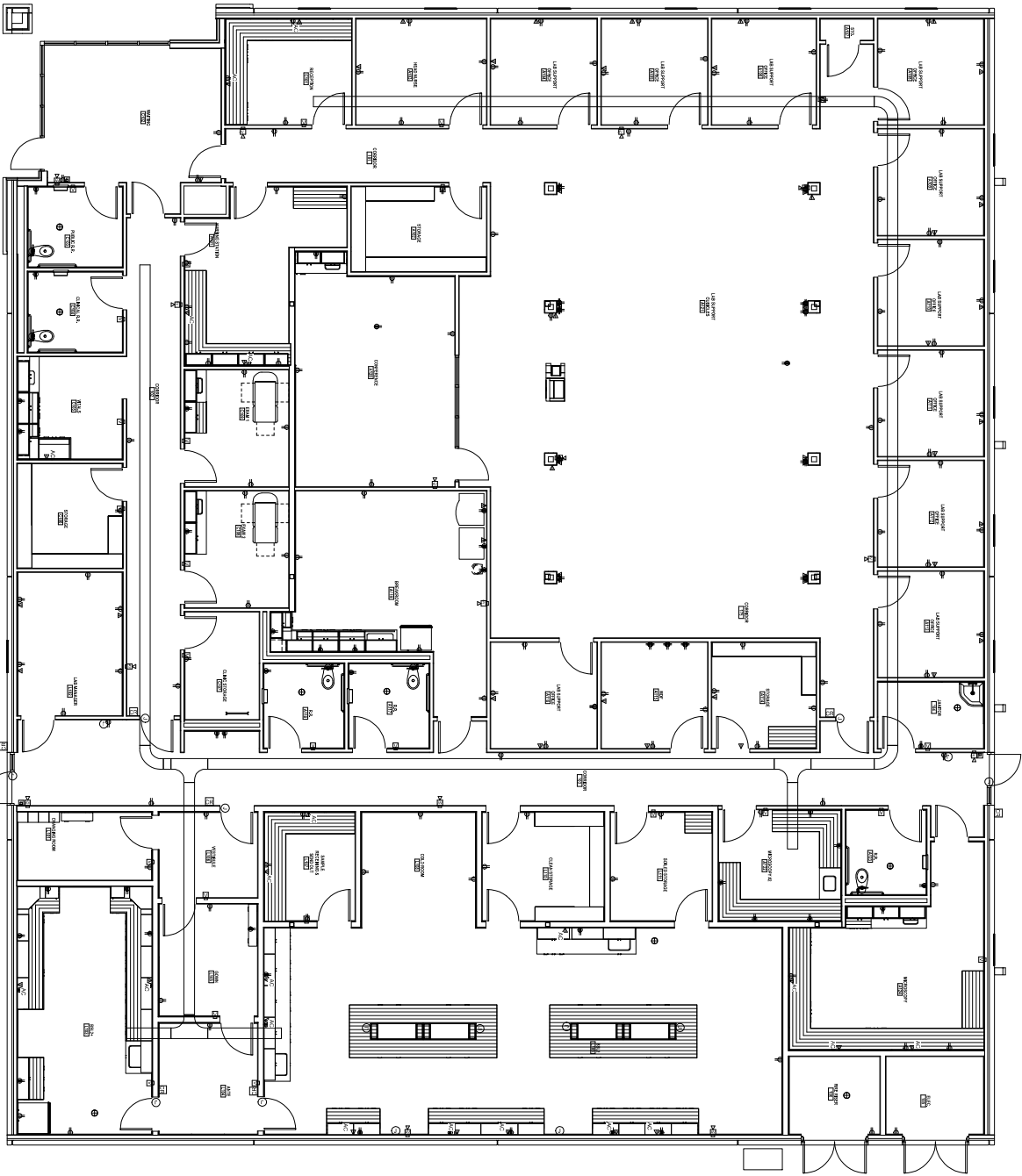
MEP CONSULTING
 1000 N. UNIVERSITY BLVD. SUITE 100
 OKLAHOMA CITY, OKLAHOMA 73109
 405.521.1400 | www.mepconsulting.com

HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

No.	Date	Description

PROJECT: HC Biosafety Lab
 DRAWING: ELECTRICAL POWER DISTRIBUTION PLAN
 SHEET: EP01
 DATE: 05/2021



- GENERAL NOTES - SPECIAL SYSTEMS**
- A. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
 5. MANUFACTURE CAPACITY
 6. MANUFACTURE WEIGHT
 7. MANUFACTURE HEIGHT
 8. MANUFACTURE WIDTH
 9. MANUFACTURE DEPTH
 10. MANUFACTURE MATERIAL
 11. MANUFACTURE FINISH
 12. MANUFACTURE COLOR
 13. MANUFACTURE OPTIONS
 14. MANUFACTURE ACCESSORIES
 15. MANUFACTURE WARRANTY
 16. MANUFACTURE SUPPORT
 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - B. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
 5. MANUFACTURE CAPACITY
 6. MANUFACTURE WEIGHT
 7. MANUFACTURE HEIGHT
 8. MANUFACTURE WIDTH
 9. MANUFACTURE DEPTH
 10. MANUFACTURE MATERIAL
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 13. MANUFACTURE OPTIONS
 14. MANUFACTURE ACCESSORIES
 15. MANUFACTURE WARRANTY
 16. MANUFACTURE SUPPORT
 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - C. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
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 - D. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
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 7. MANUFACTURE HEIGHT
 8. MANUFACTURE WIDTH
 9. MANUFACTURE DEPTH
 10. MANUFACTURE MATERIAL
 11. MANUFACTURE FINISH
 12. MANUFACTURE COLOR
 13. MANUFACTURE OPTIONS
 14. MANUFACTURE ACCESSORIES
 15. MANUFACTURE WARRANTY
 16. MANUFACTURE SUPPORT
 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - E. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
 5. MANUFACTURE CAPACITY
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 7. MANUFACTURE HEIGHT
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 10. MANUFACTURE MATERIAL
 11. MANUFACTURE FINISH
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 13. MANUFACTURE OPTIONS
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 16. MANUFACTURE SUPPORT
 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - F. ALL DEVICES SHALL BE PROVIDED WITH THE FOLLOWING INFORMATION:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
 5. MANUFACTURE CAPACITY
 6. MANUFACTURE WEIGHT
 7. MANUFACTURE HEIGHT
 8. MANUFACTURE WIDTH
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 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - G. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
 5. MANUFACTURE CAPACITY
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 7. MANUFACTURE HEIGHT
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 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - H. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
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 6. MANUFACTURE WEIGHT
 7. MANUFACTURE HEIGHT
 8. MANUFACTURE WIDTH
 9. MANUFACTURE DEPTH
 10. MANUFACTURE MATERIAL
 11. MANUFACTURE FINISH
 12. MANUFACTURE COLOR
 13. MANUFACTURE OPTIONS
 14. MANUFACTURE ACCESSORIES
 15. MANUFACTURE WARRANTY
 16. MANUFACTURE SUPPORT
 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - I. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
 5. MANUFACTURE CAPACITY
 6. MANUFACTURE WEIGHT
 7. MANUFACTURE HEIGHT
 8. MANUFACTURE WIDTH
 9. MANUFACTURE DEPTH
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 16. MANUFACTURE SUPPORT
 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE
 - J. PROVIDE THE FOLLOWING INFORMATION TO THE MANUFACTURER:
 1. MODEL NUMBER
 2. SERIAL NUMBER
 3. MANUFACTURE DATE
 4. MANUFACTURE LOCATION
 5. MANUFACTURE CAPACITY
 6. MANUFACTURE WEIGHT
 7. MANUFACTURE HEIGHT
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 17. MANUFACTURE TRAINING
 18. MANUFACTURE DOCUMENTATION
 19. MANUFACTURE CERTIFICATION
 20. MANUFACTURE COMPLIANCE

ELECTRICAL NOTES



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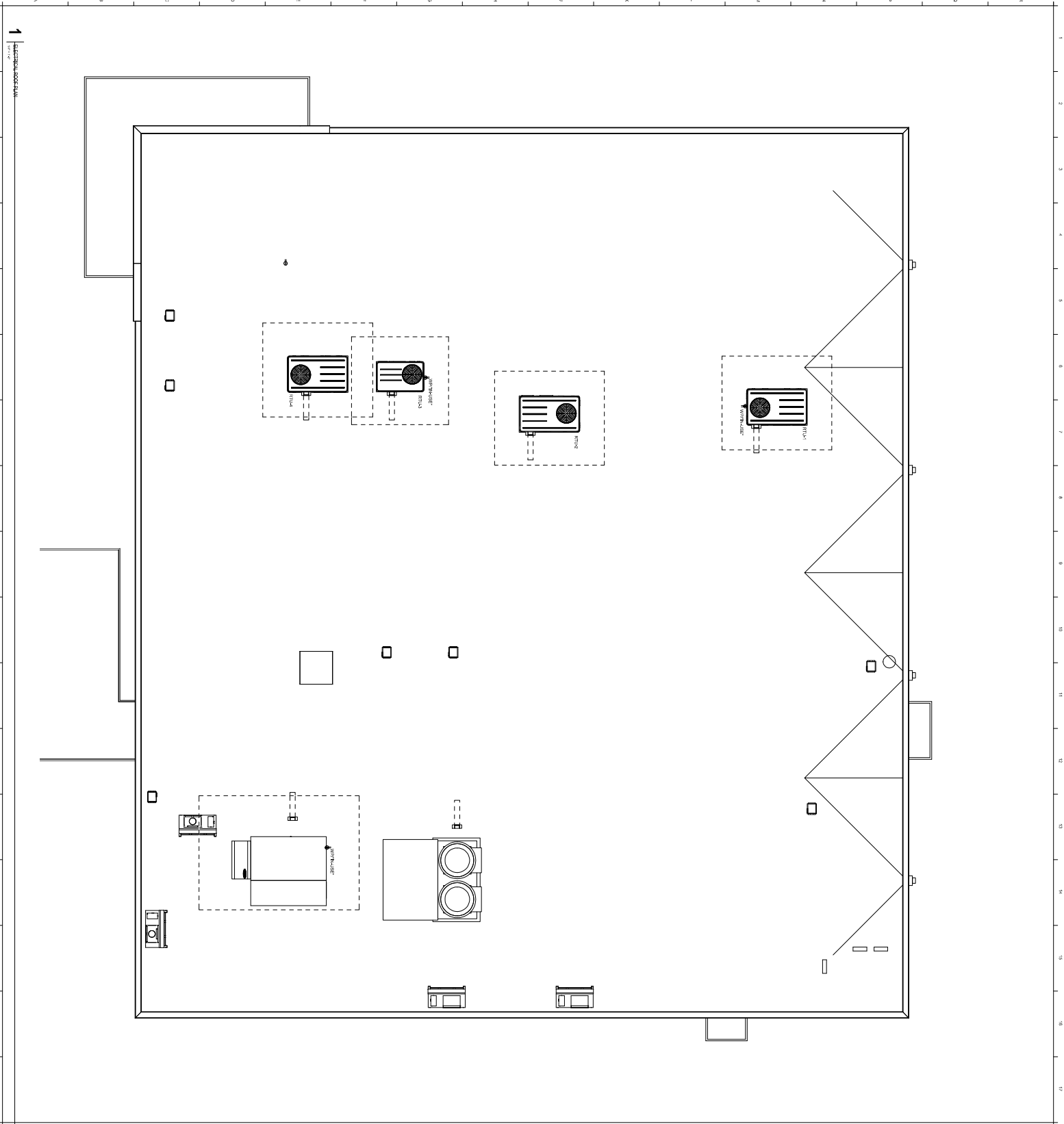
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 361.956.6611 | mepconsulting.com

HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

No.	Date	Description

PROJECT: HC Biosafety Lab
 SHEET: EP02
 SPECIAL SYSTEMS FLOOR PLAN
 100% DESIGN DEVELOPMENT



- GENERAL NOTES- POWER**
- A. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.
 - B. ELECTRICAL CONTRACTOR SHALL VERIFY ALL ELECTRICAL SYMBOLS AND NOTATIONS ARE CORRECT AND AS SHOWN ON THE DRAWING.
 - C. ELECTRICAL CONTRACTOR SHALL VERIFY ALL ELECTRICAL SYMBOLS AND NOTATIONS ARE CORRECT AND AS SHOWN ON THE DRAWING.
 - D. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.
 - E. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.
 - F. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.
 - G. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.
 - H. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.
 - I. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.
 - J. CONSULT THE ELECTRICAL CONTRACTOR FOR THE LATEST CODES AND REGULATIONS.



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HC Biosafety Lab

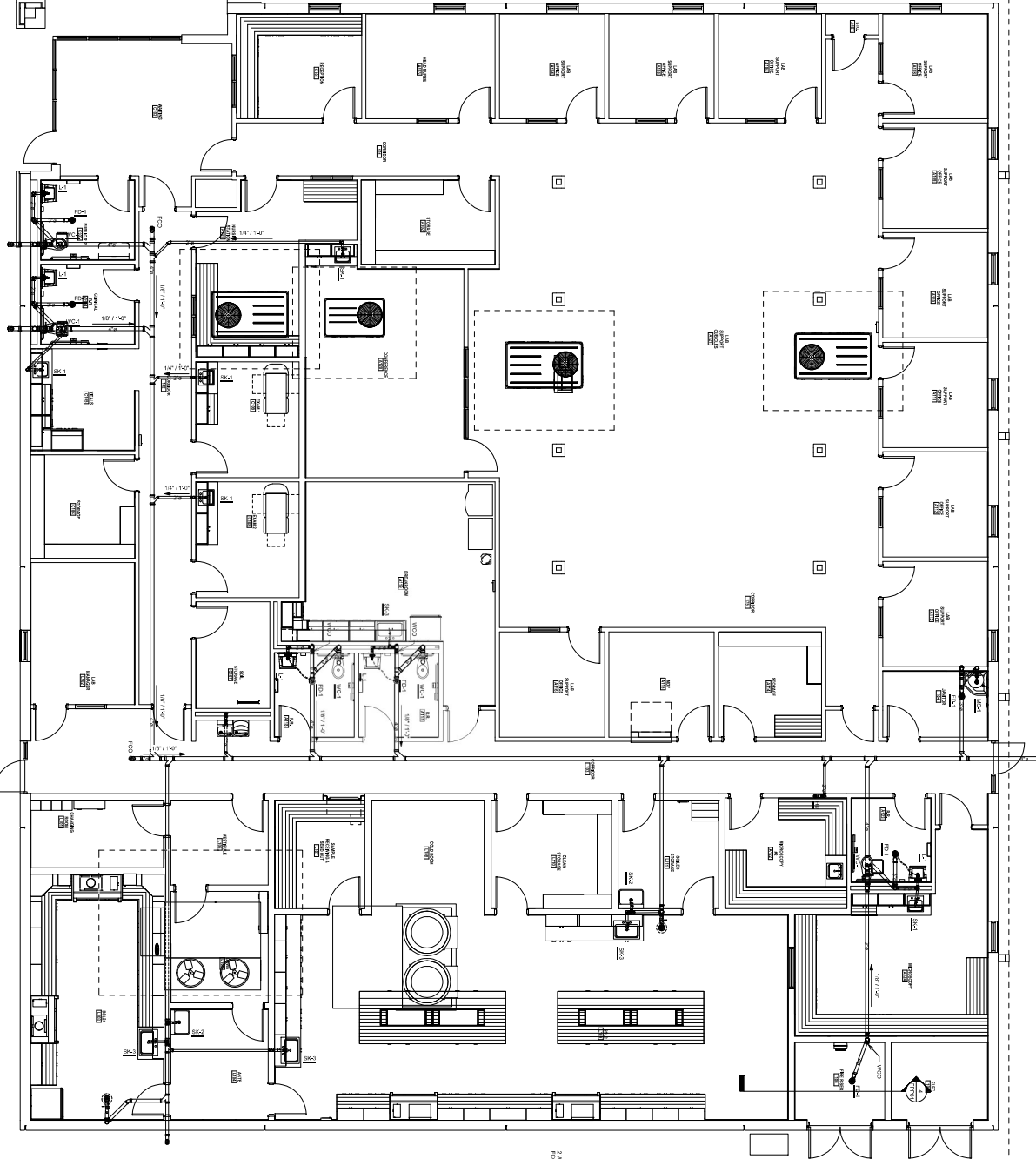
Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

No.	Date	Description

PROJECT INFORMATION

PROJECT NAME: HC Biosafety Lab
 PROJECT NUMBER: EP03
 SHEET NAME: ELECTRICAL RCP PLAN
 SHEET NUMBER: 1001-ESBEN-02-EL001-01

1
 1/16" = 1'-0"



No.	Date	Description

PROJECT: HC Biosafety Lab
 SHEET: PLUMBING SERVICES & VENT FLOOR PLAN
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 DATE: [Date]

HC Biosafety Lab

Hidalgo County Health Department
 S 25th Ave, Edinburg, TX 78542

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