I. GENERAL

A. Construction

1. Construction shall be in accordance with all applicable Federal, State of Texas, and City of Dallas codes and ordinances (IBC 2012), including fire codes.
2. This structure is classified as an open parking structure, occupancy Group S-2, and as construction Type II-A, Unprotected, Non-Combustible.
3. Contractor shall check all plans, sections, and details drawn on Structural Drawings for compatibility with Architectural Drawings. Structural Drawings show only structural elements of parking structure. Discrepancies, if any, shall be reported to Engineer for clarification or adjustments before proceeding with work.

B. Design Live Loads (all loads are service loads unless noted):

	Description	Load
1.	Roof, stair/elevator towers	20 psf

	Description	Roof (Including snow)	Floors
2.	Supported parking and drive areas		
a.	Tees (unreduced)	50 psf	40 psf
b.	Beams (unreduced)	50 psf	40 psf
c.	Columns (reduced)	50 psf	32 psf

3.	Concentrated wheel load (on 4.5" x 4.5" area)	3,000 lb.
4.	Bumper impact, on 1-ft sq, 18" & 27" (not concurrently) above finished floor	6,000 lb.
5.	Slabs on grade	40 psf
6.	Stairs, landings and lobbies	100 psf
7.	Elevator machine room	150 psf
8.	Snow loads	
a.	Ground snow load (Pg)	5 psf
b.	Flat roof snow load (Pf), includes rain on snow surcharge load	10 psf
c.	Snow exposure factor (Ce)	1.0
d.	Snow load importance factor (Is)	1.0
e.	Roof thermal factor (Ct)	1.2
9.	Wind design criteria	
a.	Ultimate design wind speed (3-second gust)	115 mph
b.	Nominal design wind speed	90 mph
c.	Risk Category	II
d.	Wind exposure	B
e.	Internal pressure coefficient	± 0.18
f.	Components and cladding	see specifications
10.	Earthquake design criteria	
a.	Seismic importance factor (Ie)	1.0
b.	Risk Category	II
c.	Spectral response acceleration for short period (Ss)	0.113g
d.	Spectral response acceleration at 1-second period (S_1)	0.049g
e.	Site class	C
f.	Design spectral response acceleration for short period (S_{DS})	0.09g
g.	Design spectral response acceleration for 1-second period (S_{D1})	0.06g
h.	Seismic design category	A
i.	Resisting system in east-west direction	
1)	Basic structural system	Bearing wall system - ordinary precast shear walls
2)	Design base shear (V)	127k (ultimate)
3)	Seismic response coefficient (Cs)	0.01
4)	Response modification factor (R)	3
5)	Deflection amplification factor (Cd)	3
6)	Analysis procedure	Equivalent lateral force
j.	Resisting system in north-south direction	
1)	Basic structural system	Bearing wall system – ordinary precast shear walls
2)	Design base shear (V)	127k (ultimate)
3)	Seismic response coefficient (Cs)	0.01
4)	Response modification factor (R)	3
5)	Deflection amplification factor (Cd)	3
6)	Analysis procedure	Equivalent lateral force
11.	Mechanical, Electrical, Plumbing (Dead Load)	3 psf
12.	Per PCI Design Handbook (6th Edition)	
a.	Design temperature differential	50 F.
b.	Annual average ambient relative humidity	70%

C. Fire ratings, conforming to MNL-124-89 and ASTM E119 are as follows:

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

D. Future Expansion

1. This parking facility not designed for future expansion.

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 recommendations of SCI Engineering, Inc., Report Number 2013-0997.10, dated April 10, 2014. For more information see sections of Specification Division 31.

B. Foundation Design

	Description	Allowable Load
1.	Drilled Piers (bearing)	30,000 psf
2.	Drilled Piers (Skin friction)	2,000 psf

C. Retaining Wall Design

1.	Design equivalent fluid pressure behind basement type walls laterally supported top and bottom.	90 pcf on site soils 65 pcf LL<35% & PI<15% 60 pcf granular material
2.	Passive resistance	250 pcf (upper 2'-0" of soil layer is ignored)

q = surcharge(psf) = 40 psf @ interior parking, 100 psf @ exterior

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

E. Drilled piers shall be socketed into competent shale or marl/limestone as determined by the on-site Geotechnical Representative.

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

G. Existing fill below grade beams and floor slab shall be removed to natural soils. The over excavation should be backfilled with select low plastic materials as determined by the Geotechnical Engineer.

H. For areas beyond the limits where the existing fill is removed, the upper 6" of subgrade shall be stabilized with 7 percent hydrated lime (TxDOT Item 264), by dry weight as recommended in the Geotechnical Report.

I. 6" void forms shall be placed below grade beams, pier caps, and grade level spandrels as recommended in the Geotechnical Report and shown in the foundation details.

III. CONCRETE

A. Material Properties - Concrete:

		F'c, psi at 28 days	Max. W/C Ratio	Max. Slump, Inches	Total Air Content (± 1.5%)	Nom. Max. Aggregate Size
1.	Cast-in-place concrete					
a.	Drilled piers	4,000	0.50	6-8#	No test	2"
b.	Caps	4,000	0.45	4	No test	2"
c.	Grade beams	4,000	0.45	4	No test	¾"
d.	Tee and slab topping	5,000	0.40	3*	4	¾"
e.	Walls	4,000	0.45	3*	4	¾"
f.	Slab on grade	4,000	0.45	4	4	1
g.	All other	4,000	0.45	4	4	¾"
2.	Precast concrete					
a.	Columns	6,000	0.40	**	N/A	¾"
b.	Tees	6,000	0.40	**	N/A	¾"
c.	Beams	6,000	0.40	**	N/A	¾"
d.	Solid slabs	6,000	0.40	**	N/A	¾"
e.	Wall panels	6,000	0.40	**	N/A	¾"
3.	Other concrete					
a.	Columns base drypack	8,000		0	No test	No. 4
b.	Masonry wall grout fill	2,000		8-10	No test	3/8"
c.	NSNS grout	8,000		0	No test	No. 4

*Prior to adding water reducer.
**No slump requirement.
#After water reducer addition (See Specification Section 316329-2.5.D.3).

4. For additional information regarding Air Entrainment, see Specification Section 033000.
5. All concrete is Normal Weight: 145 pcf, except precast double tees. Precast double tees shall be lightweight, see specification 034133.

B. Material Properties - Reinforcing And Connection Steel:

		Fy, psi	ASTM
1.	Welded bars	60,000	A615*
	OR	60,000	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
7.	Deformed bar anchors	70,000	A496
8.	Headed anchor studs	60,000 (fs)	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. Column reinforcing shall be continuous, or shall be spliced according to ACI 318-11, Section 12.17.
2. Welded wire reinforcement shall be spliced per ACI 318-11, Section 12.19.
3. Provide extra reinforcing around all openings, including door openings: two #5 bars all four sides of each opening and extend 2 feet beyond corners of opening. Add two #5 bars 4 feet long as diagonal bars at each corner.
4. Where shown hooked, provide standard 90 degree bar hooks unless noted otherwise.
5. When reinforcement is lap spliced, provide Class B splice typical, unless noted otherwise. See details for splice locations.
6. Slab-on-grade reinforcement shall be #4 @ 18 in. o.c., ew, placed 2 in. clear from top of slab.
7. Combination of polypropylene and polyethylene may be substituted for #4 bars in slab-on-grade if accepted in writing by Engineer. See Specification Section 033000 for products and dosage rates.
8. Provide a 3/4 inch chamfer on all exposed corners of concrete. Top edges of walls may be tooled.
9. Provide control/construction joints as shown on the Drawings. For more information, see Specification Section 033000.
10. All inserts and coil rods shall be Galvanized. See Specification Section 033000 for more information.
11. P/C embed shop drawings must be approved and embedded items installed where required prior to placing concrete.
12. Stripping of forms shall be in accordance with Specification Section 033000.

D. Additional notes for precast concrete:

1. 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 034133 for more requirements.
2. Provide all openings, reveals, drips, blockouts, inserts, etc., cast into precast according to Architectural, Mechanical and Electrical Drawings. Coordinate exact sizes and locations with respective Contractor.
3. Provide 2 #4 L bars minimum (3'-0" legs) at each corner of precast panels.
4. See Drawings for protection of embedded metals.
5. Bending requirements for reinforcing bars to be hot-dip galvanized vary slightly from ACI 318. Refer to ASTM A767 referenced in Specification Section 034133.
6. When erecting Precast structure, guy and plumb structure for stability. Guying and bracing shall remain until final stability is achieved. See Specification Section 034133 for information on plumbness.
7. 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.
8. For exterior columns, no outward out-of-plumbness tolerance is permitted.
9. Install expansion joints after all guying and bracing has been removed and column plumbness has been measured to be within tolerance.
10. 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 034133 for more information.
11. Floor drainage layout is based on a maximum double tee camber of 1 1/2". 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.
12. Steel connections providing gravity support either directly or indirectly (such as torsion connections) shall be fireproofed to meet fire rating requirement of supported structural element.

E. Concrete Protection for Reinforcement:

1. Specified concrete protection for reinforcement shall be per ACI 318-11, Section 7.7.
2. For prestressed and non-prestressed reinforcement in prestressed/precast concrete members, specified concrete protection at top of members shall be 1-1/2 inches consistent with ACI 362.1R-12,"Guide for the Design of Durable Parking Structures."
3. For reinforcement in cast-in-place concrete, specified concrete protection shall be as follows:

		Concrete Cover (inches)
a.	Grade beam top reinforcement	2
b.	Grade beam bottom and side reinforcement	3
c.	Wall reinforcement #5 bar and smaller	1 ½
d.	Wall reinforcement #6 bar and larger	2
e.	Drilled pier/pier cap	3

IV. CONCRETE MASONRY

A. Material Properties

1. Compressive strength of masonry, f'm = 2000 psi.
2. Mortar type "M" or "S".

B. General Concrete Masonry Notes

1. Provide dowels between foundations and walls equal to size and spacing of vertical wall reinforcing, unless noted otherwise.
2. Minimum reinforcement for masonry walls subject to bumper loads shall be #5 @ 8 in. o.c. for a height of 2 feet 8 inches above floor and grout all block cores solid up to 2 feet 8 inches above floor. Minimum reinforcement for masonry walls not subject to bumper loads shall be #4 @ 24 in. o.c. plus one #4 vertical at corners, edges of openings, and ends of walls. Grout block cells with reinforcement full.
3. In masonry walls, provide 8-in.-wide bond beam lintels reinforced with two #5 bars continuous unless shown otherwise on Drawings. Concrete block for three courses directly below bond beam bearing and extending out at an angle of 45 degrees shall be solid block or shall be grouted solid, unless noted otherwise.
4. Provide control joints in masonry walls at 20 ft. on center maximum or as noted on Drawings.

V. 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.	All shapes	50,000	A1085
C.	Steel Pipes	35,000	A53 GR. B
D.	Structural Plates and Bars	36,000	A36
E.	Bolts		
1.	½" dia. to 1" dia., UN	92,000	A325
2.	1-1/8" dia. to 1-½" dia., UN	81,000	A325
F.	Anchor Rods	36,000	F1554 GR. 36
G.	Welding Electrodes	E70XX	AWS D1.1

H. General Structural Steel Notes

1. Lintels shall have a minimum end bearing on masonry of 8 inches, but not less than 1 inch of such bearing for each foot of opening.

VI. 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 necessary penetration into inserts to develop full strength per manufacturer's recommendations.

D. Post-Installed Anchors

1. Post-installed anchors shall only be used where shown on the Construction Documents. The Contractor shall obtain approval from the Engineer-of-Record prior to installing post-installed anchors in place of missing or misplace cast-in-place anchors. Care shall be taken in placing post-installed anchors to avoid conflicts with existing rebar. Holes shall be drilled and cleaned in accordance with the manufacturer's written instructions. Substitution requests, for installations other than those shown, shall be submitted by the Contractor to the Engineer-of-Record along with calculations that are prepared and sealed by a registered professional engineer. The calculations shall demonstrate that the substituted product is capable of achieving the pertinent equivalent performance values (minimum) of the specified product using the appropriate design procedure and/or standard(s) as required by the building code. See Specification Section 033000.

a. Concrete Anchors

1) Mechanical anchors for use in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ACI 355.2 and ICC-ES AC193.
2) Adhesive anchors for use in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ICC-ES AC308.

b. Masonry Anchors

1) Anchorage to Solid-Grouted Concrete Masonry

a) Mechanical and concrete screw anchors for use in solid-grouted concrete masonry shall have been tested and qualified for use in accordance with ICC-ES AC01 or AC106, respectively.
b) Adhesive anchors for use in solid-grouted concrete masonry shall have been tested and qualified for use in accordance with ICC-ES AC58.

2) Anchorage to Hollow Concrete Masonry/Unreinforced Clay Brick Masonry

a) Screw anchors for use in hollow concrete masonry shall have been tested and qualified in accordance with ICC-ES AC106.
b) Adhesive anchors with screen tubes shall be tested and qualified in accordance with ICC-ES AC58 or AC60, as appropriate. The appropriate screen tube shall be used as recommended by the adhesive manufacturer.

E. 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.	EBP	=	elevation bottom of drilled pier
8.	EF	=	each face
9.	EJ	=	expansion joint
10.	ETC	=	elevation top of drilled pier or pile cap
11.	ETG	=	elevation top of grade beam
12.	ETS	=	elevation top of slab
13.	ETW	=	elevation top of wall
14.	EW	=	each way
15.	EWEF	=	each way, each face
16.	EWP	=	elevation working point
17.	FD	=	floor drain
18.	GC	=	general contractor
19.	HAS	=	headed anchor studs
20.	NSNS	=	non-shrink, non-stain
21.	OC	=	on center
22.	OH	=	opposite hand
23.	P/C	=	precast concrete
24.	RD	=	roof drain
25.	SOG	=	slab on grade
26.	UN	=	unless noted
27.	VSI	=	visual stability index
28.	WWR	=	welded wire reinforcement

F. DO NOT SCALE THE DRAWINGS

VII. TESTING & INSPECTION NOTES

A. Following tests and inspection shall be performed by an independent testing and inspection agency employed by Owner and approved by Engineer and Building Official. Test and inspection reports shall be submitted for approval to Engineer and Building Official. Conform to requirements of IBC sections 110, 1704, and 1705.

	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.	Inspection of bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased or where strength design is used.	x	
4.	Inspection of anchors installed in hardened concrete.		x
5.	Verifying use of required design mix.		x
6.	Perform sampling and testing of concrete according to specifications	x	
7.	Inspection of concrete placement for proper application techniques	x	
8.	Inspection for maintenance of specified curing temperature and techniques		x
9.	Inspect formwork for shape, location and dimensions of concrete member being formed		x
10.	Verify finish of concrete slabs and floors (see specification section 033000)		x
11.	Verify location and construction joints in concrete slabs and floors (see specification section 033000 and structural drawings)		x
B.	Precast Concrete		
1.	Erection of precast concrete members		x
2.	Verification of precast member connections in accordance with structural drawings and precast construction (shop) drawings		x
C.	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.	Material verification of structural steel:		
a.	Identification markings to conform to ASTM standards in approved construction documents		x
b.	Manufacturer's certified mill test reports		x
4.	Material verification of weld filler materials:		
a.	Identification markings to conform to AWS specification in approved construction documents		x
b.	Manufacturer's certificate of compliance required		x
5.	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
e.	Floor and deck welds		x
D.	Masonry Construction (see IBC section 1705.4)		
1.	Verification of slump flow and VSI as delivered to the site for self-consolidating grout	x	
2.	Verification of masonry construction		
a.	Proportions of site-prepared mortar		x
b.	Construction of mortar joints		x
c.	Location of reinforcement, connectors, and anchorages		x
3.	During construction the inspection program shall verify:		
a.	Size and location of structural elements		x
b.	Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction		x
c.	Specified size, grade, and type of reinforcement, anchor bolts, and anchorages		x
d.	Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)		x
4.	Prior to grouting, the following shall be verified to ensure compliance:		
a.	Grout space is clean		x
b.	Placement of reinforcement and connectors, and anchorages		x
c.	Construction of mortar joints		x
5.	Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed		x
E.	Soils		
1.	Verify excavations are extended to proper depth and have reached proper material		x
2.	Perform classification and testing of controlled fill materials		x
3.	Verify use of proper materials, densities, and lift thicknesses during placement and compaction of controlled fill	x	
4.	Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly		x
F.	Pier Foundations		
1.	Observe drilling operations and maintain complete and accurate records for each pier	x	
2.	Verify placement locations and plumbness, confirm pier diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable), and adequate end bearing strata capacity. Record concrete volumes.	x	
3.	Perform additional inspections in accordance with Item A. above		
G.	Miscellaneous Items		
1.	Verify installation of expansion joints, traffic topping membranes, and joint sealants		x
2.	Verify attachment and/or bracing of miscellaneous items such as pipes, equipment, signs, bollards, etc.		x

VIII. DEFERRED SUBMITTALS

A. Following items are portions of design that will not be submitted at time of building permit application. Design of these items will be performed and submitted by a specialty contractor during construction phase of project. For information see appropriate Specification Sections related to these items.

1. Precast concrete elements
2. Light gage framing
3. Structural steel framing connections

B. Engineer of Record shall review deferred submittal drawings and calculations prepared by Contractor and forward them to Building Official with notation indicating deferred submittal documents have been reviewed and found to be in general conformance with design requirements. Deferred submittal items shall not be installed until design and submittal documents have been approved by Building Official.

Date	Revisions:
2-24-14	DD2 COST ESTIMATE SET
3-05-14	35% CD SET - NOT FOR CONSTRUCTION
4-30-14	65% CD SET - NOT FOR CONSTRUCTION
6-03-14	95% CD SET - NOT FOR CONSTRUCTION
7-15-14	100% CD SET

PRINTED: 7/14/201 4 3:26:5 1 PM

CONSULTANTS:

WOOLPERT ENGINEERING
343 FOUNTAINS PARKWAY
SUITE 100
FAIRVIEW HEIGHTS, IL 62208
618-632-7004 office
618-632-0100 fax

DAVID MASON & ASSOCIATES
800 S. VANDEVENTER AVE.
ST. LOUIS, MO 63110
314-534-1030 office
314-534-1053 fax

SCI - GEOTECHNICAL
130 POINT WEST BLVD.
ST. CHARLES, MO 63301
636-949-8200
636-949-8269 fax

James E. Warner
104009
STATE OF TEXAS
JAMES E. WARNER
104009
LICENSED
PROFESSIONAL ENGINEER
7-15-14

ARCHITECT/ENGINEERS:

Chiodini Architects
Architecture / Interior Design / Graphics
1401 S. Brentwood Blvd. / Suite 420 / St. Louis, Missouri 63144
314-725-5588 / arch@chiodini.com

WALKER PARKING CONSULTANTS
2525 BAY AREA BLVD.,
SUITE 400
HOUSTON, TX 77058
281-280-0068 office
281-280-0373 fax

FIRM CERTIFICATE OF AUTHORITY NUMBER F-004168

Drawing Title: GENERAL NOTES

Approved: Project Director

Project Title: PATIENT PARKING GARAGE EXPANSION
DEPARTMENT OF VETERANS AFFIRS
NORTH TEXAS VETERANS HEALTH CARE CENTER
4500 S. LANCASTER ROAD
DALLAS, TEXAS 75216

Location

Date: Issue Date | Checked: JEW | Drawn: SOA

Project Number: 549-906
Building Number: 80
Drawing Number: S-001
Dwg. 44 of 93

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231