three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot

I. GENERAL

A. Construction

1. Construction shall be in accordance with all applicable codes and ordinances (IBC 2006) and Department of Veterans Affairs Standards.
2. This structure is classified as an open parking structure, occupancy Group S-2, and as construction Type IIB, 1 Hour Protected, Non-Combustible.
3. Building North rotated 30.91° ± counter clockwise from True North. Reference civil site plan for True North orientation.

B. Design Live Loads (All loads are non-factored, service loads):

	Description	Load	Code
1.	Roof, stair/elevator towers	20 psf	IBC 1607.11
2.	Supported parking and drive areas		
	a. Tees (unreduced)*	40 psf	IBC 1607.1
	b. Beams (unreduced)*	40 psf	IBC 1607.1
	c. Columns (reduced)*	32 psf	IBC 1607.1
	*Minimum reduced live load shown, Actual reduced live load for each component to be per applicable Building Code equations considering tributary area.		
3.	Concentrated wheel load (on 4.5" x 4.5" area)	3,000 lb.	IBC 1607.4
4.	Bumper impact, on 1-ft sq, 1'-6", above finished floor	6,000 lb.	ASCE 7-05 4.4.3
5.	Slabs on grade	40 psf	IBC 1607.1
6.	Stairs, landings and lobbies	100 psf	IBC 1607.1
7.	Stair Load on treads on 4 sq. in.	300 lb.	IBC 1607.4
8.	Elevator machine room	150 psf	
9.	Ground snow load (Pg)	0 psf	ASCE 7-05
10.	Wind design criteria ASCE 7-05		
	a. Basic wind speed (3-second gust)	85 mph	ASCE 7-05
	b. Wind load importance factor (Iw)	1.00	ASCE 7-05
	c. Wind exposure	B	ASCE 7-05
	d. Internal pressure coefficient	±0.18	
	e. Components and cladding	see specifications	
	f. Occupancy Category	II	
11.	Earthquake design criteria		
	a. Seismic importance factor (Ie)	1.00	ASCE 7-05
	b. Spectral response acceleration for short period (Ss)	0.464	ASCE 7-05
	c. Spectral response acceleration at I-second period (S1)	0.214	ASCE 7-05
	d. Site class	D	ASCE 7-05
	e. Design spectral response acceleration for short period (SDS)	0.442	ASCE 7-05
	f. Design spectral response acceleration for 1-second period (SD1)	0.281	ASCE 7-05
	g. Seismic design category	D	ASCE 7-05 Rigid Diaphragms
	h. Resisting system in east-west direction		
	1) Basic structural system		Moment Resisting Frame Systems: Precast post-tensioned Hybrid Moment Frames modeled as Special Reinf. Concrete Moment Frames
	2) Design base shear (V)		1122 K (Accounts for 2 additional levels for future expansion and PV Panel loading)
	3) Seismic response coefficient (Cs)		0.05
	4) Response modification factor (R)		8
	5) System overstrength factor (Ωo)		3
	6) Deflection amplification factor (Cd)		5.5
	7) Analysis procedure		Equivalent lateral force *(See III.D.13.)
	i. Resisting system in north-south direction		
	1) Basic structural system		Moment Resisting Frame Systems: Precast post-tensioned Hybrid Moment Frames modeled as Special Reinf. Concrete Moment Frames
	2) Design base shear (V)		1122 K (Accounts for 2 additional levels for future expansion and PV Panel loading)
	3) Seismic response coefficient (Cs)		0.05
	4) Response modification factor (R)		8
	5) System overstrength factor (Ωo)		3
	6) Deflection amplification factor (Cd)		5.5
	7) Analysis procedure		Equivalent lateral force *(See III.D.13.)
12.	Mechanical, Electrical, Plumbing (Dead Load)		3 psf
13.	Stair/Elevator Roof (Dead Load)		15 psf
14.	Per PCI Design Handbook (6th Edition)		
	a. Design temperature differential		35° F
	b. Annual average ambient relative humidity		60%

C. Fire ratings, conforming to MNL-124-S9 and ASTM E119 are as follows: OR one hour.

	Structural Element	Hours Provided	Hours Required
1.	Precast concrete tees or solid slabs	1	0
2.	Precast concrete beams	1	0
3.	Concrete columns	2	0
4.	Concrete walls	2	0
5.	Stair/elevator towers	2	0

D. Future Expansion

1. This parking facility is to be designed for future expansion.
   a. All columns and foundations to be designed to accomodate two (2) additional levels.
   b. All lateral resisting elements for hybrid moment frame to be designed to accomodate two (2) additional levels.

E. Existing Construction

1. Field verify all existing elevations, dimensions, and conditions shown on Drawings before any material fabrication and erection or concrete placement for new construction. Immediately report all discrepancies to Engineer.

II. FOUNDATION WORK

A. Foundations, retaining walls, basement walls, foundation drainage and slabs on grade have been designed in accordance with the recommendations of Krazan and Associates, Project Number 032-10024, dated May 10, 2011. For more information see sections of Specification Divisions 31 6200 and 31 63 16.

B. Foundation Design

Description	Allowable Load
1. Concrete Pad Footings	1875 PSF DL 2500 PSF DL + LL 3325 PSF Seismic
*2. Concrete Pad Footings	5000 PSF DL + LL 6650 PSF Seismic

NOTE: * Defines additional requirements for attaining increased soil bearing pressure. Contractor is to provide 3' of overexcavation under identified footings and is to provide engineered fill with soil compaction testing as per soils report amendment.

C. Retaining Wall Design

1. Design equivalent fluid pressure passive	p = (50 (lb/sf)/ft x h)
2. Design equivalent fluid pressure behind basement type walls laterally supported top and bottom	p = (70 (lb/sf)/ft x h)
3. Design equivalent fluid pressure behind cantilevered retaining walls	P = (50 (lb/sf)/ft x h)
4. Coefficient of sliding friction	0.40
p = pressure(psf); h = height(ft)	

D. See Specification Sections of Division 31 00 00 for excavation and compaction.

E. Footings shall bear on:

1. Compacted engineered fill
2. Surface compacted natural soil

F. The excavation depths indicated on the Drawings are to be used for bidding purposes only and are approximate.

G. Before placement of granular fill below the slab-an-grade, the entire surface shall be proofrolled and observed by the testing agency for soft or unstable material. Remove unacceptable material and replace with approved granular fill.

III. CONCRETE

A. Material Properties - Concrete:

		F'c, psi at 28 days	Max. W/C Ratio	Max. Slump, Inches
1.	Cast-in-place concrete			
	a. Footings	5,000	0.45	4
	b. Grade beams	5,000	0.45	4
	c. Walls	5,000	0.45	3
	d. Slab on grade	4,000	0.45	4
	e. Tee topping, pour strips	5,000	0.40	3
	f. All other	4,000	0.45	4
2.	Precast concrete			
	a. Columns	6,000	0.40	PER SPECS
	b. Tees	6,000	0.40	PER SPECS
	c. Beams	6,000	0.40	PER SPECS
	d. Hollow core units	6,000	0.40	PER SPECS
	e. Solid slabs	4,000	0.40	PER SPECS
	f. Stairs, landings, lobbies	6,000	0.45	PER SPECS
	g. Wall panels	6,000	0.40	PER SPECS
3.	Other concrete			
	a. Columns base drypack	8,000	0	
	b. Masonry wall grout fill	3,000	8-10	
	c. NSNS grout	8,000	0	

4. For additional information regarding Air Entrainment, see Specification Section 03-30-00.
5. All concrete is Normal Weight: 145 pcf.

B. Material Properties - Reinforcing And Connection Steel:

		Fy, psi	ASTM
1.	Welded bars	60,000 OR 60,000	A615* A706
2.	All bars, UN	60,000	A615
3.	Welded wire reinforcement (Smooth)	65,000	A185
4.	Prestressing strand	270,000 (fpu)	A416
5.	Coil bolts and coil rods	65,000, U.N.	
6.	Welding for steel reinf. Bars		AWS D1.4-98
7.	Deformed bar anchors	70,000	A496
8.	Headed anchor studs	60,000	A108
9.	Headed/terminator bars	60,000	A970

*with proper preheat per AWS standards.

C. General Notes for Cast-in-Place and Precast Concrete

1. All Drawings and Details shown as non-warped surfaces. Precast manufacturer is to provide detailing as needed to allow for warping in construction.
2. Column reinforcing shall be continuous, or shall be spliced according to ACI 318-05, Section 12.14.
3. Welded wire reinforcement shall be spliced per ACI 318-05, Section 1219
4. Provide extra reinforcing around all openings, including door openings: two #5 bars all four sides of each opening and extend 2 feet beyond the corners of the opening. Add two #5 bars 4 feet long as diagonal bars at each corner.
5. Where shown hooked, provide standard 90 degree bar hooks unless noted otherwise.
6. When reinforcement is lap spliced, provide Class B splice typical, unless noted otherwise. See details for splice locations.
7. Provide a 3/4 inch chamfer on all exposed corners of concrete. Top edges of walls may be tooled.
8. Provide control/construction joints as shown on the Drawings. For more information, see Specification Section 03-30-00.
9. All inserts and coil rods shall be Galvanized. See Division 3 Specifications for more information.
10. P/C embed shop drawings must be approved and embedded items installed where required prior to placing concrete.

D. Additional notes for precast concrete:

1. The Parking Structure contract Drawings are based on performance type design for precast superstructure. An integral part of this Project is preparation of final Design Drawings, Design Calculations, and Shop Drawings necessary for fabrication and construction of all precast concrete pieces and required accessories in accordance with all code and design requirements, See Specification Section 03-41-33 for more requirements.
2. Precast manufacturer shall bear the responsibility to prepare all Shop Drawings for construction of this structure. The precast manufacturer shall incorporate the necessary design and detailing for the additional two levels of parking considered future.
3. Provide all openings, reveals, drips, blackouts, inserts, etc. cast into precast according to Architectural, Mechanical and Electrical Drawings. Coordinate exact sizes and locations with respective Contractor.
4. Provide 2 #4 L bars minimum (3'-0" legs) at each corner of precast panels.
5. See Drawings for protection of embedded metals.
6. Bending requirements for reinforcing bars to be hot-dip galvanized vary slightly from ACI 318. Refer to ASTM A767 referenced in Specification Section 03-41-33.
7. When erecting the Precast structure, guy and plumb the structure for stability, Guying and bracing shall remain until final stability is achieved, See Specification Section 03-41-33 for information on plumbness.
8. The structure is designed for its final service condition. Contractor shall be responsible for piece design to withstand handling and erection forces, erection sequence, guying, staying, and shoring as required to assure structural stability during construction.
9. For exterior columns, no outward out-of-plumbness tolerance is permitted.
10. Install expansion joints after all guying and bracing has been removed and column plumbness has been measured to be within tolerance.
11. Minimum additional load factor of 1.2 shall be used for design of all superstructure connections unless superseded by seismic requirements of applicable building code. See specifications section 03-41-33 for more information.
12. Floor drainage layout is based on a maximum double tee camber of 1.8 in. Design of P/C double tees shall be such that final in-service camber does not exceed this value. Precast Contractor shall review floor drainage layout and notify engineer of any discrepancies or constructability issues prior to fabrication.
13. It shall be the responsibility of the P/C manufacturer to provide additional design analysis for all P/C reinforcing and connections associated with lateral analysis.

E. Concrete Protection for Reinforcement:

1. The minimum concrete protection for reinforcernent shall be per ACI 318-05, Section 7.7.
2. For prestressed and non-prestressed reinforcement in prestressed/precast concrete members, the minimum concrete protection at top of members shall be 1-1/2 inches consistent with ACI 362,1 R-97,"Guide for the Design of Durable Parking Structures."

IV. STRUCTURAL STEEL

		FY, psi	ASTM
A.	Structural Shapes		
1.	W-shapes	50,000	A992
2.	M-shapes, S-shapes, HP-shapes, channels, angles	36,000	A36
B.	Hollow Structural Sections		
1.	Rectangular and square	46,000	A500 GR. B
2.	Round	42,000	A500 GR. B
C.	Steel Pipes	35,000	A53 GR. B
D.	Structural Plates and Bars	36,000	A36
E.	Bolts		
1.	¼" dia. to 1" dia., UN	92,000	A325
2.	1-1/8" dia. to 1-1/2" dia., UN	81,000	A325
F.	Anchor Rods	36,000	F1554 GR. 36
G.	Welding Electrodes	E70XX	AWS D1.1-04

V. MISCELLANEOUS

A. For exact sizes and locations of mechanical and electrical items and openings, consult respective subcontractors.

B. See Specifications for additional information.

C. Inserts called out on Drawings shall be as designated below for diameters indicated. Nomenclature is for Dayton/Richmond Concrete Accessories.

1.	1/2 inch diameter	Type B-16
2.	3/4 inch diameter	Type F-56, 2 Strut
3.	1 inch diameter	Type F-56, 2 Strut
4.	1-1/4 inch diameter	Type F-58, 4 Strut
5.	Provide coil bolts and rods with the necessary penetration into inserts to develop their full strength per the manufacturer's recommendations.	

VI. TESTING & INSPECTION NOTES

A. The following tests and inspection shall be performed by an independent testing and inspection agency employed by the owner and approved by the structural engineer and the building official. Test and inspection reports shall be submitted for approval to the structural engineer and the building official. Conform to the requirements of IBC sections 109 and 1704.

Required Verification and Inspection	Cont.	Periodic
A. Concrete Construction		
1. Inspection of reinforcing steel, including prestressing tendons, and placement		X
2. Inspection of reinforcing steel welding:		
a. Verification of weldability of reinforcing steel other than ASTM A706		X
b. Shear reinforcement	X	
c. Other reinforcing steel		X
3. Verifying use of required design mix		X
4. Perform sampling and testing of concrete according to the specifications	X	
5. Inspection of concrete and shotcrete placement for proper application techniques	X	
6. Inspection for maintenance of specified curing temperature and techniques		X
7. Inspection of prestressed concrete:		
a. Application of prestressing forces	X	
8. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs		X
9. Erection of precast concrete members		X
B. Steel Construction		
1. Material verification of high-strength bolts, nuts, and washers:		
a. Identification markings to conform to ASTM standards specified in construction documents		X
b. Manufacturer's certificate of compliance required		X
2. Inspection of high strength bolting:		
a. Bearing-type connections		X
3. Inspection of structural steel welding:		
a. Complete and partial penetration groove welds	X	
b. Multi-pass fillet welds	X	
c. Single-pass fillet welds> 5/16"	X	
d. Single-pass fillet welds < 5/16"		X
C. Masonry Construction		
1. Verification of masonry construction:		
a. Size, location, and placement of masonry units		X
b. Type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction		X
c. Specified size, grade, type, and placement of reinforcement		X
d. Protection of masonry during cold weather (temperature below 40 deg. F) or hot weather (temperature above 90 deg. F) XD. Engineered Fill Material		X
D) Engineered Fill Material		
1. Verification for compliance with soils report:		
a. Site preparation		X
b. Material used		X
c. Placement and compaction		X
d. In-place dry density of compacted fill		X

VIII. DEFERRED SUBMITTALS BY PRECAST MANUFACTURER TO DEPARTMENT OF VETERANS AFFAIRS, FRESNO, CALIFORNIA

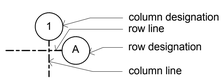
A. The design of precast elements, connections and fittings
B. Vertical element design
C. Lateral element design
D. Future allowance for expansion of 2 vertical levels for structure
E. Allowance for future photovoltaic panels (refer to structural estimated loads below)
F. Elevator and elevator shaft to be coordinated and designed according to elevator manufacturer recommendations and in accordance with these plans

ABBREVIATIONS

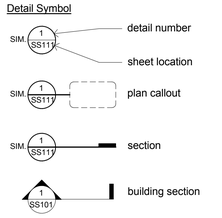
1.	AB	= anchor bolt
2.	CIP	= cast-in-place concrete
3.	CJ	= control joint/construction joint
4.	CMU	= concrete masonry unit
5.	DBA	= deformed bar anchor
6.	DP	= drilled pier
7.	DT	= double tee
8.	EF	= each face
9.	EJ	= expansion joint
10.	ES	= evenly spaced
11.	ETC	= elevation top of drilled pier or pile cap
12.	ETF	= elevation top of footing
13.	ETG	= elevation top of grade beam
14.	ETP	= elevation top of concrete pier
15.	ETS	= elevation top of slab
16.	ETW	= elevation top of wall
17.	EW	= each way
18.	EWEF	= each way, each face
19.	EWP	= elevation working point
20.	FD	= floor drain
21.	GC	= general contractor
22.	HAS	= headed anchor studs
23.	MFR	= manufacturer
24.	NSNS	= non-shrink, non-stain
25.	OC	= on center
26.	P/C	= precast concrete
27.	P/T	= post-tensioned concrete
28.	RD	= roof drain
29.	SIM	= similar
30.	SOG	= slab on grade
31.	UN	= unless noted
32.	WWR	= welded wire reinforcement

SYMBOLS

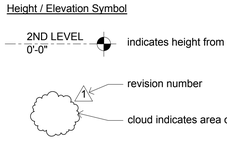
Column Line Symbol



Detail Symbol



Height / Elevation Symbol



LOADS	
ROOF DEAD LOAD:	
Metal Deck	2.8 PSF
Fire Proofing	2.0 PSF
Mechanical	1.0 PSF
Electrical	1.0 PSF
Drop Ceiling	2.0 PSF
Miscellaneous	1.0 PSF
Built Up Roofing (Reroof)	4.0 PSF
Rigid Insulation	4.0 PSF
Total	17.8 PSF
ROOF LIVE LOAD:	
Roof Live Load	20.0 PSF

TYP. LOADING

PV Loading At Top of P/C Columns

	Column Location	DL (K)	LL (K)
1	2; A,E	5.6	3.1
2	3,4; A,E	11.1	6.1
3	5; A,E	13.9	7.7
4	6; A,E	25.0	13.8
5	7; A,E	16.7	9.2
6	2,7; B	16.7	18.4
7	5,6; B	25.0	27.6

GENERAL STRUCTURAL NOTES

N.T.S.

CONSTRUCTION DOCUMENTS - FINAL SUBMISSION

Revisions:	Date

CONSULTANTS:

REGISTERED PROFESSIONAL ENGINEER — ERIC CHRISTOPHER FRAMPTON — No. 64567 — EXPIRES: 06/30/2011 — CIVIL — STATE OF CALIFORNIA

ARCHITECT/ENGINEERS:

Frampton Consulting Engineers
Civil • Structural • Design • Construction
895 W. Ashlan Ave. Clovis, CA 93612
TEL: (559)346-0800 FAX:(559)346-0900
EFRAMPTON@FCE-ENG.COM

Drawing Title: General Structural Notes	Project Title: VA Northern California Health Care System Parking Structure	Project Number: 612 - CSI - 102	Office of Construction and Facilities Management
		Building Number: N/A	
Approved: Project Director	Location: 10535 Hospital Way, Mather, CA 95655	Drawing Number: SS 001	Department of Veterans Affairs
	Date: 06/15/2011 / Checked: ECF / Drawn: SJS	Dwg. 73 of 122	

VA FORM 08-6231