BLOCK 1170 LOT 18 & 18.02 QUALIFICATION CODE C23-70 ADDRESS (SITE) 425 Jack Martin Blvd. PERMIT NO. 02-3987

CONSTRUCTION PERMIT APPLICATION

C23-70-1
C23-70-2

Application Completes: Sections I, II, III (optional), IV, VI, and VII

I. IDENTIFICATION

1. Proposed Work Site at: East Wing Addition & Parking Garage
2. Name of Owner in Fee: Medical Center of Ocean City Tel. (732) ~~840~~-3296
   Address 425 Jack Martin Blvd (street) Brick NJ (municipality) 08724 (zip code)
3. Ownership in Fee: Public ____ Private ✓
4. Principal Contractor: Wm. Blanchard Co. Tel. (973) 376-9100
   Address 199 Mountain Ave Springfield NJ 07081
   License No. OR, if new home, Builder Reg. No. ____ Exp. Date ____
   Federal Employee No. 22-1688982 FAX: (973) 376-9154
5. Architect or Engineer Vitetta Tel. (215) 218-4747
   Address 4747 South Broad St. Phila, Pa 19112
6. Responsible Person in Charge of Work Bob Wilke
   Tel. (973) 376-9100 FAX (973) 376-9154

NC 2

parking Garage for Hospital

V. FEE SUMMARY (for office use only)

			Update	Update
1.	Building	$ 28528		
2.	Electrical		453	
3.	Plumbing		300	
4.	Fire Protection		458	45
5.	Elevator Devices	0 (Fees)		
6.	Subtotal	$		
7.	Less 20% for State Plan Review			
8.	Subtotal	$		
9.	DCA Training Fee	2168		
10.	Subtotal			
11.	Cert. of Occupancy	2972		
12.	Other	30		
13.	TOTAL	$ 33698	1211	45

Co Mingled

VI. BUILDING/SITE CHARACTERISTICS

		(office use only)
1.	Number of Stories 3	
2.	Height of Structure 35 ft.	
3.	Area — Largest Floor ~~37,290~~ sq. ft.	131,295
4.	New Building Area sq. ft.	141,125
5.	Volume of New Structure cu. ft.	
6.	Construction Classification	
7.	Total Land Area Disturbed sq. ft.	
8.	Flood Hazard Zone	
9.	Base Flood Elevation ft.	
10.	Wetlands yes ____ no ✓	
11.	Max. Live Load	
12.	Max. Occupancy Load	

II. PROPOSED WORK

		Est. Cost	Plans Rec'd by	Date Rec'd	Rejection Date	Approval Date	Re-viewer	Resubmission Dates Approval	Resubmission Dates Rejection	Re-viewer
1.	☐ Minor Work									
2.	☒ New Building	2,500,000				10-16-02				
3.	☐ Addition									
4.	☐ Alteration									
5.	☒ Fire Protection	12,000				10-28-02				
6.	☐ Plumbing	105,000				10-24-02				
7.	☐ Electrical	175,000				10-3-02				
8.	☐ Elevator Devices	90,000								
9.	☐ Asbestos Abat. Subch. 8									
10.	☐ Lead Hazard Abatement									
11.	☐ Demolition		Gw	10/3/02		10/3/02				
	TOTAL COSTS	2,877,000								

OPTIONAL (for office use only)

A.H.B.T. = MANDATORY

III. DO YOU WANT: (optional)

1. ☐ Partial Releases
2. ☒ Prototype Processing

IV. DOES OR WILL YOUR BUILDING CONTAIN ANY OF THE FOLLOWING?

1. ☐ Elevators/Escalators/Lifts/Dumbwaiters/Moving Walks
2. ☐ High Pressure Boilers
3. ☐ Pressure Vessels
4. ☐ Refrigeration Systems
5. ☐ Cross-Connections/Backflow Preventers
6. ☐ Hazardous Uses/Places of Assembly
7. ☐ Sprinklers
8. ☐ Smoke Control Systems in Open Wells
9. ☐ Underground Storage Tanks

VII. DESCRIPTION OF BUILDING USE

A. RESIDENTIAL
1. ☐ Hotels (R-1)
2. ☐ Multi-Family (R-2)
3. ☐ Two-Family (R-3) BOCA
4. ☐ Two-Family (R-4) CABO
5. ☐ One-Family (R-3) BOCA
6. ☐ One-Family (R-4) CABO

No. of dwelling units:
Before Construction ____
After Construction ____
Net Gain or Loss ____

B. NON-RESIDENTIAL
1. State Specific Use: PARKING AREA
2. Use Group:
3. Change in Use Group, Indicate Former:

IN PROGRESS COMMERCIAL

LDS BR 10401381

U.C.C. F100-1 (rev. 3/96)

CERTIFICATION IN LIEU OF OATH

I. OWNER SECTION (to be completed if the applicant is the owner in fee)

I hereby certify that I am the owner in fee of the property listed on Page 1.

Mark the following applicable boxes:

A. ( ) I further certify that a new home (private residence) will be constructed on this property for my own use and occupancy. This dwelling is to be occupied by myself and is not to be used for any purpose other than single family residential use. I attest that all construction, plumbing, or electrical work will be done, in whole or in part, by me or by subcontractors under my supervision, in accordance with all applicable laws; and, I further acknowledge that said new home is not covered under the New Home Warranty and Builders Registration Act (N.J.S.A. 46:3B-1 et seq.) and that such fact shall be disclosed to any person purchasing this property within ten years of the date of issuance of a certificate of occupancy.

I UNDERSTAND THAT IN MARKING BOX A, I ACKNOWLEDGE THAT I AM ASSUMING RESPONSIBILITY FOR THE WORK DONE ON SAID PROPERTY, THE CONDITION OF THE PROPERTY PRIOR TO, DURING, AND AFTER ANY WORK PERFORMED, AND FOR THE PERFORMANCE OF THE SUBCONTRACTORS I HIRE, EMPLOY, OR OTHERWISE CONTRACT OR WITH WHOM I MAKE AGREEMENTS TO PERFORM WORK. I AM VOLUNTARILY AND KNOWINGLY ASSUMING THIS RESPONSIBILITY.

B. ( ) I further certify the following as required by the New Jersey Uniform Construction Code, N.J.A.C. 5:23-2.15(e)1.vii:

I personally prepared the plans submitted for: 1) the new home referred to in A.; or, 2) an addition, alteration, renovation, or repair to an existing single family residence owned and occupied by myself and located on the property listed on Page 1; or, 3) a new structure that will be physically separate from, but that will be deemed part of, an existing single family residence that is owned and occupied by myself and located on the property listed on Page 1.

C. ( ) I further certify that I will perform or supervise the following work:
C.1. ( ) Building C.2. ( ) Fire Protection

I further certify that I will perform the following work:
C.3. ( ) Electrical C.4. ( ) Plumbing

D. ( ) I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I understand that if any of the above statements are willfully false, I am subject to punishment.

Signature _____ Date _____

II. AGENT SECTION (to be completed if the applicant is not the owner in fee)

I hereby certify the following as required by the Uniform Construction Code, N.J.A.C. 5:32-2.15(d): the proposed work is authorized by the owner in fee; and I have been authorized by the owner in fee to make this application as his agent.

I further certify the following as required by the Uniform Construction Code, N.J.A.C. 5:23-2.15(a)5: All required State, county, and local prior approvals have been given, including such certification as the construction official may require.

I agree to advise all contractors on this project that they are required to be registered with the New Jersey Division of Taxation and to comply with all New Jersey tax laws.

I understand that if any of the above statements are willfully false, I am subject to punishment.

(✓) Check if contractor.

Agent Name Wm. Blanchard Co

Address 199 Mountain Ave

Springfield, N.J. 07081

Telephone (973) 376-9100 x235

Signature _____

III. ( ) LEAD HAZARD ABATEMENT: Include Homeowner or Building Owner Affidavit as per N.J.A.C. 5:17.

OFFICE DATE RECEIVED: _____

VIII. PRIOR APPROVALS CHECKLIST (office use only)	LOCAL APPROVAL		COUNTY APPROVAL		REGIONAL APPROVAL		STATE APPROVAL		COMMENTS
	Prelimin. Initial	Final Date	Prelimin. Initial	Final Date	Prelimin. Initial	Final Date	Prelimin. Initial	Final Date	
☐ Zoning Officer									
☐ Planning Board									
☐ Zoning Board									
☐ Sewer Authority									
☐ Water Authority									
☐ Police Department									
☐ Health Department									
☐ Soil Conservation									
☐ N.J. Department of Community Affairs									
☐ N.J. Department of Transportation									
☐ N.J. Department of Environmental Protection									
☐ Utility Dig No.									
☐									
☐									

IX. SUBCODES AND SPECIAL REGULATIONS APPLICABLE (office use only—optional)

Name of Code & Edition		Name of Code & Edition			
Building	_____	Energy	_____	Other	_____
Electrical	_____	Barrier Free	_____		_____
Plumbing	_____	Flood Hazard	_____		_____
Fire Protection	_____	As Built Elevation Cert.	_____		_____
Mechanical	_____	Other	_____		_____

X. CERTIFICATES ISSUED (office use only)

		DATE ISSUED	DATE EXPIRED	DATE REISSUED	DATE EXPIRED
☐ Temporary Certificate of Occupancy	No. _____	_____	_____	_____	_____
☐ Temporary Certificate of Compliance	No. _____	_____	_____	_____	_____
☐ Continued Certificate of Occupancy	No. _____	_____	_____	_____	_____
☐ Certificate of Compliance	No. _____	_____	_____	_____	_____
☐ Certificate of Occupancy	No. _____	_____	_____		
☐ Certificate of Approval	No. _____	_____	_____		
☐ Lead Abatement Clearance Certificate	No. _____	_____	_____	_____	_____

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

Date Issued 06/30/2003
Control #
Permit # 02-3987

UCC NEW JERSEY
CERTIFICATE

IDENTIFICATION

Block 1170 Lot 18 Qual
Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee/Occupant MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Telephone (732)840-3296
Contractor WILLIAM BLANCHARD CO
Address 199 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Telephone (973)376-9100 Fax ( )
Lic. No. or Bldrs. Reg. No.
Federal Emp. No. 22-1688982

Home Warranty No.
Type of Warranty Plan: [ ] State [ ] Private
Use Group U
Maximum Live Load 0
Construction Classification
Maximum Occupancy Load 0
Description of Work/Use:

NEW 3-STORY PARKING GARAGE AND RELATED SITE IMPRO

[ ] CERTIFICATE OF OCCUPANCY
This serves notice that said building or structure has been constructed in accordance with the New Jersey Uniform Construction Code and is approved for occupancy.

[ ] CERTIFICATE OF CLEARANCE - LEAD ABATEMENT 5:17
This serves notice that based on written certification, lead abatement was performed as per NJAC 5:17, to the following extent:
[ ] Total removal of lead-based paint hazards in scope of work
[ ] Partial or limited time period (___ years); see file

[ ] CERTIFICATE OF APPROVAL
This serves notice that the work completed has been constructed or installed in accordance with the New Jersey Uniform Construction Code and is approved. If the permit was issued for minor work, this certificate was based upon what was visible at the time of inspection.

[ ] CERTIFICATE OF CONTINUED OCCUPANCY
This serves notice that based on a general inspection of the visible parts of the building there are no imminent hazards and the building is approved for continued occupancy.

[X] TEMPORARY CERTIFICATE OF OCCUPANCY/COMPLIANCE
If this is a Temporary Certificate of Occupancy or Compliance, the following conditions must be met no later than July 10, 2003 or the owner will be subject to fine or order to vacate:
COMPLIANCE WITH FIRE

[ ] CERTIFICATE OF COMPLIANCE
This serves notice that said potentially hazardous equipment has been installed and/or maintained in accordance with the New Jersey Uniform Construction Code and is approved for use until _____, ___.

CONSTRUCTION OFFICIAL
U.C.C. F260 (rev. 3/96)

Fee $ 2972
Paid [X] Check No. 1011039
Collected by: MJR

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

Date Issued 06/30/2003
Control #
Permit # 02-3987

UCC NEW JERSEY
CERTIFICATE

IDENTIFICATION

Block 1170 Lot 18 Qual
Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee/Occupant MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Telephone (732)840-3296
Contractor WILLIAM BLANCHARD CO
Address 199 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Telephone (973)376-9100 Fax ( )
Lic. No. or Bldrs. Reg. No.
Federal Emp. No. 22-1688982

Home Warranty No.
Type of Warranty Plan: [ ] State [ ] Private
Use Group U
Maximum Live Load 0
Construction Classification
Maximum Occupancy Load 0
Description of Work/Use:

NEW 3-STORY PARKING GARAGE AND RELATED SITE IMPRO

[ ] CERTIFICATE OF OCCUPANCY
This serves notice that said building or structure has been constructed in accordance with the New Jersey Uniform Construction Code and is approved for occupancy.

[ ] CERTIFICATE OF APPROVAL
This serves notice that the work completed has been constructed or installed in accordance with the New Jersey Uniform Construction Code and is approved. If the permit was issued for minor work, this certificate was based upon what was visible at the time of inspection.

[X] TEMPORARY CERTIFICATE OF OCCUPANCY/COMPLIANCE
If this is a Temporary Certificate of Occupancy or Compliance, the following conditions must be met no later than July 10, 2003 or the owner will be subject to fine or order to vacate:
COMPLIANCE WITH FIRE

[ ] CERTIFICATE OF CLEARANCE - LEAD ABATEMENT 5:17
This serves notice that based on written certification, lead abatement was performed as per NJAC 5:17, to the following extent:
[ ] Total removal of lead-based paint hazards in scope of work
[ ] Partial or limited time period (___ years); see file

[ ] CERTIFICATE OF CONTINUED OCCUPANCY
This serves notice that based on a general inspection of the visible parts of the building there are no imminent hazards and the building is approved for continued occupancy.

[ ] CERTIFICATE OF COMPLIANCE
This serves notice that said potentially hazardous equipment has been installed and/or maintained in accordance with the New Jersey Uniform Construction Code and is approved for use until _____, ___.

Fee $ 2972
Paid [X] Check No. 1011039
Collected by: MJR

CONSTRUCTION OFFICIAL
U.C.C. F260 (rev. 3/96)

C3E

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

Date Issued 07/18/2003
Control #
Permit # 02-3987

UCC NEW JERSEY

CERTIFICATE

IDENTIFICATION

Block 1170 Lot 18 Qual
Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee/Occupant MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Telephone (732)340-3296
Contractor WILLIAM BLANCHARD CO
Address 199 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Telephone (973)376-9100 Fax ( )
Lic. No. or Bldrs. Reg. No.
Federal Emp. No. 22-16889626

Home Warranty No. NA
Type of Warranty Plan: [ ] State [X] Private
Use Group U
Maximum Live Load 0
Construction Classification
Maximum Occupancy Load 0
Description of Work/Use:

[X] CERTIFICATE OF OCCUPANCY

This serves notice that said building or structure has been constructed in accordance with the New Jersey Uniform Construction Code and is approved for occupancy.

[ ] CERTIFICATE OF CLEARANCE - LEAD ABATEMENT 5:17

This serves notice that based on written certification, lead abatement was performed as per NJAC 5:17, to the following extent:
[ ] Total removal of lead-based paint hazards in scope of work
[ ] Partial or limited time period (___ years); see file6

[ ] CERTIFICATE OF APPROVAL

This serves notice that the work completed has been constructed or installed in accordance with the New Jersey Uniform Construction Code and is approved. If the permit was issued for minor work, this certificate was based upon what was visible at the time of inspection.6

[ ] CERTIFICATE OF CONTINUED OCCUPANCY

This serves notice that based on a general inspection of the visible parts of the building there are no imminent hazards and the building is approved for continued occupancy.

[ ] TEMPORARY CERTIFICATE OF OCCUPANCY/COMPLIANCE

If this is a Temporary Certificate of Occupancy or Compliance, the following conditions must be met no later than _____, ____ or the owner will be subject to fine or order to vacate:

[ ] CERTIFICATE OF COMPLIANCE

This serves notice that said potentially hazardous equipment has been installed and/or maintained in accordance with the New Jersey Uniform Construction Code and is approved for use until _____, ____.M

Daniel A. Mercurio

CONSTRUCTION OFFICIAL
U.C.C. F250 (rev. 3/96)

Fee $ 2972
Paid [X] Check No. 1011039
Collected by: MJR

CEE

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

Date Issued 07/18/2003
Control #
Permit # 02-3987

UCC NEW JERSEY

CERTIFICATEE

IDENTIFICATION

Block 1170 Lot 18 Qual
Work Site Location 485 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee/Occupant MERIDIAN CENTER OF OCEAN CT
Address SAME
BRICK, NJ 08724-
Telephone 7321540-3298
Contractor WILLIAM BLANCHARD CO
Address 139 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Telephone (973) 376-2100 Fax ( )
Lic. No. or Bldrs. Reg. No.
Federal Emp. No. 22-1698985

Home Warranty No.
Type of Warranty Plan: [ ] State [X] Private
Use Group B
Maximum Live Load 0
Construction Classification
Maximum Occupancy Load 0
Description of Work/Use:

[X] CERTIFICATE OF OCCUPANCY

This serves notice that said building or structure has been constructed in accordance with the New Jersey Uniform Construction Code and is approved for occupancy.

[ ] CERTIFICATE OF CLEARANCE - LEAD ABATEMENT 5:17

This serves notice that based on written certification, lead abatement was performed as per N.J.A.C. 5:17, to the following extent:
[ ] Total removal of lead-based paint hazards in scope of work
[ ] Partial or limited time period (____ months); see files

[ ] CERTIFICATE OF APPROVAL

This serves notice that the work completed has been constructed or installed in accordance with the New Jersey Uniform Construction Code and is approved. If the permit was issued for minor work, this certificate was based upon what was visible at the time of inspection.

[ ] CERTIFICATE OF CONTINUED OCCUPANCY

This serves notice that based on a general inspection of the visible parts of the building there are no imminent hazards and the building is approved for continued occupancy.

[ ] TEMPORARY CERTIFICATE OF OCCUPANCY/COMPLIANCE

If this is a Temporary Certificate of Occupancy or Compliance, the following conditions must be met no later than _____, ____ or the owner will be subject to fine or order to vacate:

[ ] CERTIFICATE OF COMPLIANCE

This serves notice that said potentially hazardous equipment has been installed and or maintained in accordance with the New Jersey Uniform Construction Code and is approved for use until _____, ____.M

Fee $ 2075
Paid [X] Check No. 1011033
Collected by: MJR

CONSTRUCTION OFFICIAL
U.C.C. Fee (rev. 3.96)

C3E

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

Date Issued 10/18/2002
Control 0
Permit # 02-3987

UCC NEW JERSEY

CONSTRUCTION PERMITE

IDENTIFICATION Block 1170 Lot 18 Qual

Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Telephone (732)840-3296

Contractor WILLIAM BLANCHARD CO
Address 199 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Telephone (973)376-9100
Lic. No. or Bldrs. Reg. No.
Federal Ecp. No. 22-1588982

10/18/02 9:15AM 000000M5623
4902 SERV.002

#3987
BUILDING $28528.00
DCA $2168.00
C/O $2972.00
ZPA $15.00
EPA $15.00
CHECK #33698.00

Is hereby granted permission to perform the following work:

[X] BUILDING [ ] PLUMBING [ ] LEAD HAZARD ABATEMENT
[ ] ELECTRICAL [ ] FIRE PROTECTION [ ] DEMOLITION
[ ] ELEVATOR DEVICES [ ] ASBESTOS ABATEMENT [ ] OTHER
(Subchapter 8 only)

DESCRIPTION OF WORK:
NEW 3-STORY PARKING GARAGE AND RELATED SITE IMPROVEMENTS

NOTE: If construction does not commence within one (1) year of date of issuance, or if construction ceases for a period of six (6) months, this permit is void.

Estimated Cost of Work $ 2,500,000

Construction Official

10/18/2002
Date

U.C.C. F170 (rev. 3/96)

PAYMENTS (Office Use Only)

Building	28,528
Electrical	0
Plumbing	0
Fire Protection	0
Elevator Devices	0
Other	
DCA State Permit Fee	2,168
Cert. of Occupancy	2,972
Other ZPA EPA	30
Total	~~33,698~~
Check No.	1011039
Cash	
Collected By	MJR

33,698—

CSE

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

Update Issued 11/06/2002
Control #
Permit # 02-3987+B
Permit Issued 10/18/2002

UCC NEW JERSEY

PERMIT UPDATE

IDENTIFICATION Block 1170 Lot 18 Qual

Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Telephone (732)840-2276

Contractor LITTLE SILVER ELECTRIC
Address 69 BIRCH AVE
LITTLE SILVER, NJ
Telephone (732)741-1252
Lic. No. or Bldrs. Reg. No.
Federal Exp. No. 22-1776392

Is hereby granted permission to perform the following work:

[ ] BUILDING [ ] PLUMBING [ ] LEAD HAZARD ABATEMENT
[ ] ELECTRICAL [X] FIRE PROTECTION [ ] DEMOLITION
[ ] ELEVATOR DEVICES [ ] ASBESTOS ABATEMENT [ ] OTHER
(Subchapter 8 only)

DESCRIPTION OF WORK:
ADD'L FIRE REVIEW

PAYMENTS (Office Use Only)

Building	0
Electrical	0
Plumbing	0
Fire Protection	45
Elevator Devices	0
Other	
DCA State Permit Fee	0
Cert. of Occupancy	0
Other	
Total	45
Check No.	1011259
Cash	
Collected By	ERP

11/06/02 11:15AM 000000#5990
*X07 SERV.007
#023987
FIRE $45.00
CHECK $-45.00

Estimated Cost of Work $ 5,000

Construction Official 11/06/2002 Date

U.C.C. F190 (rev. 3/96)

CEC

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

Update Issued 11/06/2002
Control 0
Permit 0 02-3987+A
Permit Issued 10/18/2002

UCC NEW JERSEY

PERMIT UPDATE

IDENTIFICATION Block 1170 Lot 18 Qual

Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Telephone (732)840-3396

Contractor LITTLE SILVER ELECTRIC
Address 69 BIRCH AVE
LITTLE SILVER, NJ
Telephone (732)741-1222
Lic. No. or Bldrs. Reg. No. 7760
Federal Emp. No. 22-1772092

Is hereby granted permission to perform the following work:

[ ] BUILDING [X] PLUMBING [ ] LEAD HAZARD ABATEMENT
[X] ELECTRICAL [X] FIRE PROTECTION [ ] DEMOLITION
[ ] ELEVATOR DEVICES [ ] ASBESTOS ABATEMENT [ ] OTHER
(Subchapter 6 only)

DESCRIPTION OF WORK:
PARKING GARAGE

PAYMENTS (Office Use Only)

Building	0
Electrical	453
Plumbing	300
Fire Protection	458
Elevator Devices	0
Other	
DCA State Permit Fee	0
Cert. of Occupancy	0
Other	
Total	1,211
Check No.	1011239
Cash	
Collected By	ERP

Estimated Cost of Work $ 575,000

N.J. Newman Jr. 11/6/2002
Construction Official Date

U.C.C. F190 (rev. 3/96)

11/06/02 11:14AM 000000#5989
*X07 SERV.007

#023987

ELECTRIC	$453.00
PLUMBING	$300.00
FIRE	$458.00
CHECK	$1211.00

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

UCC NEW JERSEY
BUILDING
SUBCODE
TECHNICAL SECTION

Date Received 09/20/2002
Date Issued 10/18/02
Control # C23-70
Permit # 02-3987

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS. NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 Qual
Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Tele.(732)840-3296
Contractor DILLIGH BLANCHARD CO
Address 199 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Tele.(973)376-9100 Fax ( )
Lic. No. or Bldrs. Reg. No.
Federal Emp. No. 22-1688982

JOB SUMMARY (Office Use Only)

PLAN REVIEW	Date	Initial
[ ] No Plans Req.		
[X] All	10/16/02	EW
[ ] Footing		
[ ] Foundation		
[ ] Frame		
[ ] Other		

Joint Plan Review Required:
[ ] Elect [ ] Plumb [ ] Fire
SUBCODE APPROVAL [ ] Elev
[ ] CO [ ] CCO [ ] CA
Date:
Approved By:

INSPECTIONS	Dates (Month/Day) Failure	Failure	Approval	Initial
Type				
Footing				
Foundation				
Slab				
Frame				
BarrierFree				
Insulation				
Finishes				
Energy				
Mechanical				
TCO				
Other				
Final				
BarrierFree				

B. BUILDING CHARACTERISTICS

Use Group Present U Proposed U
Constr. Class Present Proposed
No. of Stories 3
Height of Structure 25 Ft.
Area Largest Floor 0 Sq. Ft.
New Bldg. Area/All Floors 131,295 Sq. Ft.
Volume of New Structure 1,141,125 Cu. Ft.
Total Land Area Disturbed 0 Sq. Ft.

Est. Cost of Bldg. Work:
1. New Bldg. $ 2,500,000
2. Alteration $ 0
3. Total (1+2)$ 2,500,000

Industrialized Building:
[ ] State Approved
[ ] HUD

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application.

Signature

D. TECHNICAL SITE DATA
DESCRIPTION OF WORK

NOTE: NO water TO be added TO site delivered concrete only use HRWR

NEW 3-STORY PARKING GARAGE AND RELATED SITE IMPROVEMENTS

cold weather placement must comply with ACI 306.1
Precast must comply with Sect 03410

TYPE OF WORK	FEE (Office Use Only)
[X] New Building	$ 28,528
[ ] Addition	0
[ ] Alteration	0
[ ] Roofing	0
[ ] Siding	0
[ ] Fence 0 Height (exceeds 6')	0
[ ] Sign 0 Sq. Ft.	0
[ ] Pool	0
[ ] Asbestos Abatement Subchapter 8	0
[ ] Lead Haz. Abatement NJAC 5:17	0
[ ] Other	0
Other	0
[ ] Demolition	0

Administrative Surcharge	$ 0
Minimum Fee	$ 0
TOTAL FEE	$ 28,528
CCA State Permit Fee	$ 2,168

Paid [ ] Check # Collected by:

U.C.C. F110 (rev. 3/98)

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

UCC NEW JERSEY
BUILDING
SUBCODE
TECHNICAL SECTION

Date Received 09/20/2002
Date Issued 10/18/02
Control # C23-70
Permit # 02-3987

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS. NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 Qual
Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Tele.(732)840-3296
Contractor WILLIAM BLANCHARD CO
Address 199 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Tele.(973)376-9100 Fax ( )
Lic. No. or Bldrs. Reg. No.
Federal Emp. No. 22-1688982

JOB SUMMARY (Office Use Only)

PLAN REVIEW	Date	Initial
[ ] No Plans Req.		
[X] All	10/16/02	EW
[ ] Footing		
[ ] Foundation		
[ ] Frame		
[ ] Other		

Joint Plan Review Required:
[ ] Elect [ ] Plumb [ ] Fire
SUBCODE APPROVAL [ ] Elev
[ ] CO [ ] CCO [ ] CA
Date:
Approved By:

INSPECTIONS	Dates (Month/Day) Failure	Failure	Approval	Initial
Type				
Footing				
Foundation				
Slab				
Frame				
BarrierFree				
Insulation				
Finishes				
Energy				
Mechanical				
TCO				
Other				
Final				
BarrierFree				

B. BUILDING CHARACTERISTICS

Use Group Present U Proposed U
Constr. Class Present Proposed
No. of Stories 3
Height of Structure 25 Ft.
Area Largest Floor 0 Sq. Ft.
New Bldg. Area/All Floors 131,293 Sq. Ft.
Volume of New Structure 1,141,125 Cu. Ft.
Total Land Area Disturbed 0 Sq. Ft.

Est. Cost of Bldg. Work:
1. New Bldg. $ 2,500,000
2. Alteration $ 0
3. Total (1+2)$ 2,500,000

Industrialized Building:
[ ] State Approved
[ ] HUD

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and an authorized to make this application.

Signature

D. TECHNICAL SITE DATA
DESCRIPTION OF WORK

NOTE: No water to be added to site delivered concrete only use HRWR.

NEW 3-STORY PARKING GARAGE AND RELATED SITE IMPROVEMENTS

Cold weather placement must comply with ACI 306.1
Precast must comply with Sect 03410

TYPE OF WORK	FEE (Office Use Only)
[X] New Building	$ 28,528
[ ] Addition	0
[ ] Alteration	0
[ ] Roofing	0
[ ] Siding	0
[ ] Fence 0 Height (exceeds 6')	0
[ ] Sign 0 Sq. Ft.	0
[ ] Pool	0
[ ] Asbestos Abatement Subchapter 8	0
[ ] Lead Haz. Abatement NJAC 5:17	0
[ ] Other	0
Other	0
[ ] Demolition	0

Administrative Surcharge	$ 0
Paid [ ] Check # Minimum Fee	$ 0
Collected by: TOTAL FEE	$ 28,528
DCA State Permit Fee	$ 2,168

U.C.C. F110 (rev. 3/96)

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

UCC NEW JERSEY
BUILDING
SUBCODE
TECHNICAL SECTION

Date Received 09/20/2002
Date Issued 10/18/02
Control # C23-70
Permit # 02-3987

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS. NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 Qual
Work Site Location 425 JACK MARTIN BLVD
PARKING GARAGE EAST WING
Owner in Fee MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Tele.(732)840-3296
Contractor WILLIAM BLANCHARD CO
Address 199 MOUNTAIN AVE
SPRINGFIELD, NJ 07081-
Tele.(973)376-9100 Fax ( )
Lic. No. or Bldrs. Reg. No.
Federal Emp. No. 22-1688982

COMMERCIAL

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application.

Signature

D. TECHNICAL SITE DATA
DESCRIPTION OF WORK

NOTE: No water to be added to site delivered concrete. Only use HRWR

NEW 3-STORY PARKING GARAGE AND RELATED SITE IMPROVEMENTS

Cold weather placement must comply with ACI 306.1
Precast must comply with Sect 03410

JOB SUMMARY (Office Use Only)

PLAN REVIEW	Date	Initial
[ ] No Plans Req.		
[X] All	10-16-02	FM
[ ] Footing		
[ ] Foundation		
[ ] Frame		
[ ] Other		

Joint Plan Review Required:
[ ] Elect [ ] Plumb [ ] Fire

SUBCODE APPROVAL [ ] Elev
[ ] CO [ ] C/O [ ] CA
Date: 6-30-03
Approved By: FM

INSPECTIONS Type	Dates (Month/Day) Failure	Failure	Approval	Initial
Footing				
Foundation				
Slab				
Frame				
BarrierFree				
Insulation				
Finishes				
Energy				
Mechanical				
TCO				
Other				
Final			6-30-03	FM
BarrierFree				

see other side

B. BUILDING CHARACTERISTICS

Use Group Present U Proposed U
Constr. Class Present Proposed
No. of Stories 3
Height of Structure 25 Ft.
Area Largest Floor 0 Sq. Ft.
New Bldg. Area/All Floors 131,293 Sq. Ft.
Volume of New Structure 1,141,125 Cu. Ft.
Total Land Area Disturbed 0 Sq. Ft.

Est. Cost of Bldg. Work:
1. New Bldg. $ 2,500,000
2. Alteration $ 0
3. Total (1+2)$ 2,500,000

Industrialized Building:
[ ] State Approved
[ ] HUD

TYPE OF WORK	FEE (Office Use Only)
[X] New Building	$ 28,528
[ ] Addition	0
[ ] Alteration	0
[ ] Roofing	0
[ ] Siding	0
[ ] Fence 0 Height (exceeds 6')	0
[ ] Sign 0 Sq. Ft.	0
[ ] Pool	0
[ ] Asbestos Abatement Subchapter 8	0
[ ] Lead Haz. Abatement NJAC 5:17	0
[ ] Other	0
Other	0
[ ] Demolition	0
Administrative Surcharge	$ 0
Minimum Fee	$ 0
TOTAL FEE	$ 28,528
DCA State Permit Fee	$ 2,168

Paid [ ] Check #
Collected by:

U.C.C. F110 (rev. 3/96)

12-30-02
5 Line From: 5 YCL
1 Line Partial (FW)

1-6-03 E Line Partial & End of 1 Line

1-7-03 E-Line Complete

1-9-03 Corner Near Elevator

1-13-03 Interior Piers

1-14 03 Interior Piers

1-15-03 Elevator shaft walls & int Line

1-16-03 partial Inspection wall outside Elevator pit. Change From mountain wall & slab ok

2-1-03 Elevator Starts

East Wing

ELECTRICAL SUBCODE TECHNICAL SECTION

Date Received 11/6/02
Date Issued
Control # ~~023701~~
Permit # 02 3987+A

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 & 18.02
Work Site Location Medical Center of Ocean County
Jack Martin Blvd., Brick, NJ (Parking Garage)
Owner in Fee Medical Center of Ocean County
Address Jack Martin Blvd.
Brick, NJ
Tele. (732) 840-3398
Contractor Little Silver Electric Inc.
Address 68 Birch Avenue
Little Silver, New Jersey 07739
Tele. (____) (732) 741-1222 • Fax (732) 530-5925
Lic. No. 7760
Federal Emp. No: 22-1778092 or Social Security No. ____

COMMERCIAL
Cell 732 778 0335
WR 1004004

B. ELECTRICAL CHARACTERISTICS

Use Group Present ____ Proposed ____
[ ] Pole/Pad # ____ [ ] Temporary [ ] Other ____
Building Occupied as Parking Garage Utility Co. JCP&L
Est. Cost of Elec. Work $ 320,000.00 Fax 732 840 9491 Thanks

JOB SUMMARY (Office Use Only)

PLAN REVIEW:
[ ] No Plans Required
Joint Plan Review Required:
[ ] Bldg. [ ] Plumb.
[ ] Fire [ ] Elevator
[X] Elec. Plans Approved
Date: 10 30 02
Approved by:

SUBCODE APPROVAL
[X] CO [ ] CCO [ ] CA
Date: 6 18 03
Approved By:

INSPECTIONS Type:	Dates (Month/Day) Failure	Failure	Approval	Initial
Rough				
~~Temporary~~ Rough/Stub			4 16 03	MC
Constr. Serv.				
TCO				
Other			12 20	MM
Service			1 17 03	MM
~~Final Serv.~~			3 24 03	MM
Temp. Cut-in-Card Date Issued			3 24 03	MM
Final ~~Cut-in-Card Date Issued~~			6 18 03	MM

Inspect

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Signature — Contractor Seal

[✓] Licensed Electrical Contractor [ ] Exempt Applicant

D. TECHNICAL SITE DATA

NO.	SIZE	ITEM	FEE (Office Use Only)
193		Fixtures (1)	
6		Receptacles (2)	
4		Switches (3)	
203		Total 1 + 2 + 3	____
____	____ Kw	Range	____
____	____ Kw	Oven(s)	____
2	5 Kw	~~Surface~~ Unit Htrs. ?	____
____	____ hp	Dishwasher	____
____	____ hp	Garbage Disposal	____
____	____ Kw	Dryer	____
____	____ Kw	A/C Unit	____
____		Burglar Alarms	____
____		Intercoms Panels	____
4		Smoke Detectors	____
____	____ hp	Whirlpool/spa	____
____		Pool Bonding	____
____	____ hp	Pool Filter Motor	____
____		Pool Lights	____
____	____ Kw	Water Heater(s)	____
____	____ Kw	Central heat:	
		oil, gas or elec.	____
____	____ Kw	Baseboard Heat Units	____
____		Thermostats	____
____	____ hp	Heat Pump	____
1	Frac hp	Pump(s)	____
2 (1)250	Amp	Motor Control Center/Sub Panels	____
(1)60	Amp	Signs	____
12	20'	Light Standards ?	____
4	1/4 hp	Motors—Fractional H.P.	____
2	40 hp	Motors—All Others	____
1	15 Kw	Transformers	____
____	____ Kw	Generators	____
1	250 Amp	Service Entrance— 480V 3Phase	____
____	____	Other	____

Administrative Surcharge $ ____
Paid [ ] Check # ____ Minimum Fee $ ____
DCA Training Fee $ ____
Collected by: ____ TOTAL FEE $ ____

U.C.C. Form F-120B 1 White = Inspector Copy 2 Canary = Office Copy 3 Pink = Office Copy 4 Gold = Applicant Copy

EAST Wing

ELECTRICAL SUBCODE
TECHNICAL SECTION

Date Received 11/6/02
Date Issued
Control # ~~033-70-1~~
Permit # 02 3987 A

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block ~~1170~~ Lot ~~18 & 18.02~~
Work Site Location ~~Medical Center of Ocean County~~
~~Jack Martin Blvd., Brick, NJ (Parking Garage)~~
Owner in Fee ~~Medical Center of Ocean County~~
Address ~~Jack Martin Blvd.~~
~~Brick, NJ~~
Tele. (~~732~~) ~~840-3398~~
Contractor Little Silver Electric Inc.
Address 68 Birch Avenue
Little Silver, New Jersey 07739
Tele. ( ) (732) 741-1222 • Fax (732) 530-5925
Lic. No. 7760
Federal Emp. No. 22-1778092 or Social Security No.

B. ELECTRICAL CHARACTERISTICS

Use Group Present Proposed
[ ] Pole/Pad # [ ] Temporary [ ] Other
Building Occupied as ~~Parking Garage~~ Utility Co. ~~JCP&L~~
Est. Cost of Elec. Work $ ~~320,000.00~~

JOB SUMMARY (Office Use Only)

PLAN REVIEW:
[ ] No Plans Required
Joint Plan Review Required:
[ ] Bldg. [ ] Plumb.
[ ] Fire [ ] Elevator
[X] Elec. Plans Approved
Date: 10.30.02
Approved by:

SUBCODE APPROVAL
[ ] CO [ ] CCO [ ] CA
Date:
Approved By:

INSPECTIONS Type:	Dates (Month/Day) Failure	Failure	Approval	Initial
Rough				
Temporary				
Constr. Serv.				
TCO				
Other				
Service				
Final				

Temp. Cut-in-Card Date Issued
Final Cut-in-Card Date Issued

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Signature — Contractor Seal

[✓] Licensed Electrical Contractor [ ] Exempt Applicant

D. TECHNICAL SITE DATA

NO.	SIZE		ITEM	FEE (Office Use Only)
~~193~~			Fixtures (1)	
~~6~~			Receptacles (2)	
~~4~~			Switches (3)	
~~203~~			Total 1 + 2 + 3	
		Kw	Range	
		Kw	Oven(s)	
~~2~~	~~5~~	Kw	~~Surface Unit~~ Htrs.	
		hp	Dishwasher	
		hp	Garbage Disposal	
		Kw	Dryer	
		Kw	A/C Unit	
			Burglar Alarms	
			Intercoms Panels	
~~4~~			Smoke Detectors	
		hp	Whirlpool/spa	
			Pool Bonding	
		hp	Pool Filter Motor	
			Pool Lights	
		Kw	Water Heater(s)	
		Kw	Central heat: oil, gas or elec.	
		Kw	Baseboard Heat Units	
			Thermostats	
		hp	Heat Pump	
~~1~~	~~Frac~~	hp	Pump(s)	
~~2~~	~~(1)250~~	Amp	Motor Control Center/Sub Panels	
	~~(1)60~~	Amp	Signs	
~~12~~	~~20'~~		Light Standards	
~~4~~	~~1/4~~	hp	Motors—Fractional H.P.	
~~2~~	~~40~~	hp	Motors—All Others	
~~1~~	~~15~~	Kw	Transformers	
		Kw	Generators	
~~1~~	~~250~~	Amp	Service Entrance — 480V 3Phase	
			Other	

Administrative Surcharge $
Paid [ ] Check # Minimum Fee $
DCA Training Fee $
Collected by: TOTAL FEE $

U.C.C. Form F-120B 1 White = Inspector Copy 2 Canary = Office Copy 3 Pink = Office Copy 4 Gold = Applicant Copy

EAST Wing

FIRE SUBCODE TECHNICAL SECTION

Date Received 11/6/02
Date Issued
Control # ~~C23 10-2~~
Permit # 02 3987+B

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 & 18.02
Work Site Location Medical Center of Ocean County
425 Jack Martin Blvd., Brick, NJ
Owner in Fee Medical Center of Ocean
Address Jack Martin Blvd.
Brick, NJ +(Parking Garage)
Tele. (732) 840-3398
Contractor Little Silver Electric Inc.
Address 68 Birch Avenue
Little Silver, New Jersey 07739
Tele.(732) 741-1222 (732) 530-5925
Lic. No. 7760
Federal Emp. No. 22-1778092 or Social Security No.

COMMERCIAL

B. FIRE PROTECTION CHARACTERISTICS

Use Group Present ____ Proposed ____
Constr. Class. Present ____ Proposed ____
Heating Systems [ ] New [ ] Existing [ ] HVAC
Type: [ ] Gas [ ] Oil [ ] Electrical [ ] Solar
[ ] Other ____
Location: ____
Total Cost of Fire Protection Work $ 5,000.00

Fire Alarm System
New [X] Existing [X]
Location of Panel: Main Bldg.
Fire Suppression/Standpipe System
New [ ] Existing [ ]
Location of Main Control Valve:

JOB SUMMARY (Office Use Only)

PLAN REVIEW:
[ ] No Plans Required
Joint Plan Review Required:
[ ] Building. [ ] Plumbing
[ ] Electric [ ] Elevator
[ ] Fire Plans Approved
Date: 11-01-02
Approved by: KLR
SUBCODE APPROVAL
[ ] CO [ ] CCO [ ] CA
Date: 7-3-03
Approved By:

INSPECTIONS Type:	Dates (Month/Day) Failure	Failure	Approval	Initial
Alarm System	6/27		6/27	(KW)
Suppression Sys.				
Standpipe				
Fire Pump				
Pre-Eng. System				
Mechanical				
Smoke Control				
TCO — TEMP TODAY				
Final				
Other				

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application.

7-18-03 Approved

Signature

1 Original = Applicant's Copy 2 Canary = Office Copy
3 Pink = Office Copy 4 Gold = Inspector's Copy

U.C.C. Form F-140A (rev. 3/96)

D. TECHNICAL SITE DATA

Description of Work

Water Supply Source
Method of Valve Supervision

Storage Tanks
Type: [ ] Flammable Liquid [ ] Combustible Liquid
[ ] LPG [ ] LNG Capacity ____ Fuel ____

Alarm Systems [X] 110v Interconnected [X] System

	NUMBER
Alarm Devices (i.e., smoke, heat, pulls, water/flow)	10
Supervisory Devices (i.e., tampers, low/high air)	2
Signaling Devices (i.e., horn/strobes, bells)	6
Other Devices	
TOTAL	18

Suppression Systems

Fire Pump ____ GPM Type ____	
Dry Pipe/Alarm Valves	
Pre-action Valves	
Sprinkler Heads (Dry and Wet)	
Standpipes	
Pre-engineered Systems	
Wet Chemical	
Dry Chemical	
CO_2 Suppression	
Foam Suppression	
Halon Suppression	
Other	
Kitchen Hood Exhaust System	
Smoke Control System	
Gas [ ] or Oil [ ] Fired Appliances	
Other	

6/27/03 need to insp. sleeve SD heads

FEE (Office Use Only)

Administrative Surcharge	$
Minimum Fee	$
DCA Training Fee	$
TOTAL FEE	$

EAST WING

MCOC BRICK FACILITY
NEW PARKING GARAGE

FIRE SUBCODE TECHNICAL SECTION

Date Received 11/6/02
Date Issued
Control # ~~C23-70~~ 1
Permit # 02 3987 TA

STAFF 132740 2717

A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 1170 Lot 18 & 18.20
Work Site Location JACK MARTIN BLVD 425
BRICK NJ 08724
Owner in Fee MERIDIAN HEALTH SYSTEM
Address WALL NJ

Tele. (732) 836-4077
Contractor BARHAM-MCBRIDE CO. INC.
Address 4239 HWY 33
TINTON FALLS NJ 07753
Tele. (732) 922-0660 Fax (732) 922-3562
Lic. No. BI 6107
Federal Emp. No. 22-1101670

B. FIRE PROTECTION CHARACTERISTICS

Use Group Present HOSPITAL Proposed HOSPITAL
Constr. Class Present _____ Proposed _____
Heating Systems [ ] New [ ] Existing [ ] HVAC
Type: [ ] Gas [ ] Oil [ ] Electric [ ] Solar
[ ] Other _____
Location: _____
Total Cost of Fire Protection Work $ _____

Fire Alarm System
New [ ] Existing [ ]
Location of Panel: _____
Fire Suppression/Standpipe System
New [ ] Existing [ ]
Location of Main Control Valve: _____

COMMERCIAL

JOB SUMMARY (Office Use Only)

PLAN REVIEW
[ ] No Plans Required
Joint Plan Review Required:
[ ] Building [ ] Plumbing
[ ] Electric [ ] Elevator
[ ] Fire Plans Approved
Date: 10-28-02
Approved by: ICC

SUBCODE APPROVAL
[ ] CO [ ] CCO [ ] CA
Date: 7303
Approved by: _____

INSPECTIONS Type:	Dates (Month/Day) Failure	Failure	Approval	Initial
Alarm System				
Suppression Sys.	5-12-03			
Standpipe	200 PSI OK		6-25-03	
Fire Pump			PC	
Pre-Eng. System				
Mechanical			6-27-03	
Smoke Control				
TCO →	TEMP →			
Final				
Other			10	

7/8/03 EW

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application.

_____
Signature

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK:

Water Supply Source _____
Method of Alarm/Suppression System Supervision _____

	NUMBER	FEE (Office Use Only)
Storage Tanks		
Type: [ ] Flammable Liquid [ ] Combustible Liquid		
[ ] LPG [ ] LNG Capacity ___ Fuel ___		
Alarm Systems [ ] 110v Interconnected	**NUMBER**	
[ ] System		
Alarm Devices (i.e., smoke, heat, pulls, water/flow)	19	
Supervisory Devices (i.e., tampers, low/high air)	4	
Signaling Devices (i.e., horn/strobes, bells)	4	
Other Devices _____		
TOTAL		
Suppression Systems		
Fire Pump ___ GPM Type ___		
Dry Pipe/Alarm Valves		
Preaction Valves		
Sprinkler Heads (Dry and Wet)		
Standpipes	2	
Pre-engineered Systems		
Wet Chemical		
Dry Chemical		
CO_2 Suppression		
Foam Suppression		
Halon Suppression		
Other _____		
Kitchen Hood Exhaust System		
Smoke Control System		
Gas [ ] or Oil [ ] Fired Appliances		
Other _____		

Administrative Surcharge	$ _____
Minimum Fee	$ _____
DCA Training Fee	$ _____
TOTAL FEE	$ _____

U.C.C. F140
(rev. 3/96)

5-13-03 @ 9:15 200 PSI standpipe

5-13-03 @

6-24-03 Tested pumps

Houston Accel to DE

EAST Wing

FIRE SUBCODE TECHNICAL SECTION

Date Received 11/6/02
Date Issued
Control # ~~22,702~~
Permit # 02 35873

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 & 18.02
Work Site Location Medical Center of Ocean County
425 Jack Martin Blvd., Brick, NJ
Owner in Fee Medical Center of Ocean
Address Jack Martin Blvd.
Brick, NJ +(Parking Garage)
Tele. (732) 840-3398
Contractor Little Silver Electric Inc.
Address 68 Birch Avenue
Little Silver, New Jersey 07739
Tele.(732) 741-1222 (732) 530-5925
Lic. No. 7760
Federal Emp. No. 22-1778092 or Social Security No.

B. FIRE PROTECTION CHARACTERISTICS

Use Group Present _____ Proposed _____
Constr. Class. Present _____ Proposed _____
Heating Systems [ ] New [ ] Existing [ ] HVAC
Type: [ ] Gas [ ] Oil [ ] Electrical [ ] Solar
[ ] Other _____
Location: _____
Total Cost of Fire Protection Work $ 5,000.00

Fire Alarm System
New [X] Existing [X]
Location of Panel: Main Bldg.
Fire Suppression/Standpipe System
New [ ] Existing [ ]
Location of Main Control Valve:

JOB SUMMARY (Office Use Only)

PLAN REVIEW:
[ ] No Plans Required
Joint Plan Review Required:
[ ] Building. [ ] Plumbing
[ ] Electric [ ] Elevator
[ ] Fire Plans Approved
Date: 11-01-02
Approved by: RLR
SUBCODE APPROVAL
[ ] CO [ ] CCO [ ] CA
Date:
Approved By:

INSPECTIONS Type:	Dates (Month/Day) Failure	Failure	Approval	Initial
Alarm System				
Suppression Sys.				
Standpipe				
Fire Pump				
Pre-Eng. System				
Mechanical				
Smoke Control				
TCO			1	
Final				
Other				

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am/authorized to make this application.

Signature

1 Original = Applicant's Copy 2 Canary = Office Copy
3 Pink = Office Copy 4 Gold = Inspector's Copy

U.C.C. Form F-140A
(rev. 3/96)

D. TECHNICAL SITE DATA

Description of Work

Water Supply Source
Method of Valve Supervision

Storage Tanks
Type: [ ] Flammable Liquid [ ] Combustible Liquid
[ ] LPG [ ] LNG Capacity ____ Fuel ____

	NUMBER	FEE (Office Use Only)
Alarm Systems [X] 110v Interconnected [X] System		
Alarm Devices (i.e., smoke, heat, pulls, water/flow)	10	
Supervisory Devices (i.e., tampers, low/high air)	2	
Signaling Devices (i.e., horn/strobes, bells)	6	
Other Devices		
TOTAL	18	
Suppression Systems		
Fire Pump ____ GPM Type ____		
Dry Pipe/Alarm Valves		
Pre-action Valves		
Sprinkler Heads (Dry and Wet)		
Standpipes		
Pre-engineered Systems		
Wet Chemical		
Dry Chemical		
CO_2 Suppression		
Foam Suppression		
Halon Suppression		
Other		
Kitchen Hood Exhaust System		
Smoke Control System		
Gas [ ] or Oil [ ] Fired Appliances		
Other		

Administrative Surcharge	$	
Minimum Fee	$	
DCA Training Fee	$	
TOTAL FEE	$	

MCOC BRICK FACILITY
NEW PARKING GARAGE

EAST Wing c/o 1/18/07

03-36

PLUMBING SUBCODE
TECHNICAL SECTION

Date Received
Date Issued
Control # ~~C23-76-1~~
Permit # 02-3987+A

A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 1170 Lot 18 & 18.02
Work Site Location 425 JACK MARTIN BLVD
BRICK NJ 08724
Owner in Fee MERIDIAN HEALTH SYSTEM
Address WALL NJ
Tele. (732) 836-4077
Contractor BARHAM-MCBRIDE CO INC
Address 4239 HWY 33
TINTON FALLS NJ 07753
Tele. (732) 922-0660
Lic. No. BI 6107
Federal Emp. No. 22-1101670 or Social Security No.

732-890 0223 Call

COMMERCIAL

B. PLUMBING CHARACTERISTICS

Use Group Present HOSPITAL Proposed HOSPITAL
Building Sewer Size EXISTING Public Sewer Private Septic
Water Service Size EXISTING Public Water Private Well
Estimated Cost of Plumbing Work $ 80,000.00

JOB SUMMARY (Office Use Only)

PLAN REVIEW:
[ ] No Plans Required
Joint Plan Review Required:
[ ] Bldg. [ ] Elec.
[ ] Fire [ ] Elevator
[ ] Plumb. Plans Approved
Date: 10-24-02
Approved by:

SUBCODE APPROVAL:
[ ] CO [ ] CCO [ ]
Approved By:
Date: 2-18-05

INSPECTIONS Type:	Failure	Failure	Dates (Month/Day) Approval	Initial
Slab				
Rough				
Water				
Sewer				
Fixtures				
Gas Equipment				
Gas Piping				
Solar				
TCO GARAGE Addn'l			1/18/07	
GARAGE FINAL			1/24/07	
			6/27/03	

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Signature—Contractor Seal

+C

[X] Licensed Plumbing Contractor [ ] Exempt Applicant

D. TECHNICAL SITE DATA (List all fixtures.)

NO.	FIXTURE/EQUIPMENT	FEE (Office Use Only)
	Water Closet	
	Urinal/Bidet	
	Bath Tub	
	Lavatory	
	Shower	
	Floor Drain	
	Sink	
	Dishwasher	
	Drinking Fountain	
	Washing Machine	
	Hose Bibb	
	Water Heater	
	Fuel Oil Piping	
	Gas Piping	
	Steam Boiler	
	Hot Water Boiler	
	Sewer Pump	
	Interceptor/Separator	
	Backflow Preventer	
	Greasetrap	
	Water Cooled A/C or Refrigeration Unit	
	Sewer Connection	
	Water Service Connection	
	Active Solar System	
27	Other GARAGE DRAINS	
3	AREA DRAINS	

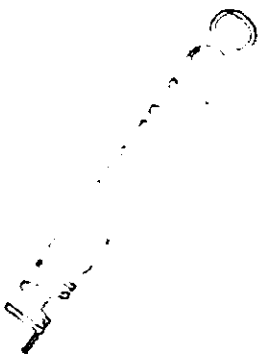
Administrative Surcharge $
Paid [ ] Check # Minimum Fee $
DCA Training Fee $
Collected by: TOTAL $

U.C.C. Form F-130B

1 White = Inspector Copy
2 Canary = Office Copy
3 Pink = Office Copy
4 Gold = Applicant Copy

4/11/03

① - UPDATE NUMBERS FOR Sump. Pump. IN ELEVATOR SHAFT.



5/30

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

UCC NEW JERSEY
PLUMBING
SUBCODE
TECHNICAL SECTION

Date Received 05/27/2003
Date Issued ~~01/01/1954~~
Control #
Permit # 02-3987+C 6/30/03

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS. NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 Qual

Work Site Location 425 JACK MARTIN BLVD
SUMP PUMP (PARKING LOT OF EAST WING)

Owner in Fee MERIDIAN CENTER OF OCEAN CTY
Address SAME
BRICK, NJ 08724-
Tele.(732)840-3296
Contractor BARHAM-MCBRIDE CO INC
Address 4239 HWY 33
TINTON FALLS, NJ 07753-
Tele.(732)922-0660
Lic. No. or Bldrs. Reg. No. BI6107
Federal Emp. No. 22-1101670

B. PLUMBING CHARACTERISTICS

Use Group Present U Proposed U
Building Sewer Size [ ] Public Sewer [ ] Private Septic
Water Sewer Size [ ] Public Water [ ] Private Well
Estimated Cost of Plumbing Work $ 250

JOB SUMMARY (Office Use Only)

~~PLAN REVIEW~~
[ ] No Plans Required
Joint Plan Review Required:
[ ] Bldg [ ] Elect
[ ] Fire [ ] Elevator
[ ] Plumb. Plans Approved
Date: 5/29/03
Approved By:

SUBCODE APPROVAL
[ ] CO [ ] CCO [ ] CA
Approved By:
Date:

INSPECTIONS Type	Dates (Month/Day) Failure	Failure	Approval	Initial
Slab				
Rough				
Water				
Sewer				
Fixtures				
Gas Equip.				
Gas Piping				
Solar				
TCO				

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Signature/Contractor Seal
[ ] Licensed Plumbing Contractor [ ] Exempt Applicant

D. TECHNICAL SITE DATA (List all fixtures.)

NO.	FIXTURE/EQUIPMENT	FEE (Office Use Only)
0	Water Closet	0
0	Urinal / Bidet	0
0	Bath Tub	0
0	Lavatory	0
0	Shower	0
0	Floor Drain	0
0	Sink	0
0	Dishwasher	0
0	Drinking Fountain	0
0	Washing Machine	0
0	Hose Bib	0
0	Water Heater	0
0	Fuel Oil Piping	0
0	Gas Piping	0
0	Steam Boiler	0
0	Hot Water Boiler	0
1	~~Sewer Pump~~ Sump Pump	35
0	Interceptor / Separator	0
0	Backflow Preventer (elevator)	0
0	Greasetrap	0
0	Sewer Connection	0
0	Water Service Connection	0
0	Stacks	0
	Other	0
	Other	0

Administrative Surcharge $	0
Minimum Fee $	0
TOTAL FEE $	35
DCA State Permit Fee $	0

Paid [ ] Check #
Collected by:

U.C.C. F130 (rev. 3/96)

TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE RD
DIVISION OF INSPECTIONS

UCC NEW JERSEY
PLUMBING
SUBCODE
TECHNICAL SECTION

Date Received 05/27/2003
Date Issued 01/01/1954
Control #
Permit # 02-3987+C

A. IDENTIFICATION-APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS. NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000

Block 1170 Lot 18 Qual

Work Site Location 425 JACK MARTIN BLVD

SUMP PUMP

Owner in Fee MERIDIAN CENTER OF OCEAN CTY

Address SAME

BRICK, NJ 08724-

Tele.(732)840-3296

Contractor BARHAM-MCBRIDE CO INC

Address 4239 HWY 33

TINTON FALLS, NJ 07753-

Tele.(732)922-0660

Lic. No. or Bldrs. Reg. No. BI6107

Federal Emp. No. 22-1101670

B. PLUMBING CHARACTERISTICS

Use Group Present U Proposed U

Building Sewer Size [ ] Public Sewer [ ] Private Septic

Water Sewer Size [ ] Public Water [ ] Private Well

Estimated Cost of Plumbing Work $ 250

JOB SUMMARY (Office Use Only)

PLAN REVIEW
[ ] No Plans Required
Joint Plan Review Required:
[ ] Bldg [ ] Elect
[ ] Fire [ ] Elevator
[ ] Plumb. Plans Approved
Date: 5/29/03
Approved By:
SUBCODE APPROVAL
[ ] CO [ ] CCO [ ] CA
Approved By:
Date:

INSPECTIONS Type	Dates (Month/Day) Failure	Failure	Approval	Initial
Slab				
Rough				
Water				
Sewer				
Fixtures				
Gas Equip.				
Gas Piping				
Solar				
TCO				

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I an the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Signature/Contractor Seal

[ ] Licensed Plumbing Contractor [ ] Exempt Applicant

D. TECHNICAL SITE DATA (List all fixtures.)

NO.	FIXTURE/EQUIPMENT	FEE (Office Use Only)
0	Water Closet	0
0	Urinal / Bidet	0
0	Bath Tub	0
0	Lavatory	0
0	Shower	0
0	Floor Drain	0
0	Sink	0
0	Dishwasher	0
0	Drinking Fountain	0
0	Washing Machine	0
0	Hose Bib	0
0	Water Heater	0
0	Fuel Oil Piping	0
0	Gas Piping	0
0	Steam Boiler	0
0	Hot Water Boiler	0
1	~~Sewer Pump~~ Sump Pump	35
0	Interceptor / Separator	0
0	Backflow Preventer (reduced pressure)	0
0	Greasetrap	0
0	Sewer Connection	0
0	Water Service Connection	0
0	Stacks	0
	Other	0
	Other	0

Administrative Surcharge $ 0
Minimum Fee $ 0
TOTAL FEE $ 35
DCA State Permit Fee $ 0

Paid [ ] Check #
Collected by:

U.C.C. F130 (rev. 3/96)

NCOC BRICK FACILITY
NEW PARKING GARAGE

PLUMBING SUBCODE
TECHNICAL SECTION

Date Received
Date Issued
Control #
Permit #

A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 11769 Lot 18 & 18.02
Work Site Location 75 JACK MARTIN BLVD
BRICK NJ 08724
Owner in Fee MERIDIAN HEALTH SYSTE
Address HALL
Tele. (732) 836-4077
Contractor PARISI SCHEDE CO INC
Address 4239 HWY 33
TINTON FALLS NJ 07753
Tele. (732) 922-9660
Lic. No. ST 6107
Federal Emp. No. 22-1101570 or Social Security No.

B. PLUMBING CHARACTERISTICS

Use Group Present HOSPITAL Proposed HOSPITAL
Building Sewer Size EXISTING Public Sewer Private Septic
Water Service Size EXISTING Public Water Private Well
Estimated Cost of Plumbing Work $ 86,000.00

JOB SUMMARY (Office Use Only)

PLAN REVIEW:
[ ] No Plans Required
Joint Plan Review Required:
[ ] Bldg. [ ] Elec.
[ ] Fire [ ] Elevator
[ ] Plumb. Plans Approved
Date:
Approved by:

SUBCODE APPROVAL:
[ ] CO [ ] CCO [ ] CA
Approved By:
Date:

INSPECTIONS Type:	Failure	Dates (Month/Day) Failure	Approval	Initial
Slab				
Rough				
Water				
Sewer				
Fixtures				
Gas Equipment				
Gas Piping				
Solar				
TCO				

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Signature—Contractor, Seal

[X] Licensed Plumbing Contractor [ ] Exempt Applicant

D. TECHNICAL SITE DATA (List all fixtures.)

NO.	FIXTURE/EQUIPMENT	FEE (Office Use Only)
	Water Closet	
	Urinal/Bidet	
	Bath Tub	
	Lavatory	
	Shower	
	Floor Drain	
	Sink	
	Dishwasher	
	Drinking Fountain	
	Washing Machine	
	Hose Bibb	
	Water Heater	
	Fuel Oil Piping	
	Gas Piping	
	Steam Boiler	
	Hot Water Boiler	
	Sewer Pump	
	Interceptor/Separator	
	Backflow Preventer	
	Greasetrap	
	Water Cooled A/C or Refrigeration Unit	
	Sewer Connection	
	Water Service Connection	
	Active Solar System	
27	Other GARAGE DRAINS	
3	[illegible]	

Administrative Surcharge $
Paid [ ] Check # Minimum Fee $
DCA Training Fee $
Collected by: TOTAL $

U.C.C. Form F-1308 1 White = Inspector Copy 2 Canary = Office Copy 3 Pink = Office Copy 4 Gold = Applicant Copy

TOWNSHIP OF BRICK
ZONING PERMIT

Approved: October 2, 2002 **No.** 2.1635

Block: 1170 **Lot:** 18-18.02 **Zone:** H-S, Hospital Support

Property Address: 425 Jack Martin Boulevard

Applicant: Robert Wilke; William Blanchard Company

Property Owner: Medical Center of Ocean County

Existing Use: Hospital

Proposed Use: Same.

Proposed Construction: Three-story parking garage, 25' high.

Conditions: Site plan approved by the Planning Board.
Case No. PB-2403 (2266)(1281)2-A-PSP/FSP-V-2/02.
Resolution adopted on July 10, 2002.
Maps signed on September 27, 2002.

This permit shall be null, void and of no effect if any of the facts contained in the application upon the basis that this permit was granted are false or untrue in any material respect.
This permit shall expire one (1) year after the date of issuance if the use or substantial construction has not been commenced.

Michael P. Fowler, AICP/PP
Municipal Planner

Sean Kinnevy
Zoning Officer

RECEIVED
SEP 24 2002
ZONING

RECEIVED
OCT 2 2002
ZONING

TOWNSHIP OF BRICK ZONING PERMIT APPLICATION

(Please Type or Print Neatly in Ink, Not Pencil)

Applications missing any of the following information will delay processing and may be returned to you.

Block 1170 Lot 18 & 18.02 Qualifier

PROPERTY ADDRESS 425 Jack Martin Blvd.

PERSONAL NAME OF APPLICANT Robert Wilke

BUSINESS NAME OF APPLICANT Wm. Blanchard Co.

PROPERTY OWNER Medical Center of Ocean County

PRESENT USE OF PROPERTY (check all that apply)

☐ Vacant Lot ☐ Single-family dwelling ☐ Multi-family dwelling
☒ Commercial (please describe) Hospital Parking Area

PROPOSED USE OF PROPERTY (check all that apply)

☐ Vacant Lot ☐ Single-family dwelling ☐ Multi-dwelling
☒ Commercial (please describe) Hospital Public Garage

PROPOSED CONSTRUCTION (check all that apply)

☒ New Building (please describe) 3-Story Parking Garage
☐ Addition
☐ Alteration
☐ Porch or deck (state heights)
☐ Shed (state height)
☐ Fence (state type & height)
☐ Swimming Pool ☐ in-ground ☐ above-ground
☐ Other (please describe)

COMMERCIAL

CHECKLIST

☑ All information completed above
☑ Two (2) copies of a plot plan containing:
☑ All existing and proposed structures
☑ All dimensions of the lot and structures
☑ All setbacks from the structures to the property lines
☑ All adjacent streets and waterways
☐ If applicable, include a copy of the Zoning Board of Adjustment Resolution, the date that the map was signed, and/or the date that the subdivision map was filed with the Ocean County Clerk, along with the file map and number.

Note: No partial, taped, faxed, reduced or enlarged copies can be accepted.

The applicant certifies that all statements and information made and provided as part of this application are true to the best of the applicant's knowledge, information and belief. The applicant further states that the applicant will comply with all other Municipal approvals and ordinances, and all County, State, and Federal Regulations.

Signature of applicant [signature] Date Sept 19, 2002

Reviewed by Zoning Office [signature] Date 9/20/2 (X) Approved ( ) Denied
[signature] 10/2/2

Wilke, Bob

From: Steven J. DiFlora [sdiflora@klengineers.com]
Sent: Monday, October 07, 2002 11:46 AM
To: 'Wilke, Bob'
Cc: Doug Murray (E-mail); Scott Malin (E-mail); Samenfeld, Richard; Samuel Turovsky
Subject: RE: Electrical Questions from Brick Electrical Subcode Official o n Garage Job 4869

LPHG.XLS

Post-it® Fax Note 7671 Date 10/7/02 # of pages 2
To MARCEL RENSEN From BOB WILKE
Co./Dept. Brick Bldg Dept. Co. WMBCO
Phone # 732-262-4628 Phone # 973-376-9100
Fax # 732-262-8954 Fax # 376-9154

Bob: Answers to the 5 numbered questions below:

1. The available ground fault current rating is 150,000 AIC for main switchboard.
2. We will add the grounding to the riser diagram.
3. Electrical load calculation and summary are attached below.
4. The "wiring methods" covers to much verbiage to put on a drawing in its' entirety. This is covered in the Specification. However, we can add a simple note about the conduit types to the drawing. Basically, as the spec says, all exposed conduits in the Parking Garage are to be of rigid Sch.40 galvanized steel pipe. All those located inside the Electrical Equipment Room can be of EMT.
5. For conduits housing the secondaries, the buried portion must be in either rigid Sch.40 galvanized steel pipe, or, in concrete-encased rigid PVC. Once you pop up in the Electrical Room, see 4 above.

THIS IS WHAT WILL BE DONE

Steve

-----Original Message-----
From: Wilke, Bob [mailto:bwilke@wmblanchard.com]
Sent: Monday, October 07, 2002 11:04 AM
To: Steve DiFlora (E-mail)
Cc: Doug Murray (E-mail); Scott Malin (E-mail); Samenfeld, Richard
Subject: Electrical Questions from Brick Electrical Subcode Official on Ga rage Job 4869

Steve,
The electrical inspector would like you to answer the following questions as part of his plan review on the Garage Drawings:

1. Available Fault Current Rating on gear?
2. Grounding not shown on riser diagram
3. Total Load Calculation
4. Wiring Methods. (I told him we were using EMT. He said to put it on the drawings).
5. Conduit type from the secondary side of the utility transformer to the garage service needs to be specified; pvc, thin wall, rigid?

Please e-mail your responses back to me and I will print out and fax same to Mr. Marcel Renson.

Thanks,
Bob Wilke
Wm Blanchard Co.

DATE: 07-Oct-02 12:34 PM

JOB: 4960

PANEL: LPHG

PANEL CODE: 2

PHASE: 3

WIRE: 4

MAINS AMP: 225

MAIN CB AMP:

AIC

PANEL CODE- 1(120/208V) 2(277/480V) 3(265/460V)

CIRCUIT NO	CIRCUIT BKR	LOAD DESIGNATION	LOAD VA	PHASES A	PHASES B	PHASES C	LOAD VA	LOAD DESIGNATION	CIRCUIT BKR	CIRCUIT NO
1	3P/	ELEV. #1	15000	18100			3100	LTG. 1st LEVEL	2P/	2
3	100	3#2, 1" C	15000		18100		3100		20	4
5			15000			18100	3100	LTG. 1st LEVEL	2P/	6
7	3P/	ELEV. #2	15000	18100			3100		20	8
9	100	3#2, 1" C	15000		17500		2500	LTG. 2nd LEVEL	2P/	10
11			15000			17500	2500		20	12
13	3P/	AP-G (VIA TR.)	5000	7500			2500	LTG. 2nd LEVEL	2P/	14
15	30	(15 KVA)	5000		7500		2500		20	16
17		3#10, 1/2"C	5000			7700	2700	LTG. 3rd LEVEL	2P/	18
19	20	LTG. STAIRS	400	3100			2700		20	20
21	20	LTG. STAIRS	400		2300		1900	OUTDOOR LTG.	2P/	22
23	20	EM. LTG 1st LEVEL	300			2200	1900		20	24
25	20	EM. LTG 2nd LEVEL	300	5300			5000	UH-1, 2#6, 3/4"C	40	26
27	20	EXIT SIGNS	50		5050		5000	UH-2, 2#6, 3/4"C	40	28
29	20	EXIT SIGNS	50			50		SPARE	20	30
31	20	SPARE		0				SPARE	20	32
33	20	SPARE			0			SPARE	20	34
35	20	SPARE				0		SPARE	20	36
37	20	SPARE		0				SPARE	20	38
39	20	SPARE			0			SPARE	20	40
41	20	SPARE				0		SPARE	20	42
			TOTAL	52100	50450	45550	TOT. KVA	148.1		
							TOT. AMP	178.2		
				DEM. DECIMAL		1	DEM.KVA	148.1		
				SPARE DECIMAL			DEM.AMP	178.2		

FILE N 4960 ELEC LPHG

732-840-3296

Bob Wilk

National Electrical Code
Plan Review Record
Township of Brick

973 3[illegible] 9100

Date: 10-7-02

Site Address: Hospital Parking Garage

Reviewed By: MW

CORRECTION LIST

No.	Description
(1)	Aic Rating for gear
(2)	grounding? not on Drawing 2 sec!!
(3)	permit all work
(4)	total load caculation
(5)	Wire method
(6)	Conduit type

Party Called and Phone #:

Resubmitted on: By:

BRICK TOWNSHIP PLANNING BOARD

SECOND AMENDED PRELIMINARY AND

FINAL SITE PLAN APPROVAL WITH VARIANCES

RESOLUTION R- 42 -02 PAGE 1

Case No. PB-2403 (2266) (1281) 2-A-PSP/FSP-V-2/02 April 24, 2002

WHEREAS, MERIDIAN HOSPITALS CORPORATION, MEDICAL CENTER OF OCEAN COUNTY, having a mailing address of 425 Jack Martin Boulevard, Brick, New Jersey 08724, has applied to the Brick Township Planning Board for second amended preliminary and final site plan approval pursuant to N.J.S.A. 40:55D-46, 50, 51, and 60; and

WHEREAS, proof of service as required by law upon appropriate property owners and governmental bodies has been furnished and determined to be in proper order; and

WHEREAS, a public hearing was held on April 10, 2002 in the Municipal Building for a discussion of the reasons for the second amended preliminary and final site plan approval and all interested parties having been heard, and at which time testimony was presented on behalf of the applicant and all interested parties having been heard and the following exhibits were admitted into evidence:

A-1 Site Plan by Menlo Engineering Associates Inc. dated 2/14/02

A-2 Color rendering of architectural/hospital addition

A-3 Plan of canopies/circulation route

A-4 Architectural of proposed three-story parking garage

A-5 Temporary Office Trailer Plan by Menlo Engineering Associates Inc. dated 3/19/02

A-6 Architectural of four-story hospital addition

A-7 Traffic Assessment Study dated 1/02

A-8 Drainage Plan by Menlo Engineering Associates Inc. dated 2/14/02

A-9 Environmental Impact Study by Menlo Engineering Associates Inc. dated 2/14/02

A-10 Brick Township Shade Tree Commission Report of 4/5/02

A-11 Ocean County Soil Conservation Report dated 2/25/02

A-12 Brick Township Planning Board Engineering Professional Jay C. Steinmetz, P.E., C.M.E. of T&M Associates report of 4/1/02

A-13 Brick Township Planning Board Municipal Planner Michael Fowler, A.I.C.P./P.P., report of 4/9/02

A-14 Brick Township Bureau of Fire Safety Kevin C. Batzel, Bureau Chief/Fire Sub Code Official, report of 3/4/02

A-15 Color rendering of 1-page Site Plan (hospital addition)

A-16 Color rendering of entire campus site plan

WHEREAS, the applicant received a resolution of intent of preliminary and final site plan approval with Resolution R-39-82 dated May 26, 1982; and

WHEREAS, the applicant received a resolution approving site plan and conditional use with Resolution R-41-82, dated June 9, 1982; and

WHEREAS, the applicant has received amended preliminary and final site plan approval with variances and design waivers with Resolution R-84-98 dated October 28, 1998, which amended approval and granted variances for minimum parking stall sizes of 9' by 18' where 10' by 20' are required; minimum aisle width of 24' where 25' was required; minimum setback of 5' between proposed parking lot adjoining Highway 88 and adjoining business use/zone where 10' was required; and a design waiver for rows of parking stalls ranging from 26 to 49 spaces with no

islands in between, where a landscaping island was required for each row of ten (10) parking stalls.

WHEREAS, the Board makes the following factual findings and findings of law:

1. This property is known and designated as Block 1170, Lots 18 and 18.02 on the Municipal Tax Map.

2. The property is located in the HS (Hospital Support) Zone and is comprised of 26.47 acres fronting on State Highway Route 88 westbound and Jack Martin Boulevard north of State Highway Route 70. The applicant proposes an expansion (to house the Shore Rehabilitation Institute and other hospital uses) which consists of a four-story building addition with full basement to be constructed at the southeast corner of existing building, together with a three-story parking garage deck containing 443 parking stalls which is proposed in the northwest area of the parking lot. On completion, this garage would provide for a net increase of 286 on-site parking spaces. Additionally, applicant has indicated necessity of placement of a temporary office trailer on site, because of the construction displacement of certain offices.

3. The applicant currently proposes to further amend the previous approvals in order to permit a variance for a minimum parking stall size of 9' by 18' where 10' by 20' is required; and a variance for minimum driveway aisle width of 24' where 25' is required. The proposed second amended preliminary and final site plan is shown on plans entitled, "Preliminary and Final Site Plan, Medical Center of Ocean County, Block 1170, Lots 18 and 18.02, Township of Brick, Ocean County, New Jersey," dated 2/14/02, and last revised 2/20/02, consisting of fifteen (15) sheets, as prepared by Menlo Engineering Associates, Inc./Julius T. Szalay, P.E./L.S.

4. T&M Associates, Jay C. Steinmetz, P.E., C.M.E., prepared a report to the Board dated April 1, 2002. The Board hereby adopts the findings in that report and incorporates that document in this resolution by reference.

5. Michael P. Fowler, A.I.C.P./P.P., Municipal Planner, prepared a report to the Board dated April 9, 2002. The Board hereby adopts the findings in that report and incorporates that document in this resolution by reference.

6. The Bureau of Fire Safety, Kevin C. Batzel, prepared a report to the Board dated March 4, 2002. The Board hereby adopts the findings in that report and incorporates that document into this resolution by reference.

7. The Shade Tree Commission, Dottie La Posa, prepared a report to the Board dated March 5, 2002. The Board hereby adopts the findings in that report and incorporates that document into this resolution by reference.

8. Albert A. Zager, Esq. appeared on behalf of the applicant and introduced a number of applicant's executives and professionals. Mr. Jeffrey Brickman, the executive vice president of Meridian Health System Inc., parent company of Meridian Health Corporation/Medical Center of Ocean County, testified that the expansion is extremely important because the hospital has been a "victim of its own success." Mr. Brickman further testified that the hospital is busier than ever, and occupancy levels are at their highest, making it urgent that this expansion be approved. He further testified that the relocation of the Shore Rehabilitation Center from its present location in Point Pleasant, to the Brick Township Hospital campus will be more convenient for patients and staff; and ease the transition to restorative care that the Rehab Center provides. Mr. Brickman concluded that, when this expansion is complete, it will make the Medical Center of Ocean County a "state-of-the-art Medical Center equal to any in the State of New Jersey."

Mr. Peter Daniels, newly installed president of the Medical Center of Ocean County, testified that the expansion proposed of 98,000 sq. ft. in the four-story addition with full basement and the expansion of the available parking by the construction of the three story parking deck garage (adding 286 spaces net) is necessary and timely. Mr. Daniels further testified that the relocation of the Shore Rehabilitation Center will help provide appropriate and convenient continuity of patient care. He further testified that he anticipated the first floor of the proposed addition would be utilized by the Outpatient Shore Rehab Center. The second floor, he anticipated, would be used as a 40-bed inpatient unit; the third floor used as demand required, but perhaps a 24-bed medical/surgical unit, and the use of the fourth floor is as yet undesignated. Mr. Daniels additionally testified that the basement would be used to expand support services and conference facilities. In his brief time here, Mr. Daniels acknowledged that the storage space issue is a problem that this expansion will remedy. He further related that, in answer to a Board member's concern, the entire hospital has just contracted to ensure that the entire interior of the hospital complex will be fit with sprinklers to the satisfaction of the Bureau of Fire Safety.

Mr. Scott Malin, A.I.A., architect with Vitetta Group, applicant's architectural firm, testified that with the project's L-shaped configuration, the applicant could provide safe, convenient access to the proposed new main entrance, which will be canopied in a color scheme still to be decided. Mr. Malin acknowledged that the applicant intends to match the existing structure's brick/stone for the four-story addition. However due to the uncertainty of obtaining specific materials and the sometimes lengthy delay in delivery, as well as cost considerations, applicant wanted to keep its options open as to the siding of the three-story parking garage. Mr. Malin testified that the first floor would have a glass block wall element; and

every effort would be made to work with the Board and its architectural committee in applicant's final selection of materials. Mr. Malin then testified as to the parking garage, and utilized the exhibits A-3 and A-4 in explaining the design and material choices of applicant. Mr. Malin concluded that the choices of costs, detail, and delivery dates are all important but the applicant wanted what was "right for the property."

Mr. William Lane, L.E., of Menlo Engineering Associates, Inc., applicant's engineering firm, recited the applicant's desire to cooperate with recommended changes and modifications suggested by Board's Engineer Mr. Steinmetz, as shown in Exhibit A-12, and agreed with many concerns, including the prohibiting of left turns from driveways of applicant onto Route 88. Although this would require diverting traffic to Jack Martin Blvd., then east to Route 70, or continuing through to Route 88, Mr. Lane agreed that it is a difficulty that they will address and remedy. Further concerns as to quality of drainage, landscaping length, and environmental impact have all been recognized and agreed. The applicant's acceptance of these changes were fully recorded in Mr. Steinmetz's conditions of report.

Mr. Raymond Fochesto, Senior Manager of Facilities Support Services, testified as to the temporary office trailer. It is 65' long and 24' wide (approximately 1200 sq. ft.), a double wide trailer. It will be removed at end of project, no later than four months after the certificate of occupancy is issued. The trailer is necessary because of the construction displacement of several offices, and it will be equipped with air conditioning, telephones, and electricity, as well as a chemical toilet, which will be periodically serviced as necessary.

Mr. Eric Keller, P.E., P.P., Omland Engineering Associates, Inc., testified as to the site's traffic patterns and applicant's proposed expansion. He recited that the 9' by 18' stall size match what is on site and is generally accepted. He further

testified that the parking needs of applicant are met by this garage/deck and that it is an efficient use of open space, and maximizes applicant's available and necessary need for visitor, patient, staff, vendor and physician parking.

Mr. Keller could not definitively answer Board's questions and concern as to whether there will be a fee or charge for parking. Mr. Keller acknowledged that it is never a popular choice to charge for parking, but applicant wanted to keep the option available of in the future charging a parking fee.

After some thought and consideration, and recognizing the concerns of the Board, applicant agreed that at present there would be no charge for parking, and agreed to return to the Planning Board for approval of any change in that "No-Fee Parking" policy.

Applicant further agreed that the handicapped parking area would be relocated adjacent to the proposed addition building, as it makes sense to have those spaces as convenient as possible to the entrance, and recognizing applicant has in excess of required spaces per existing plan.

Further, the site of the temporary office trailer will be restored to its pre-trailer condition (or better) after removal of the trailer, and in view of the approximate twenty-month period the temporary office trailer would be utilized, applicant agreed to provide landscaping in the vicinity of the trailer to the satisfaction of Board's Planner and Engineer.

With the exception of the variances granted hereinabove, the applicant has complied with the requirements of the Site Plan Ordinance. The plan is consistent with the intent and purpose of the Master Plan and the Municipal Development Ordinance. Further, recognizing the growing health care needs of the Township of Brick and its surrounding communities, the Board is satisfied that the applicant's plan is reasonable and consistent with its health care service mission to the community.

Accordingly, the Board finds that the benefits of the proposed development outweigh any detriments, and the relief requested can be granted without substantial detriment to the public good and will not substantially impair the intent and purpose of the Township Zoning Ordinance or Master Plan.

NOW, THEREFORE, BE IT RESOLVED by the Township Planning Board on this 24th day of April, 2002, that this application to amend resolution R-84-98 be approved subject to the following conditions:

1. The applicant must comply with all conditions of the original approving intent Resolution R-39-82 dated May 26, 1982, pertaining to the subject property; Resolution R-41-82 dated June 9, 1982 approving site plan and conditional use; and the amended approving Resolution R-84-98 dated October 28, 1998, except as modified by this resolution.

2. The applicant shall comply with all standard Planning Board conditions for preliminary major subdivision approval as set forth on Attachment 'A.'

3. The applicant shall comply with all representations and agreements made by the applicant's representatives, its attorney, or its professionals during the presentation of this case.

4. The applicant shall comply with the comments contained in the report from Michael P. Fowler, Municipal Planner, dated April 9, 2002, including:

   A. Applicant agreed that at least one space per parking level would be van-accessible.

   B. Applicant agreed to enhancements of landscaping around parking garage including foundation plantings and supplementing with shade trees and evergreens to the satisfaction of Board's Engineer and Planner.

C. Applicant recited circulation in/around garage and agreed to provide to continue sidewalk/walkway to/from parking garage to satisfaction of Board's Engineer and Planner.

D. Applicant agreed to pavement marking adjacent to handicapped parking and depressed curbing in front of Shore Rehab, and will add crosswalks as per Board Engineer and Planner.

E. Applicant will provide color renderings of architectural plans to satisfaction of Board's Engineer and Planner.

F. Applicant agreed to provide outdoor public seating where appropriate to satisfaction of Board's Engineer and Planner.

G. Applicant advised safety concerns as to loading zones prevented walkway around the entire perimeter of hospital building.

H. Applicant agreed not to remove topsoil from site or use same as spoil. Applicant further agreed to use redistributed topsoil throughout site.

5. The applicant shall comply with the comments contained in the report of T&M Associates, J.C. Steinmetz, P.E., C.M.E., Board Engineer, dated April 1, 2002.

Traffic Circulation/Layout

3.4 Applicant will correct required number of parking spaces.

3.5 Applicant will supply to satisfaction of Board Engineer the layout of proposed parking deck.

3.7 Applicant agrees to restrict "No Left Turn" onto Rt. 88 from applicant's driveways.

3.8 Applicant will supply sign schedule.

3.9 Applicant will supply signage for traffic exiting Brick Medical Arts Facility.

Grading/Drainage

4.1 Applicant has applied for Ocean County approval.

4.2 Applicant will indicate which pipes are to be plugged and abandoned or removed and, will supply details of plugged and abandoned pipe.

4.3 Applicant will supply details of proposed stormwater collection system for parking deck.

4.4 Applicant will provide details of proposed storm manholes and inlets.

4.5 Applicant will provide pipe bedding details.

Landscaping

5.1 Applicant will supply clearer, unshaded plans for review of Board Engineer.

5.2 Applicant agreed to attempt to relocate as many existing trees as possible and recite/provide same.

5.3 Applicant agreed to irrigate landscaped areas as required by Brick Township Ordinance Chap. 190-257 (K).

5.4 Applicant agreed to mulch per Brick Township Ordinance 190-257(I) and provide details of same to Board Engineer.

5.5 Applicant agreed to provide weed barrier per Brick Township Ordinance 190-257 (G).

5.6 Applicant agreed to define landscaped areas per Brick Township Ordinance 190-257 (E).

5.7 Applicant agreed to relocate existing 6" caliper Zelkova trees near proposed parking deck.

5.8 Applicant agreed to incorporate into the deciduous tree planting detail a root barrier product for deciduous trees that are to be Installed with 10' of new or existing sidewalks/curbs.

5.9 Applicant agreed to include and correct planting sizes to satisfaction of Board Engineer.

5.10 Applicant agreed to reposition white pines or replace them with a fastigiate species to satisfaction of Board Engineer.

5.11 Applicant agreed to enhance and supplement proposed plantings around north side of parking deck, as well as between proposed deck and walkway on south side of parking deck, to satisfaction of Board Engineer.

Lighting

6.1 Applicant agreed to re-label "Light Pole Foundation/"

6.2 Applicant agreed to add bollard light foundations to Detail Sheet 2.

6.3 Applicant agreed to supply photometrics for Lighting Plan I vicinity of outer roadway (eastern portion of site) or to supplement existing lighting to Board Engineer's satisfaction.

6.4 Applicant agreed to supplement proposed lighting in the handicapped parking area in northwest corner of existing hospital building to Board Engineer's satisfaction.

Environmental Impact Statement

7.1 Applicant agreed to supplement report to address Brick Township Ordinance Chap. 190-188C (a) 5&6 as to air quality and noise.

7.1.1 Applicant agreed to supply further information as to reduction in air quality.

7.1.2 Applicant agreed to recite and represent that mechanicals are in basement.

7.2 Applicant agreed to supplement report to recite as to need for expanded facility and effect on evaluated factors, to address the alternate proposal element of the Environmental Impact Statement.

Site Plan

8.1 Applicant agreed to supplement per Brick Township Ordinance on page OP-1.

8.3 Applicant agreed to either reconfigure handicap spaces in easterly lot adjacent to Jack Martin Boulevard to eliminate crossing of 25' access drive or to paint crosswalks at each ramp location to satisfaction of Board Engineer.

8.4.1 Applicant will supply details to satisfaction of Board Engineer as to concrete curb.

8.4.2 Applicant will supply details to satisfaction of Board Engineer as to concrete sidewalk.

8.4.3 Applicant will supply details to satisfaction of Board Engineer as to parking lot pavement

8.4.4 Applicant will supply details to satisfaction of Board Engineer as to handicap spaces and associated signs.

Temporary Office Trailer Plan

9.1 Applicant testified proposed trailer is an office trailer, not a construction trailer, and applicant will supplement existing proposed location as shown in A-5.

9.2 Applicant agreed to supply restoration notes when trailer is removed to satisfaction of Board Engineer.

General

10.1 Applicant acknowledges provisions of Article XVIII Hospital Support Zone mandatory fee contribution to Brick Township Affordable Trust Fund established in Article VB.

10.2 Applicant will repair/replace as necessary existing Type B inlet as to Board Engineer's satisfaction.

10.3 Applicant agrees to add sidewalk on southwest side access to building from adjacent parking lots to match the existing sidewalks to satisfaction of Board Engineer.

6. The applicant shall comply with the comments contained in the report from the Bureau of Fire Safety dated March 4, 2002.

A. Applicant will comply with the canopy height acceptable for fire apparatus passage.

B. Applicant will revise plan to show drop-off zones.

C. Applicant will show "no parking" areas under Title 39 and new fire zone.

D. Applicant will provide additional fire hydrant on east side of proposed addition.

E. Applicant will provide details of dry standpipe system of parking garage to satisfaction of Fire Safety Bureau.

F. Applicant represented the hospital has contracted to fully sprinkle all floors of hospital.

G. Applicant represents that new structure will eliminate overcrowding in mechanical rooms and hallways.

H. Applicant will comply with fire zone and fire signs and striping per Brick Township Ordinance 102-71.

7. The applicant shall comply with the comments contained in the report from Shade Tree Commission dated 4/5/02.

8. Applicant shall provide Board Engineer and Planner with the location of any proposed construction trailers prior to placement on site, so that Board's professionals might report back to Board should there be any concerns.

9. Applicant will supply Board's Engineer and Planner with an anticipated construction schedule.

10. Applicant will supply to Board copies of cross-access agreement for parking with adjacent lot, to facilitate traffic circulation on site.

11. Applicant will supply to Board's Engineer and Planner revised Lighting Plan reciting shielding of lighting from adjacent residences.

12. Applicant will supply to Board's Engineer and Planner revised Landscaping Plan for area of Office Trailer.

MOVED BY: Mr. Scherer

SECONDED BY: Mr. Kelly

VOTING IN THE AFFIRMATIVE: Mr. Kelly, Mrs. LaDuke, Mr. Dockery, Mr. Petoia, Mr. Vespi, Mr. Higgins, Mr. Scherer

VOTING IN THE NEGATIVE:

INELIGIBLE TO VOTE: Councilman Underwood, Mr. Aiello, Mr. Fredo

ABSTAINING:

ABSENT: Mr. Reilly

CERTIFICATION

I, **JUDITH FOX NELSON**, Clerk of the Planning Board of the Township of Brick, County of Ocean, State of New Jersey, do hereby certify that the foregoing resolution was duly **ADOPTED** by the said Planning Board of the Township of Brick at a regular meeting held on the 24th day of April, 2002.

IN WITNESS WHEREOF, I have set my hand this 26th day of April, 2002.

JUDITH FOX NELSON, Clerk
Brick Township Planning Board

ATTACHMENT "A"

BRICK TOWNSHIP PLANNING BOARD

STANDARD CONDITIONS FOR SITE PLAN APPROVAL

1. Applicant shall obtain certification by the Local Soil Conservation District of a plan for soil erosion and sediment control in accordance with N.J.S.A. 4:24-39 et seq., commonly known as the "Soil Erosion and Sediment Control Act."

2. All materials, methods of construction and details shall be in conformance with the current "Engineering Specifications and Construction Details" of the Township of Brick, which are on file in the office of the Township Engineer.

3. Applicant shall obtain all approvals required by any Federal, State, County or Municipal agency having regulatory jurisdiction of this development. Upon receipt of such approval(s), the applicant shall supply a copy of the permit(s) to the Board. In the event that any other agency requires a change in the plans approved by this Board, the applicant must reapply to the Brick Township Planning Board for approval of that change.

4. Applicant shall submit this entire proposal for re-approval should there be any deviation from the terms and conditions of this Resolution or the documents submitted as part of this application, all of which are made a part hereof and shall be binding on the applicant.

5. Applicant shall provide a statement from the Brick Township Tax Collector that all taxes are paid in full as of the date of this Resolution and as of the date of the fulfillment of any condition(s) of this Resolution.

6. Prior to the issuance of a construction permit, the applicant shall furnish the Township Clerk with a cash bond and performance guarantee in an amount to be determined by the Township Engineer.

7. Applicant shall post an inspection fund with the Township Clerk in an amount to be determined by the Township Engineer.

8. No soil shall be removed from the site without the written approval of the Township Council.

9. The applicant shall comply with all provisions and pay all fees established under Article VB (Mandatory Development Fees) of Chapter 190 of the Code of the Township of Brick.

10. For all residential uses the subdivider or site plan applicant shall provide for a trash receptacle.

11. In order to insure uniformity of trash receptacles and compatibility with the automatic trash collection system, all trash can receptacles required herein shall be obtained from the Township of Brick.

12. Applicant shall provide proof of application for Title NJSA 39:5 A-1 to the Planning Board.

TOWNSHIP OF BRICK

OCEAN COUNTY, NEW JERSEY

401 CHAMBERS BRIDGE ROAD • BRICK , NJ 08723

Joseph C. Scarpelli, Mayor

Township Council:
Steven N. Cucci — President
Stephen C. Acropolis
Kimberley S. Casten
Gregory S. Kavanagh
Kathy M. Russell
Tony R. Shupin
Frederick J. Underwood, Sr.

Department of Administration & Finance
Office of Land Use Management
Sean Kinnevy
Zoning Officer
(732) 262-1041
skinn@twp.brick.nj.us

Kate MacDonald
Asst. Zoning Officer
(732) 262-1043
Fax: (732) 262-8954
kmacdon@twp.brick.nj.us
http://www.twp.brick.nj.us

OC
10/2/2

September 30, 2002

Robert Wilke
William Blanchard Company
199 Mountain Avenue
Springfield, NJ 07081

Re: Block: 1179, Lot: 18 & 18.01
425 Jack Martin Boulevard
Zoning Permit Application

Resubmit
10-02-02

Dear Mr. Wilke:

Your zoning permit application for a parking garage on the referenced property cannot be approved until the site plan maps are signed by the Planning Board.

Due to MAP signing

Very truly yours,

Sean Kinnevy

Sean Kinnevy
Zoning Officer

CC: Mayor Joseph Scarpelli
Scott R. MacFadden, Business Administrator
Michael P. Fowler, AIP/PP, Municipal Planner
Daniel F. Newman, Jr., Construction Official

Daniel Newman

From: Wilke, Bob [bwilke@wmblanchard.com]
Sent: Tuesday, September 24, 2002 10:44 AM
To: Daniel Newman
Subject: FW: 9315.04 MCOC Parking Garage Volume

Dan,
As discussed. I gave this to Allison over the phone earlier.
Bob Wilke
Wm Blanchard

-----Original Message-----
From: Busch-Richardson, Heidi [mailto:busch@vitetta.com]
Sent: Tuesday, September 24, 2002 9:26 AM
To: Bob Wilke (E-mail)
Subject: FW: 9315.04 MCOC Parking Garage Volume

Bob,

Per John Finley's request, I am resending the volume of the Parking Garage.

Heidi

-----Original Message-----
From: Busch-Richardson, Heidi
Sent: Friday, July 19, 2002 12:44 PM
To: Bob Wilke (E-mail)
Cc: Finley, John; Gerhart, Todd; Malin, Scott
Subject: 9315.04 MCOC Parking Garage Volume

Bob,

Per John Finley's request, we are sending the volume of the MCOC Parking Garage. The total volume of the garage is 1,141,125 cu ft.

Heidi Busch-Richardson

TOWNSHIP OF BRICK

OCEAN COUNTY, NEW JERSEY

401 CHAMBERS BRIDGE ROAD • BRICK , NJ 08723

Joseph C. Scarpelli, Mayor

Township Council:
Steven N. Cucci — President
Stephen C. Acropolis
Kimberley S. Casten
Gregory S. Kavanagh
Kathy M. Russell
Tony R. Shupin
Frederick J. Underwood, Sr.

Department of Administration & Finance

Division of Inspections
Daniel F. Newman Jr.
Construction Official
(732) 262-1030
Fax: (732) 262-8954
http://www.twp.brick.nj.us

Work Site location East Wing Addition & Parking Garage Block 1170 Lot 18 & 18.02
425 Jack Martin Blvd

I have been advised that a Certificate of Occupancy shall not be issued until all final inspections have been made. The required inspections from the Brick Township Building Department are as follows;

1.) Final Building
2.) Final Electric
3.) Final Plumbing
4.) Final Fire

Additional requirements (prior approvals):

5.) Final Engineering (scheduled through Brick Township Engineering Department)
6.) Certificate of Compliance (received from the BTMUA)
7.) Final Ocean County Soil (necessary when more than 5,000 sq. ft. are disturbed, and/or when more than one house is constructed)
8.) Homeowners Warranty or Affidavit
9.) Garbage can receipt (obtainable in the Brick Township Tax Collector's Office)
10.) Affordable Housing
11.) CO Application

♦ No Temporary Certificates shall be issued from the Brick Township Building Department without temporary and, or conditional approvals from ALL prior approvals. **NO EXCEPTIONS.**

♦ The Construction Official shall issue a Certificate of Occupancy within ten days of receiving ALL paperwork as per NJAC 5:23-2.23(i)

Name Robert Wilke

Signature

Date 9/19/02

COMMERCIAL

SINGLE FAMILY DWELLING CHECKLIST N/A

1. Construction Permit Jacket Completed and Signed Yes _____ No_____
2. Zoning Application Completed Yes _____ No_____
3. Two True Size Surveys Yes _____ No_____
4. Engineering Form:
   - Single Family Home Checklist Yes _____ No_____
   - Major Subdivision Yes _____ No_____
5. Shade Tree Application Yes _____ No_____
6. Debris Form Yes _____ No_____
7. BTMUA Availability Statement Yes _____ No_____
8. Building, Plumbing, Electrical and Fire Permits Yes _____ No_____
9. Gas Pipe Drawing Yes _____ No_____
10. Drain Waste Venting Schematic (DWV) Yes _____ No_____
11. Brochures:
    - Furnace Yes _____ No_____
    - Air Conditioner Yes _____ No_____
    - Fireplace Yes _____ No _____
    - Boiler Yes _____ No _____
12. Options:
    - Fireplace (Gas or Wood) Yes _____ No_____
    - Basement Yes _____ No_____
    - Crawl Yes _____ No_____
    - Slab Yes _____ No_____
    - Deck Yes _____ No_____
13. Two Sets of Plans-architectural plans signed and sealed Homeowners Plans signed by homeowner on all pages Yes _____ No_____
14. Soil Boring Report showing seasonal high water table required for any new basements Yes _____ No_____
15. Joist layout showing blocking for any engineered floor joist (TJI) Yes _____ No_____

**Please separate the cost for fireplaces and decks from the cost of the new building - they are considered alterations

Your permit application will not be accepted if any of the above information is missing

1860 Blanchard
Wm. Blanchard Co. I Builders since 1860

P.O. Box 298 199 Mountain Avenue.Springfield, New Jersey 07081
973.376.9100 Fax: 973=376=9154

September 19, 2002

Building Department
Township of Brick
401 Chambers Bridge Road
Brick, NJ 08723

Permit for Parking Garage @ 425 Jack Martin Blvd.

Attn: Daniel F. Newman, Jr. – Construction Official
732-262-1030
732=262=8954 (Fax)

Ref: Job No. 4869
East Wing Addition Parking Garage
Medical Center of Ocean County
Brick, New Jersey

We Are:

- ☐ Forwarding To You
- ☐ Enclosing Herewith
- ☐ Returning Herewith
- ☒ **Handing You on 9/20/02**

For Your:

- ☐ Quotation
- ☐ Approval
- ☐ Review and Comment
- ☐ Approved as Noted
- ☒ **Use**

Drawings by: Vitetta

No. Copies	Drawing Number	Title	Date
1	Completed Various Permit Applications for Parking Garage		
1	Completed Building Sub-Code Tech Section w/ Permit Jacket		
3	Signed/Sealed Drawings and Spec Books as prepared by Vitetta (Arch)		

COMMENTS: This is for your review and approval. Plumbing, Fire, and Electrical Tech Sections will be turned in later today or on Monday by the respective Subcontractors doing that work for us. (They will be sealed). Please advise on permit fee costs ASAP.

Thanks,
Wm. Blanchard *Co.*

Robert Wilke
Project Manager

RW/lak
Encls.
Cc: Doug Murray, GA
Ray Fochesto, MCOC
R. A. Samenfeld
Stan Kozal
File w/ copy

Applicable to Ordinance 720-92
This form must be handed in with permit application or a permit will not be issued.

TOWNSHIP OF BRICK
Debris Form

Work Site Address 425 Jack Martin Blvd.

Block 1170 Lock 18 & 18.02

Contractor Wm Blanchard Co.

Contractor's Address 199 Mountain Ave Springfield NJ

Type of Construction (minor, new home) Commercial Addition

Type of Debris (shingles, siding, wood, etc.) JUST GENERAL CONSTRUCTION REFUSE
BOXES - CRATES, ETC

Party Responsible for removal Not Yet Awarded

Dumpster Size 20 cy & 30 cy

Destination of Debris Discard As Approved

Any recyclable material must be delivered to an approved recycling center and receipts provided to the Building Department along with tipping receipts for non-recyclable.

Generator's Certification: Under penalty of criminal and civil prosecution for the making or submission of false statements, representations or omissions, I declare, on behalf of the generator that the contents of this document are fully and accurately described above and have been disposed of in accordance with all applicable State and Federal laws and regulations, and that I have been authorized in writing, to make such declaration by the person in charge of the generator's operation.

Signature 9/19/02
Date

ROBERT WICKE
Print Name

BRICK TOWNSHIP PLANNING BOARD

AMENDMENT TO THE SECOND AMENDED

PRELIMINARY ANDFINAL SITE PLAN APPROVAL

WITH VARIANCES

RESOLUTION R-63-02 PAGE 1 OF 4

Case No. PB-2403 (2266) (1281) 2-A-PSP/FSP-V-2/02 July 10, 2002

WHEREAS, MERIDIAN HOSPITALS CORPORATION, MEDICAL CENTER OF OCEAN COUNTY, having a mailing address of 425 Jack Martin Boulevard, Brick, New Jersey 08724, has applied to the Brick Township Planning Board for an amendment to the second amended preliminary and final site plan approval pursuant to N.J.S.A. 40:55D-46, 50, 51, and 60; and

WHEREAS, a hearing was held on July 3, 2002 in the Municipal Building for a discussion of the reasons for the amendment to the second amended preliminary and final site plan approval and all interested parties having been heard, and at which time testimony was presented on behalf of the applicant and all interested parties having been heard; and

WHEREAS, the applicant received a resolution of intent of preliminary and final site plan approval with Resolution R-39-82 dated May 26, 1982; and

WHEREAS, the applicant received a resolution approving site plan and conditional use with Resolution R-41-82, dated June 9, 1982; and

WHEREAS, the applicant has received amended preliminary and final site plan approval with variances and design waivers with Resolution R-84-98 dated October 28, 1998, which amended approval and granted variances; and applicant received second amended approval with variances and design waivers with Resolution R-42-02 dated April 24, 2002;

WHEREAS, the Board makes the following factual findings and findings of law:

1. This property is known and designated as Block 1170, Lots 18 and 18.02 on the Municipal Tax Map.

Maps signed 9-27-02

2. The property is located in the HS (Hospital Support) Zone and is comprised of 26.47 acres fronting on State Highway Route 88 westbound and Jack Martin Boulevard north of State Highway Route 70. The applicant proposes an expansion of the existing boiler room located at the southwest corner of the existing building to accommodate additional utilities required for the proposed building expansion. The expansion of the boiler room is to consist of a basement story and one story above ground.

3. The proposed amendment to the second amended preliminary and final site plan is shown on plans entitled, "Preliminary and Final Site Plan, Medical Center of Ocean County, Block 1170, Lots 18 and 18.02, Township of Brick, Ocean County, New Jersey," dated 2/14/02, and last revised 6/20/02, consisting of fifteen (15) sheets, as prepared by Menlo Engineering Associates, Inc./Julius T. Szalay, P.E./L.S.

4. T&M Associates, Jay C. Steinmetz, P.E., C.M.E., prepared a report to the Board dated July 3, 2002. The Board hereby adopts the findings in that report and incorporates that document in this resolution by reference.

5. Mr. Steinmetz advises that the proposed addition does not impact traffic circulation or layout; as adequate parking was already supplied, as this subject application will not increase parking needs.

6. Mr. Steinmetz further advises that grading and drainage are not impacted. Certain necessary changes in routing were made which are acceptable. He further advises that landscaping and lighting were not affected by this application.

7. Further, Mr. Steinmetz advises that there is no change to the environmental impact and compliance statement as the facility already existed with prior approvals, and same is not affected by this application.

Whereas, applicant seeks amendment to expand existing boiler room, and the applicant has complied with the requirements of the Site Plan Ordinance. The plan is consistent with the intent and purpose of the Master Plan and the Municipal

Development Ordinance. Further, recognizing the growing health care needs of the Township of Brick and its surrounding communities, the Board is satisfied that the applicant's amended plan is reasonable and consistent with its health care service mission to the community. The Board finds that the amendment is reasonable and should be granted permitting the boiler room expansion. Accordingly, the Board permits this amendment.

NOW, THEREFORE, BE IT RESOLVED by the Township Planning Board on this 10th day of July, 2002, that this application to amend resolution R-42-02 be approved subject to the following conditions:

1. The applicant must comply with all conditions of the original approving intent Resolution R-39-82 dated May 26, 1982, pertaining to the subject property; Resolution R-41-82 dated June 9, 1982 approving site plan and conditional use; and the amended approving Resolution R-84-98 dated October 28, 1998, and Resolution R-42-02 dated April 24, 2002, except as modified by this resolution.

2. The applicant shall comply with all standard Planning Board conditions for preliminary major site plan approval as set forth on Attachment 'A.'

3. The applicant shall comply with all representations and agreements made by the applicant's representatives, its attorney, or its professionals during the presentation of this case.

4. The applicant shall comply with the comments contained in the report of T & M Associates, J.C. Steinmetz, P.E., C.M.E., Board Engineer, dated July 3, 2002.

MOVED BY: Mr. Aiello

SECONDED BY: Mr. Reilly

VOTING IN THE AFFIRMATIVE: Mrs. LaDuke, Mr. Aiello, Mr. Dockery, Mr. Reilly, Mr. Vespi, Mr. Fredo

VOTING IN THE NEGATIVE:

INELIGIBLE TO VOTE:

ABSTAINING: Mr. Kelly

ABSENT: Councilman Underwood, Mr. Petoia, Mr. Higgins, Mr. Scherer

CERTIFICATION

I, **JUDITH FOX NELSON**, Clerk of the Planning Board of the Township of Brick, County of Ocean, State of New Jersey, do hereby certify that the foregoing resolution was duly **ADOPTED** by the said Planning Board of the Township of Brick at a regular meeting held on the 10th day of July, 2002.

IN WITNESS WHEREOF, I have set my hand this 12th day of July, 2002.

Judith Fox Nelson

JUDITH FOX NELSON, Clerk
Brick Township Planning Board

BRICK TOWNSHIP PLANNING BOARD

SECOND AMENDED PRELIMINARY AND

FINAL SITE PLAN APPROVAL WITH VARIANCES

RESOLUTION R- 42 -02 PAGE 1

Case No. PB-2403 (2266) (1281) 2-A-PSP/FSP-V-2/02 April 24, 2002

WHEREAS, MERIDIAN HOSPITALS CORPORATION, MEDICAL CENTER OF OCEAN COUNTY, having a mailing address of 425 Jack Martin Boulevard, Brick, New Jersey 08724, has applied to the Brick Township Planning Board for second amended preliminary and final site plan approval pursuant to N.J.S.A. 40:55D-46, 50, 51, and 60; and

WHEREAS, proof of service as required by law upon appropriate property owners and governmental bodies has been furnished and determined to be in proper order; and

WHEREAS, a public hearing was held on April 10, 2002 in the Municipal Building for a discussion of the reasons for the second amended preliminary and final site plan approval and all interested parties having been heard, and at which time testimony was presented on behalf of the applicant and all interested parties having been heard and the following exhibits were admitted into evidence:

A-1 Site Plan by Menlo Engineering Associates Inc. dated 2/14/02

A-2 Color rendering of architectural/hospital addition

A-3 Plan of canopies/circulation route

A-4 Architectural of proposed three-story parking garage

A-5 Temporary Office Trailer Plan by Menlo Engineering Associates Inc. dated 3/19/02

A-6 Architectural of four-story hospital addition

A-7 Traffic Assessment Study dated 1/02

A-8 Drainage Plan by Menlo Engineering Associates Inc. dated 2/14/02

A-9 Environmental Impact Study by Menlo Engineering Associates Inc. dated 2/14/02

A-10 Brick Township Shade Tree Commission Report of 4/5/02

A-11 Ocean County Soil Conservation Report dated 2/25/02

A-12 Brick Township Planning Board Engineering Professional Jay C. Steinmetz, P.E., C.M.E. of T&M Associates report of 4/1/02

A-13 Brick Township Planning Board Municipal Planner Michael Fowler, A.I.C.P./P.P., report of 4/9/02

A-14 Brick Township Bureau of Fire Safety Kevin C. Batzel, Bureau Chief/Fire Sub Code Official, report of 3/4/02

A-15 Color rendering of 1-page Site Plan (hospital addition)

A-16 Color rendering of entire campus site plan

WHEREAS, the applicant received a resolution of intent of preliminary and final site plan approval with Resolution R-39-82 dated May 26, 1982; and

WHEREAS, the applicant received a resolution approving site plan and conditional use with Resolution R-41-82, dated June 9, 1982; and

WHEREAS, the applicant has received amended preliminary and final site plan approval with variances and design waivers with Resolution R-84-98 dated October 28, 1998, which amended approval and granted variances for minimum parking stall sizes of 9' by 18' where 10' by 20' are required; minimum aisle width of 24' where 25' was required; minimum setback of 5' between proposed parking lot adjoining Highway 88 and adjoining business use/zone where 10' was required; and a design waiver for rows of parking stalls ranging from 26 to 49 spaces with no

islands in between, where a landscaping island was required for each row of ten (10) parking stalls.

WHEREAS, the Board makes the following factual findings and findings of law:

1. This property is known and designated as Block 1170, Lots 18 and 18.02 on the Municipal Tax Map.

2. The property is located in the HS (Hospital Support) Zone and is comprised of 26.47 acres fronting on State Highway Route 88 westbound and Jack Martin Boulevard north of State Highway Route 70. The applicant proposes an expansion (to house the Shore Rehabilitation Institute and other hospital uses) which consists of a four-story building addition with full basement to be constructed at the southeast corner of existing building, together with a three-story parking garage deck containing 443 parking stalls which is proposed in the northwest area of the parking lot. On completion, this garage would provide for a net increase of 286 on-site parking spaces. Additionally, applicant has indicated necessity of placement of a temporary office trailer on site, because of the construction displacement of certain offices.

3. The applicant currently proposes to further amend the previous approvals in order to permit a variance for a minimum parking stall size of 9' by 18' where 10' by 20' is required; and a variance for minimum driveway aisle width of 24' where 25' is required. The proposed second amended preliminary and final site plan is shown on plans entitled, "Preliminary and Final Site Plan, Medical Center of Ocean County, Block 1170, Lots 18 and 18.02, Township of Brick, Ocean County, New Jersey," dated 2/14/02, and last revised 2/20/02, consisting of fifteen (15) sheets, as prepared by Menlo Engineering Associates, Inc./Julius T. Szalay, P.E./L.S.

4. T&M Associates, Jay C. Steinmetz, P.E., C.M.E., prepared a report to the Board dated April 1, 2002. The Board hereby adopts the findings in that report and incorporates that document in this resolution by reference.

5. Michael P. Fowler, A.I.C.P./P.P., Municipal Planner, prepared a report to the Board dated April 9, 2002. The Board hereby adopts the findings in that report and incorporates that document in this resolution by reference.

6. The Bureau of Fire Safety, Kevin C. Batzel, prepared a report to the Board dated March 4, 2002. The Board hereby adopts the findings in that report and incorporates that document into this resolution by reference.

7. The Shade Tree Commission, Dottie La Posa, prepared a report to the Board dated March 5, 2002. The Board hereby adopts the findings in that report and incorporates that document into this resolution by reference.

8. Albert A. Zager, Esq. appeared on behalf of the applicant and introduced a number of applicant's executives and professionals. Mr. Jeffrey Brickman, the executive vice president of Meridian Health System Inc., parent company of Meridian Health Corporation/Medical Center of Ocean County, testified that the expansion is extremely important because the hospital has been a "victim of its own success." Mr. Brickman further testified that the hospital is busier than ever, and occupancy levels are at their highest, making it urgent that this expansion be approved. He further testified that the relocation of the Shore Rehabilitation Center from its present location in Point Pleasant, to the Brick Township Hospital campus will be more convenient for patients and staff; and ease the transition to restorative care that the Rehab Center provides. Mr. Brickman concluded that, when this expansion is complete, it will make the Medical Center of Ocean County a "state-of-the-art Medical Center equal to any in the State of New Jersey."

Mr. Peter Daniels, newly installed president of the Medical Center of Ocean County, testified that the expansion proposed of 98,000 sq. ft. in the four-story addition with full basement and the expansion of the available parking by the construction of the three story parking deck garage (adding 286 spaces net) is necessary and timely. Mr. Daniels further testified that the relocation of the Shore Rehabilitation Center will help provide appropriate and convenient continuity of patient care. He further testified that he anticipated the first floor of the proposed addition would be utilized by the Outpatient Shore Rehab Center. The second floor, he anticipated, would be used as a 40-bed inpatient unit; the third floor used as demand required, but perhaps a 24-bed medical/surgical unit, and the use of the fourth floor is as yet undesignated. Mr. Daniels additionally testified that the basement would be used to expand support services and conference facilities. In his brief time here, Mr. Daniels acknowledged that the storage space issue is a problem that this expansion will remedy. He further related that, in answer to a Board member's concern, the entire hospital has just contracted to ensure that the entire interior of the hospital complex will be fit with sprinklers to the satisfaction of the Bureau of Fire Safety.

Mr. Scott Malin, A.I.A., architect with Vitetta Group, applicant's architectural firm, testified that with the project's L-shaped configuration, the applicant could provide safe, convenient access to the proposed new main entrance, which will be canopied in a color scheme still to be decided. Mr. Malin acknowledged that the applicant intends to match the existing structure's brick/stone for the four-story addition. However due to the uncertainty of obtaining specific materials and the sometimes lengthy delay in delivery, as well as cost considerations, applicant wanted to keep its options open as to the siding of the three-story parking garage. Mr. Malin testified that the first floor would have a glass block wall element; and

every effort would be made to work with the Board and its architectural committee in applicant's final selection of materials. Mr. Malin then testified as to the parking garage, and utilized the exhibits A-3 and A-4 in explaining the design and material choices of applicant. Mr. Malin concluded that the choices of costs, detail, and delivery dates are all important but the applicant wanted what was "right for the property."

Mr. William Lane, L.E., of Menlo Engineering Associates, Inc., applicant's engineering firm, recited the applicant's desire to cooperate with recommended changes and modifications suggested by Board's Engineer Mr. Steinmetz, as shown in Exhibit A-12, and agreed with many concerns, including the prohibiting of left turns from driveways of applicant onto Route 88. Although this would require diverting traffic to Jack Martin Blvd., then east to Route 70, or continuing through to Route 88, Mr. Lane agreed that it is a difficulty that they will address and remedy. Further concerns as to quality of drainage, landscaping length, and environmental impact have all been recognized and agreed. The applicant's acceptance of these changes were fully recorded in Mr. Steinmetz's conditions of report.

Mr. Raymond Fochesto, Senior Manager of Facilities Support Services, testified as to the temporary office trailer. It is 65' long and 24' wide (approximately 1200 sq. ft.), a double wide trailer. It will be removed at end of project, no later than four months after the certificate of occupancy is issued. The trailer is necessary because of the construction displacement of several offices, and it will be equipped with air conditioning, telephones, and electricity, as well as a chemical toilet, which will be periodically serviced as necessary.

Mr. Eric Keller, P.E., P.P., Omland Engineering Associates, Inc., testified as to the site's traffic patterns and applicant's proposed expansion. He recited that the 9' by 18' stall size match what is on site and is generally accepted. He further

testified that the parking needs of applicant are met by this garage/deck and that it is an efficient use of open space, and maximizes applicant's available and necessary need for visitor, patient, staff, vendor and physician parking.

Mr. Keller could not definitively answer Board's questions and concern as to whether there will be a fee or charge for parking. Mr. Keller acknowledged that it is never a popular choice to charge for parking, but applicant wanted to keep the option available of in the future charging a parking fee.

After some thought and consideration, and recognizing the concerns of the Board, applicant agreed that at present there would be no charge for parking, and agreed to return to the Planning Board for approval of any change in that "No-Fee Parking" policy.

Applicant further agreed that the handicapped parking area would be relocated adjacent to the proposed addition building, as it makes sense to have those spaces as convenient as possible to the entrance, and recognizing applicant has in excess of required spaces per existing plan.

Further, the site of the temporary office trailer will be restored to its pre-trailer condition (or better) after removal of the trailer, and in view of the approximate twenty-month period the temporary office trailer would be utilized, applicant agreed to provide landscaping in the vicinity of the trailer to the satisfaction of Board's Planner and Engineer.

With the exception of the variances granted hereinabove, the applicant has complied with the requirements of the Site Plan Ordinance. The plan is consistent with the intent and purpose of the Master Plan and the Municipal Development Ordinance. Further, recognizing the growing health care needs of the Township of Brick and its surrounding communities, the Board is satisfied that the applicant's plan is reasonable and consistent with its health care service mission to the community.

Accordingly, the Board finds that the benefits of the proposed development outweigh any detriments, and the relief requested can be granted without substantial detriment to the public good and will not substantially impair the intent and purpose of the Township Zoning Ordinance or Master Plan.

NOW, THEREFORE, BE IT RESOLVED by the Township Planning Board on this 24th day of April, 2002, that this application to amend resolution R-84-98 be approved subject to the following conditions:

1. The applicant must comply with all conditions of the original approving intent Resolution R-39-82 dated May 26, 1982, pertaining to the subject property; Resolution R-41-82 dated June 9, 1982 approving site plan and conditional use; and the amended approving Resolution R-84-98 dated October 28, 1998, except as modified by this resolution.

2. The applicant shall comply with all standard Planning Board conditions for preliminary major subdivision approval as set forth on Attachment 'A.'

3. The applicant shall comply with all representations and agreements made by the applicant's representatives, its attorney, or its professionals during the presentation of this case.

4. The applicant shall comply with the comments contained in the report from Michael P. Fowler, Municipal Planner, dated April 9, 2002, including:

   A. Applicant agreed that at least one space per parking level would be van-accessible.

   B. Applicant agreed to enhancements of landscaping around parking garage including foundation plantings and supplementing with shade trees and evergreens to the satisfaction of Board's Engineer and Planner.

C. Applicant recited circulation in/around garage and agreed to provide to continue sidewalk/walkway to/from parking garage to satisfaction of Board's Engineer and Planner.

D. Applicant agreed to pavement marking adjacent to handicapped parking and depressed curbing in front of Shore Rehab, and will add crosswalks as per Board Engineer and Planner.

E. Applicant will provide color renderings of architectural plans to satisfaction of Board's Engineer and Planner.

F. Applicant agreed to provide outdoor public seating where appropriate to satisfaction of Board's Engineer and Planner.

G. Applicant advised safety concerns as to loading zones prevented walkway around the entire perimeter of hospital building.

H. Applicant agreed not to remove topsoil from site or use same as spoil. Applicant further agreed to use redistributed topsoil throughout site.

5. The applicant shall comply with the comments contained in the report of T&M Associates, J.C. Steinmetz, P.E., C.M.E., Board Engineer, dated April 1, 2002.

Traffic Circulation/Layout

3.4 Applicant will correct required number of parking spaces.

3.5 Applicant will supply to satisfaction of Board Engineer the layout of proposed parking deck.

3.7 Applicant agrees to restrict "No Left Turn" onto Rt. 88 from applicant's driveways.

3.8 Applicant will supply sign schedule.

3.9 Applicant will supply signage for traffic exiting Brick Medical Arts Facility.

Grading/Drainage

4.1 Applicant has applied for Ocean County approval.

4.2 Applicant will indicate which pipes are to be plugged and abandoned or removed and, will supply details of plugged and abandoned pipe.

4.3 Applicant will supply details of proposed stormwater collection system for parking deck.

4.4 Applicant will provide details of proposed storm manholes and inlets.

4.5 Applicant will provide pipe bedding details.

Landscaping

5.1 Applicant will supply clearer, unshaded plans for review of Board Engineer.

5.2 Applicant agreed to attempt to relocate as many existing trees as possible and recite/provide same.

5.3 Applicant agreed to irrigate landscaped areas as required by Brick Township Ordinance Chap. 190-257 (K).

5.4 Applicant agreed to mulch per Brick Township Ordinance 190-257(I) and provide details of same to Board Engineer.

5.5 Applicant agreed to provide weed barrier per Brick Township Ordinance 190-257 (G).

5.6 Applicant agreed to define landscaped areas per Brick Township Ordinance 190-257 (E).

5.7 Applicant agreed to relocate existing 6" caliper Zelkova trees near proposed parking deck.

5.8 Applicant agreed to incorporate into the deciduous tree planting detail a root barrier product for deciduous trees that are to be Installed with 10' of new or existing sidewalks/curbs.

5.9 Applicant agreed to include and correct planting sizes to satisfaction of Board Engineer.

5.10 Applicant agreed to reposition white pines or replace them with a fastigiate species to satisfaction of Board Engineer.

5.11 Applicant agreed to enhance and supplement proposed plantings around north side of parking deck, as well as between proposed deck and walkway on south side of parking deck, to satisfaction of Board Engineer.

Lighting

6.1 Applicant agreed to re-label "Light Pole Foundation/"

6.2 Applicant agreed to add bollard light foundations to Detail Sheet 2.

6.3 Applicant agreed to supply photometrics for Lighting Plan I vicinity of outer roadway (eastern portion of site) or to supplement existing lighting to Board Engineer's satisfaction.

6.4 Applicant agreed to supplement proposed lighting in the handicapped parking area in northwest corner of existing hospital building to Board Engineer's satisfaction.

Environmental Impact Statement

7.1 Applicant agreed to supplement report to address Brick Township Ordinance Chap. 190-188C (a) 5&6 as to air quality and noise.

7.1.1 Applicant agreed to supply further information as to reduction in air quality.

7.1.2 Applicant agreed to recite and represent that mechanicals are in basement.

7.2 Applicant agreed to supplement report to recite as to need for expanded facility and effect on evaluated factors, to address the alternate proposal element of the Environmental Impact Statement.

Site Plan

8.1 Applicant agreed to supplement per Brick Township Ordinance on page OP-1.

8.3 Applicant agreed to either reconfigure handicap spaces in easterly lot adjacent to Jack Martin Boulevard to eliminate crossing of 25' access drive or to paint crosswalks at each ramp location to satisfaction of Board Engineer.

8.4.1 Applicant will supply details to satisfaction of Board Engineer as to concrete curb.

8.4.2 Applicant will supply details to satisfaction of Board Engineer as to concrete sidewalk.

8.4.3 Applicant will supply details to satisfaction of Board Engineer as to parking lot pavement

8.4.4 Applicant will supply details to satisfaction of Board Engineer as to handicap spaces and associated signs.

Temporary Office Trailer Plan

9.1 Applicant testified proposed trailer is an office trailer, not a construction trailer, and applicant will supplement existing proposed location as shown in A-5.

9.2 Applicant agreed to supply restoration notes when trailer is removed to satisfaction of Board Engineer.

General

10.1 Applicant acknowledges provisions of Article XVIII Hospital Support Zone mandatory fee contribution to Brick Township Affordable Trust Fund established in Article VB.

10.2 Applicant will repair/replace as necessary existing Type B inlet as to Board Engineer's satisfaction.

10.3 Applicant agrees to add sidewalk on southwest side access to building from adjacent parking lots to match the existing sidewalks to satisfaction of Board Engineer.

6. The applicant shall comply with the comments contained in the report from the Bureau of Fire Safety dated March 4, 2002.

A. Applicant will comply with the canopy height acceptable for fire apparatus passage.

B. Applicant will revise plan to show drop-off zones.

C. Applicant will show "no parking" areas under Title 39 and new fire zone.

D. Applicant will provide additional fire hydrant on east side of proposed addition.

E. Applicant will provide details of dry standpipe system of parking garage to satisfaction of Fire Safety Bureau.

F. Applicant represented the hospital has contracted to fully sprinkle all floors of hospital.

G. Applicant represents that new structure will eliminate overcrowding in mechanical rooms and hallways.

H. Applicant will comply with fire zone and fire signs and striping per Brick Township Ordinance 102-71.

7. The applicant shall comply with the comments contained in the report from Shade Tree Commission dated 4/5/02.

8. Applicant shall provide Board Engineer and Planner with the location of any proposed construction trailers prior to placement on site, so that Board's professionals might report back to Board should there be any concerns.

9. Applicant will supply Board's Engineer and Planner with an anticipated construction schedule.

10. Applicant will supply to Board copies of cross-access agreement for parking with adjacent lot, to facilitate traffic circulation on site.

11. Applicant will supply to Board's Engineer and Planner revised Lighting Plan reciting shielding of lighting from adjacent residences.

12. Applicant will supply to Board's Engineer and Planner revised Landscaping Plan for area of Office Trailer.

MOVED BY: Mr. Scherer

SECONDED BY: Mr. Kelly

VOTING IN THE AFFIRMATIVE: Mr. Kelly, Mrs. LaDuke, Mr. Dockery, Mr. Petoia, Mr. Vespi, Mr. Higgins, Mr. Scherer

VOTING IN THE NEGATIVE:

INELIGIBLE TO VOTE: Councilman Underwood, Mr. Aiello, Mr. Fredo

ABSTAINING:

ABSENT: Mr. Reilly

CERTIFICATION

I, JUDITH FOX NELSON, Clerk of the Planning Board of the Township of Brick, County of Ocean, State of New Jersey, do hereby certify that the foregoing resolution was duly ADOPTED by the said Planning Board of the Township of Brick at a regular meeting held on the 24th day of April, 2002.

IN WITNESS WHEREOF, I have set my hand this 26th day of April, 2002.

JUDITH FOX NELSON, Clerk
Brick Township Planning Board

ATTACHMENT "A"

BRICK TOWNSHIP PLANNING BOARD

STANDARD CONDITIONS FOR SITE PLAN APPROVAL

1. Applicant shall obtain certification by the Local Soil Conservation District of a plan for soil erosion and sediment control in accordance with N.J.S.A. 4:24-39 et seq., commonly known as the "Soil Erosion and Sediment Control Act."

2. All materials, methods of construction and details shall be in conformance with the current "Engineering Specifications and Construction Details" of the Township of Brick, which are on file in the office of the Township Engineer.

3. Applicant shall obtain all approvals required by any Federal, State, County or Municipal agency having regulatory jurisdiction of this development. Upon receipt of such approval(s), the applicant shall supply a copy of the permit(s) to the Board. In the event that any other agency requires a change in the plans approved by this Board, the applicant must reapply to the Brick Township Planning Board for approval of that change.

4. Applicant shall submit this entire proposal for re-approval should there be any deviation from the terms and conditions of this Resolution or the documents submitted as part of this application, all of which are made a part hereof and shall be binding on the applicant.

5. Applicant shall provide a statement from the Brick Township Tax Collector that all taxes are paid in full as of the date of this Resolution and as of the date of the fulfillment of any condition(s) of this Resolution.

6. Prior to the issuance of a construction permit, the applicant shall furnish the Township Clerk with a cash bond and performance guarantee in an amount to be determined by the Township Engineer.

7. Applicant shall post an inspection fund with the Township Clerk in an amount to be determined by the Township Engineer.

8. No soil shall be removed from the site without the written approval of the Township Council.

9. The applicant shall comply with all provisions and pay all fees established under Article VB (Mandatory Development Fees) of Chapter 190 of the Code of the Township of Brick.

10. For all residential uses the subdivider or site plan applicant shall provide for a trash receptacle.

11. In order to insure uniformity of trash receptacles and compatibility with the automatic trash collection system, all trash can receptacles required herein shall be obtained from the Township of Brick.

12. Applicant shall provide proof of application for Title NJSA 39:5 A-1 to the Planning Board.

SHADE TREE PERMIT

RECEIPT OF FEES

BLOCK: 1170

LOT: 18 & 18.02

FEE: $ 0

INSPECTION

COMMERCIAL

APPLICATION FOR SHADE TREE PERMIT
ORDINANCE # 158-E-99

Telephone # 973-376-9100

1. Name of Applicant & Address Wm. Blanchard Co.
199 Mountain Ave, Springfield NJ 07081
Give name and address of person applying for permit. If applicant is other than owner, give and identify names and addresses of both.

2. Property is Block 1170, Lot(s) 18 & 18.02
This information is available from your deed or tax bill.

3. Address if different from applicant 405 Jack Martin Blvd.
Give street and number if one is assigned. If there is no street number, estimate distance and direction from nearest intersection or other easily recognizable land mark.

4. Location of trees on property See Site Plan and number of trees presently on property See Site Plan.

A. FOR INDIVIDUAL BUILDING LOTS:

Provide either a copy of a recent survey or a sketch of the property drawn to scale including any pertinent distances not easily read from the sketch.

Include existing buildings, driveways and other constructions in SOLID LINES. Show all existing trees (see note below) with a circle. Trees may be keyed as to genus and species if desired, otherwise include a C inside circle for coniferous (pine, etc.) trees and A D for dedidous trees.

Note* Trees to be removed will have an X through the circle.

If removal is desired because of proposed construction of any kind, include such construction in DOTTED LINES and identify. If planting of new trees (including but not limited to those in note below) is proposed in application to replace those removed, or for any other reason, show approximate proposed location with a DOTTED CIRCLE and specify species and approximate planting size (height and caliper).

There should be a minimum of one tree for each 2000 square foot after all tree removal and replacement. (e.g. an 80 X 100 Ft lot includes 8000 SF and would require a minimum of 4 trees).

B. FOR OTHER ACREAGE

Include copy of subdivision plot plan or equivalent outlining all wooded areas and solitary trees. Identify each (e.g."heavily wooded mature oak with scattered Dogwood" or "sparsely wooded mixed Pitch Pine and small Oak, etc).

2000 SF as above is required

APPLICATION FOR SHADE TREE PERMIT- Ordinance # 158-E-99
Page 2

Note*

"Tree" for the purpose of this permit means (1) any live coniferous tree 4" or more DBH (diameter breast high) (2) any dediduous tree (live) 3" or more DBH (3) any live American Holly or Dogwood 1" or more, one foot above ground and (4) any live Laurel 3" or more across root crown.

Date Sept 19, 2002

Name of Applicant Wm. Blanchard Co.

Address 199 Mountain Ave.

Springfield, NJ 07081

Block 1170 Lot 18 & 18.02

Residential _____ Commercial ✓

Address if different from applicant 425 Jack Martin Blvd.

Brick, N.J. 08724

LOCATION OF TREES ON PROPERTY

See Site Plan

NUMBER OF TREES PRESENTLY ON PROPERTY

See Site Plan

FEES

$5.00 per tree (maximum $25.00) on individual building lot

$25.00 per acre for approved subdivisions/site plans

AMOUNT OF FEE 0

Reviewed by _____

Approved _____ Township Engineer Date 10/3/02

TOWNSHIP OF BRICK

OCEAN COUNTY, NEW JERSEY

401 CHAMBERS BRIDGE ROAD · BRICK, NJ 08723

Joseph C. Scarpelli, Mayor

Township Council:
Steven N. Cucci — President
Stephen C. Acropolis
Kimberley S. Casten
Gregory S. Kavanagh
Kathy M. Russell
Tony R. Shupin
Frederick J. Underwood, Sr.

Department of Administration & Finance

Division of Inspections
Daniel F. Newman Jr.
Contruction Official
(732) 262-1030
Fax: (732) 262-6954
http://www.twp.brick.nj.us

Date: Sept 19, 2002

Township Engineer
401 Chambers Bridge Road
Brick, NJ 08723

RE: Block: 1170 Lot: 18 & 18.02

Property Address: 425 Jack Martin Blvd

I, Robert Wilke of Wm. Blanchard Co. of 199 Mountain Ave. Springfield NJ 07081
(name) (address)

Request to be exempted from the plot plan requirement for an addition as outlined in the Brick Land Use Book, Chapter 190.31, part B.

COMMERCIAL

Applicant's Signature

The following shall be submitted with this request:

1. Submit survey locating existing dwelling and proposed addition. Dimensions of addition should be included.

2. Proof that the property is not located in a Flood Hazard Area.

Note: Prior to approval, a site inspection by the Engineering Department will be performed to verify that the proposed addition will not create a drainage problem.

OFFICE USE

Approved: 10/3/02 Signed:

Rejected: Signed:

UPDATE 02-3987
DATE 5-27-03
INITIALED BY
FOR Plumbing

Brick Township
Plan Review Date Dept By
Zoning 02-3987 7/8/02
Plumbing
Building
Fire
Electrical

Counter Form
PLEASE PRINT

PLUMBING

Contractor: BARHAM - McBRIDE Co.
Address: 4039 Rt 33
TINTON FALLS
Phone #: 732-922-0600
Lis #: 6107
Federal Emp # or SSN 22-1101670

Technical Data

Fixtures	Quantity
Water Closets (Toilet)	
Urinals/Bidets	
Bath Tub (w/or w/out shower head)	
Lavatory (BR Sink)	
Shower	
Floor Drain	
Sink	
Dishwasher	
Drinking Fountain	
Washing Machine	
Hose Bib	
Gas Piping	
Fuel Oil Piping	
Water Heater	
Steam Boiler	
Hot Water Boiler	
Sewer Pump	
Interceptor/Separator	
Backflow Preventer	
Greasetrap	
Air Conditioner (Condensate Drain)	
Septic Tank Closure	
Sewer Service Connection	
Water Service Connection	
Active Solar System	
Auxiliary Meter	
Sprinkler Heads	
Sump Pump	1 Sump Pump (ELEVATOR)
Pool Heater	
Other:	

Sump Missed on

Estimated Cost of Plumbing Work $ IN ORIGINAL

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:

Please Print Name: DAVID L. AMBROSIA

CONTRACTOR'S SEAL

FIRE

Contractor:
Address:
Phone #:
Lis #:
Federal Emp # or SSN

Technical Data

Description of Work:

Heating Type: ___Gas ___Oil ___Electric ___Solar
Heating System is ___New ___Existing
Location of Furnace/Boiler:
Water Supply Source
Method of Valve Supervision
Local Alarm Supervision
Central Supervision:
Proprietary Supervision:

Flammable Storage Tanks _____capacity_____fuel
Combustible Storage Tanks_____capacity_____fuel
LPG Storage Tanks_____capacity_____fuel

Item	Quantity
Wet Sprinkler Heads	
Dry Sprinkler Heads	
Total	
Smoke Detectors	
Heat Detectors	
Total	
Stand Pipes	
Kitchen Hood Exhaust System	

Pre-Engineered Systems:
CO2 Suppression
Halon Suppression
Foam Suppression
Dry Chemical
Wet Chemical

Gas/ Oil Fired Appliances:
Gas Stove
Gas Dryer
Furnace (Gas or Oil)
Gas Fireplace
Gas Logs
Total Appliances

Wood Burning Stove
Wood Fireplace
Other:

Estimated Cost of Fire Work

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:

Print Name:

Township of Brick

Counter Form

(PLEASE PRINT)

Site Location: Ocean Cty Medical Center
Block: 11700 Lot: 18 & 18.02
Owner's Name: Meridian Health Services
Owner's Mailing Address: Wall NJ.

Phone: (732) 836-4077

BUILDING

Contractor:
Address:

Phone#:
Lis #
Federal Emp # or SSN

Technical Data

Description of Work:

Type of Work

___New Building	___Siding
___Addition	___Fence
___Alteration	___Pool
___Roofing	___Demolition
___Asbestos Abatement	___Sign _____sq ft
___Fireplace wd/gas	

Building Characteristics

Use Group Present: Proposed:
No of Stories:
Height of Structure:
Area of the largest floor:
Area of New Structure:
Volume of New Structure:
Total Land Disturbed:

Cost of Alteration: $

Cost of New Building: $

Cost of Site Work $

Total Cost of New Building Work: $

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:

Please Print Name

ELECTRICAL

Contractor:
Address:

Phone#:
Lis #:
Federal Emp # or SSN

Technical Data

Item Quantity

Lighting Fixtures
Receptacles
Switches
Detectors
Light Poles
Motors w/ Fract. HP
Emergency & Exit Lights
Communication Points
Alarm Devices/FAC Panel
Total

Pool (Receptacles, Switches, Lights, Motor 1HP)
Spa/Hot Tub/Storable Pool
Electric Range KW
Oven/Surface Unit KW
Electric Water Heater KW
Electric Dryer KW
Dishwasher KW
Garbage Disposal HP
A/C Unit –Central Air KW
Space Heater/Air Handler KW
Baseboard Heating KW
Motors 1+ HP
Transformer/Generator KW
Light Stander AMP
Service AMP
Subpanel AMP
Motor Control Center AMP
Sign/Outline Light KW
Furnace
Steam Boiler
Other:

Estimated Cost of Electrical Work:

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:

Please Print Name

CONTRACTOR'S SEAL

1850 Blanchard
Wm. Blanchard Co. | Builders since 1860

P.O. Box 298 199 Mountain Avenue.Springfield, New Jersey 07081
973.376.9100 Fax: 973=376=9154

June 26, 2003

Building Department
Township of Brick
401 Chambers Bridge Road
Brick, NJ 08723

Attn: Frank Miser
Building Code Official

Ref: Job No. 4826 & 4869
East Wing Addition and
Parking Garage
Medical Center of Ocean County
Brick, New Jersey

We Are:

- ☐ Forwarding To You
- ☐ Enclosing Herewith
- ☐ Returning Herewith
- ☒ **Handing You**

For Your:

- ☐ Quotation
- ☐ Approval
- ☐ Review and Comment
- ☐ Approved as Noted
- ☒ **Use**

No. Copies	Drawing Number	Title	Date
1	Field Report from O'Donnell & Naccarato, Inc.		06/25/03
1	Draft Report from SOR Testing Laboratories, Inc.		06/25/03
1	Field Report from O'Donnell & Naccarato, Inc.		06/26/03

COMMENTS: For your use.

Thanks,
Wm. **Blanchard** *Co.*

Stan Kozal
Superintendent

SK/lr
Cc: Kevin Gibbons, Granary
John Finley, Vitetta
Fred Schwab, Stateline
Richard A. Samenfeld/SF
Bob Wilke
File w/ copy

O'DONNELL & NACCARATO, INC.
111 S. Independence Mall East
Suite 1060
Philadelphia, Pennsylvania 19106
(T)(215) 925-3788 Fax (215) 627-1051

DATE:	JOB NO.
6-25-03	2133-001

~~MONTHLY~~ REPORT FOR: MEDICAL CENTER OF OCEAN COUNTY

PROJECT EAST WING

CONTRACTOR	OWNER
J. M. BLANCHARD	GILBANE

TO ATTN: KEVIN G.

GALLOWAY ASSOC.

DATES: NOTES

- 3rd FLR FROM EAST 6 TO CL FROM EAST 6 to EAST 7 CL LINE. REMOVE W/ WWF 6x6 W2.9xW2.9 w/ # 4 COUT and # 4 @ 16 AS PER 19/S6.2 and # 4 @ 12 6'-0" LONG @ HEADS, and # 4 INSTALLED AS PER 21/S6.2
- 2nd & 4th FLR FROM EAST 6 TO CL FROM EAST 6 to EAST 7 CL, REMOVE PER 19/S6.2, 21/S6.2, and 13&14/S6.2.
- 25 STUDS MISSING @ 3rd FLR CBU LINE CL

FIELD REPORT

COPIES TO • WM BLANCHARD - STAN M.
• O-N - DAVE B.
• VALETTA - M. BUSHA - RICHARDSON

SIGNED CHRISTIAN KROWSKI WITTER

SOR TESTING LABORATORIES, INC.
SOR CONSULTING ENGINEERS, INC.
S & S ENVIRONMENTAL SCIENCES, INC.

Geotechnical Engineering – Materials Testing – Forensic Studies
Scientific and Chemical Testing and Consultation
98 Sand Park Road, Cedar Grove, New Jersey 07009
(973) 239-8001 Fax (973) 239-8360
www.sorlabs.com

Kamil Sor, Ph.D.
Orhun Sor, P.E.
Peter G. Micklus, P.E.
Yilmaz Arhan, Ph.D.
Kenneth J. Rowbotham, P.E.

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CCRL Cement and Concrete Reference Laboratory Inspected

US Army Corps of Engineers Accredited

NJ DEP Certified Laboratory

New Jersey EDA Prequalified

Fax

To: DAVE ISTON From: ORHUN

Company: O'DONNELL BLANCHARD Pages (including cover): 2

Fax: 215-627-8051 732-840-4513 Date: 6-25-03

Re: DRAFT REPORT

PLEASE CALL (973) 239-8001 IF ANY PAGES ARE NOT RECEIVED OR ARE ILLEGIBLE

This facsimile is the confidential property of the Client. Any information contained herein may only be published or reproduced with our written permission.

Comments:

WE LIKE TYPE THIS REPORT

NEED TOMORROW ORHUN

WINNER OF
ACI / NJCAA's 39TH. ANNUAL CONCRETE GRAND & 7 MERIT AWARDS

Draft

On June 25, 2003, a steel technician from our office went to the project to observe the structural steel. Our steel technician's report is provided below.

Stairway 104-404 was completed. The right angle clips were welded all around with a ¼" fillet weld. Welds were cleaned and found to be satisfactory.

On the roof level, the observed support bracing along column line 5 between lines BB and F were in general conformance with field sketch 0610. This detail is now complete on the 2nd, 3rd and roof levels.

In the link, between column lines BB and F and 3.1 and 5, the observed steel was in general conformance with Vierra's field sketches.

On the 1st, 2nd, 3rd floors and the roof the observed structural steel between column lines M and A and 1 and 12 were in general conformance with Weirs Weldings approved drawings. The testing of the studs was performed by others.

Additional structural steel members will be erected in the canopy. The client will call us when the canopy is competed.

Draft

O'DONNELL & NACCARATO, INC.
111 S. Independence Mall East
Suite 1060
Philadelphia, Pennsylvania 19106
(T)(215) 925-3788 Fax (215) 627-1051

DATE:	JOB NO.
6-26-03	2133.001

MONTHLY REPORT FOR: MEDICAL CENTER OF OCEAN COUNTY

PROJECT EAST WING

CONTRACTOR	OWNER
J.M. BLANCHARD	GILBANE

PAGE 1 OF 2

TO ATTN: KEVIN G.

RAMEY ASSOC.

DATES: NOTES

- 4th Flr Link SLAB
  - From Col. Line CC TO Exist 6 and From Exist 6 to Exist 7
  - Reinf As per "S3", 19/S6.2, 21/S6.2, 13/S6.2, 14/S6.2
  - III Trucks SET 1
    OT = 79°
    CT = 80°
    Slump = 8
- 2nd Flr Link SLAB
  - From Col. Line CC TO Exist 6 and From Exist 6 to Exist 7
  - Reinf As per "S3", 19/S6.2, 21/S6.2, 13/S6.2, and 14/S6.2
  - III Trucks SET 2
    OT = 80°
    CT = 81°
    Slump = 9
- 3rd FLR LINK SLAB*
  - From Col Line CC TO and From Exist 6 to Exist 7
  - Reinf As per "S3", 19/S6.2, 21/S6.2, 13/S6.2, and 14/S6.2
  - 1 Truck
- cont'd

FIELD REPORT

COPIES TO • WM BLANCHARD - STAN M.
• D-N - DAVE B.
• V. PETTA - H. Bosted - Richardson

SIGNED Christian Krowen Wetter

(25) [Col. Line CC]
* MISSING STUDS PLACED 6-26-03.

O'DONNELL & NACCARATO, INC.
111 S. Independence Mall East
Suite 1060
Philadelphia, Pennsylvania 19106
(T)(215) 925-3768 Fax (215) 627-1051

DATE: 6-26-03	JOB NO. 2133.01
MONTHLY REPORT FOR: MEDICAL CENTER OF OCEAN COUNTY	
PROJECT EAST WING	
CONTRACTOR CM BLANCHARD	OWNER GRANDEY
PAGE 2 OF 2	

TO GRANDEY ASSOC.

ATTN: KEVIN G.

DATES: NOTES

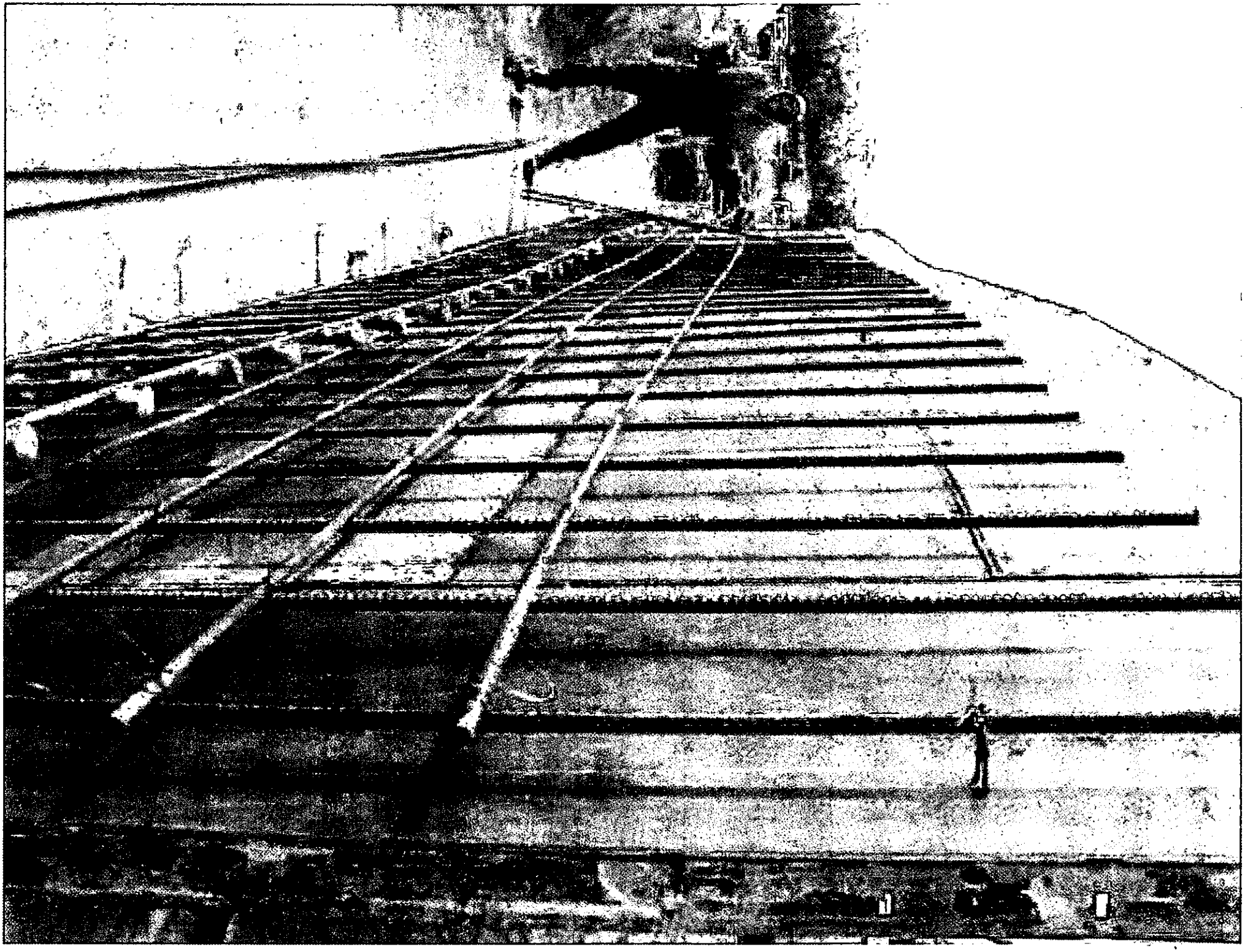
- STAIRWAY B11 ENTRANCE LANDINGS POURED W/ 4000 PSI CONC.
- REINF. AT LANDING WWF 6x6 W2.9 x W2.9
- 2ND & 3RD EXTERIOR STOPS RECHECKED W/ OWNER REPRESENTATIVE MARKED W/ ORANGE PAINT

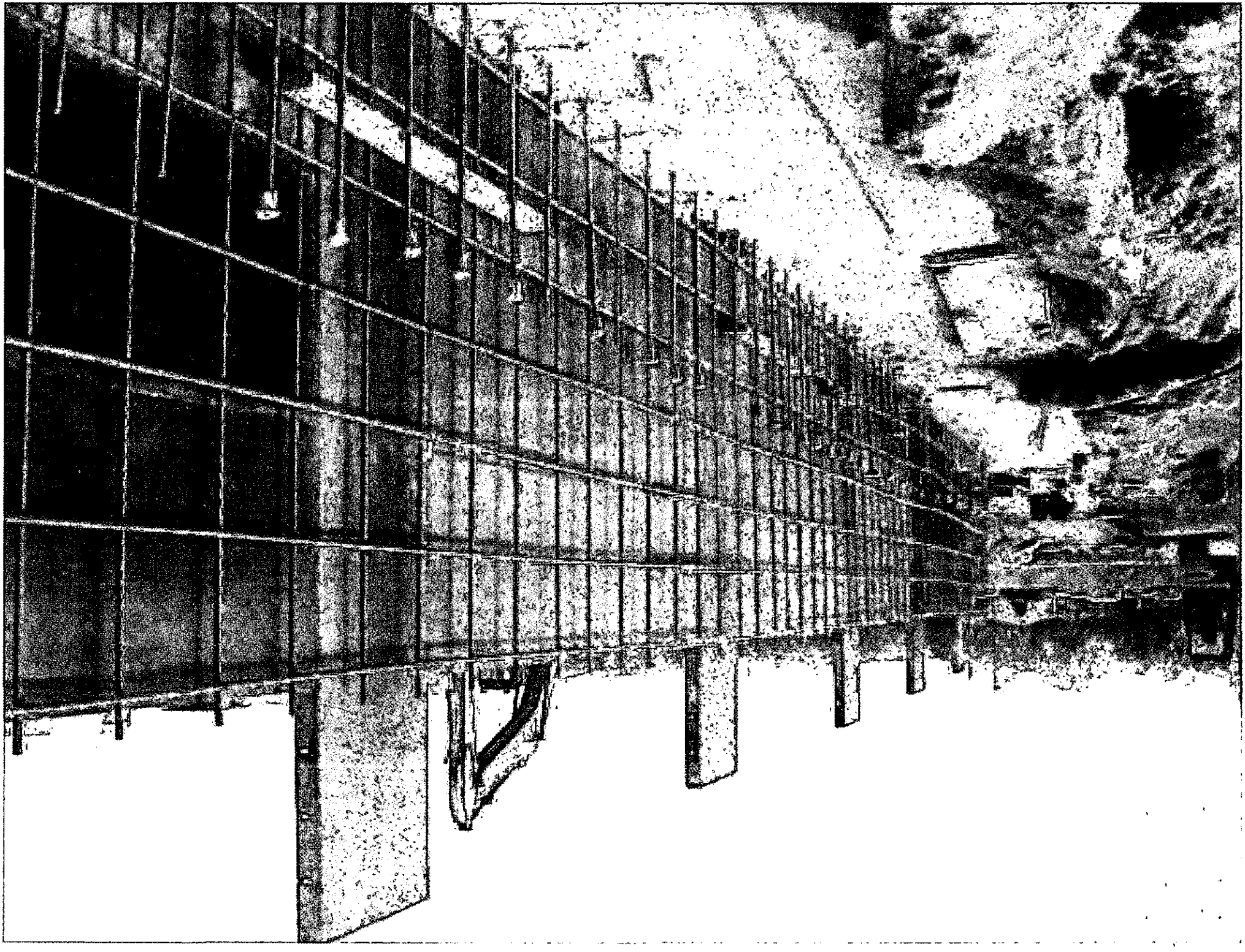
FIELD REPORT

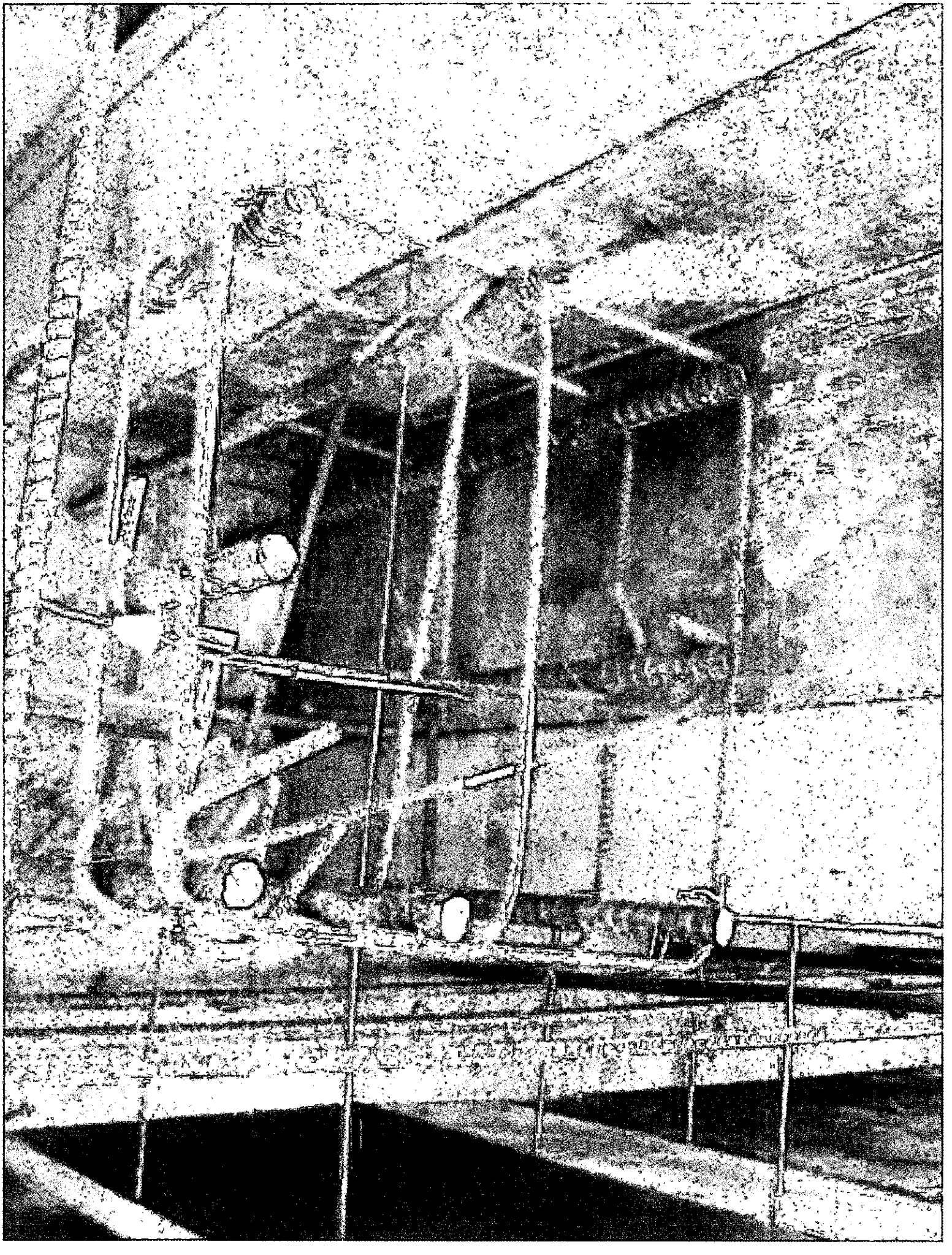
COPIES TO

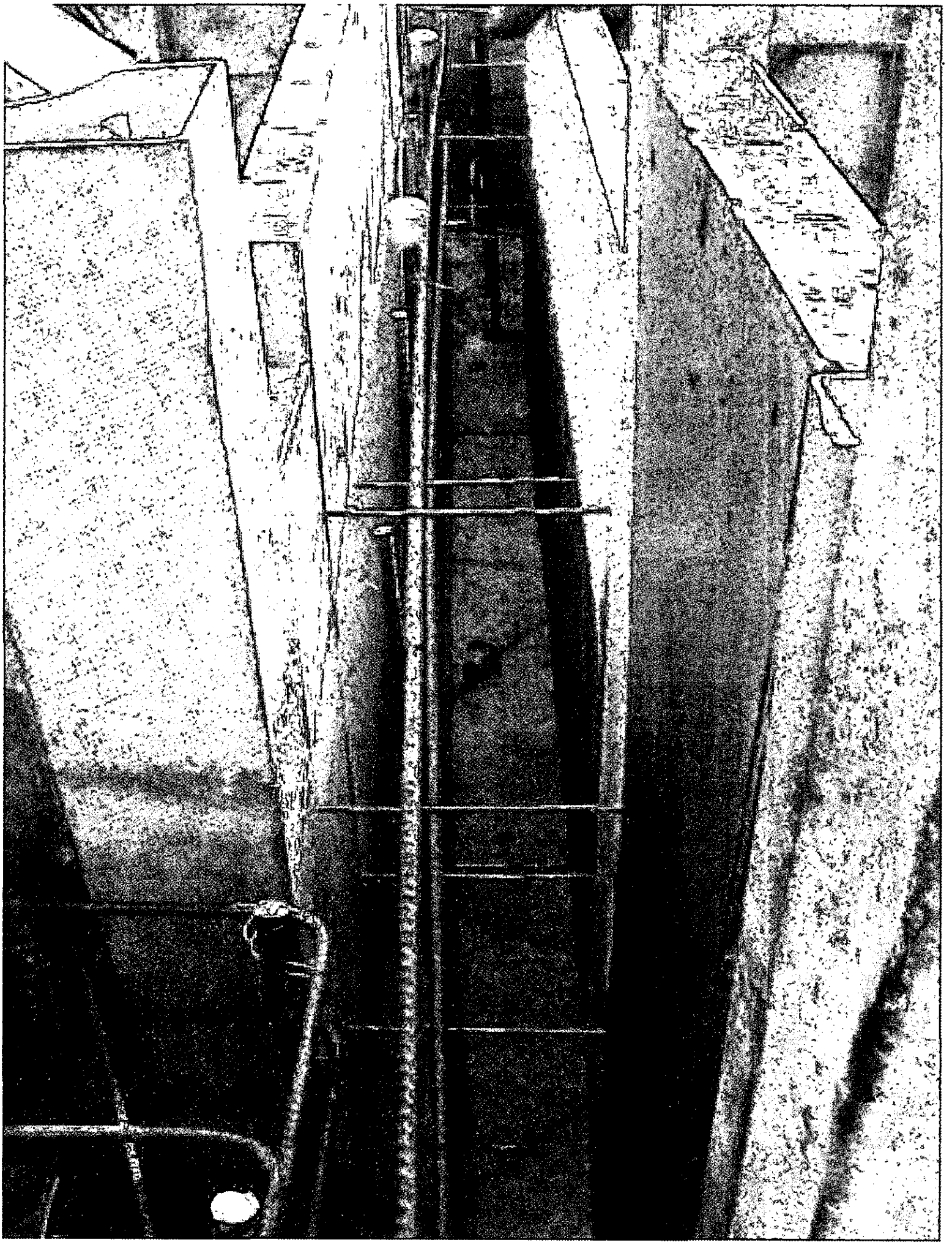
SIGNED

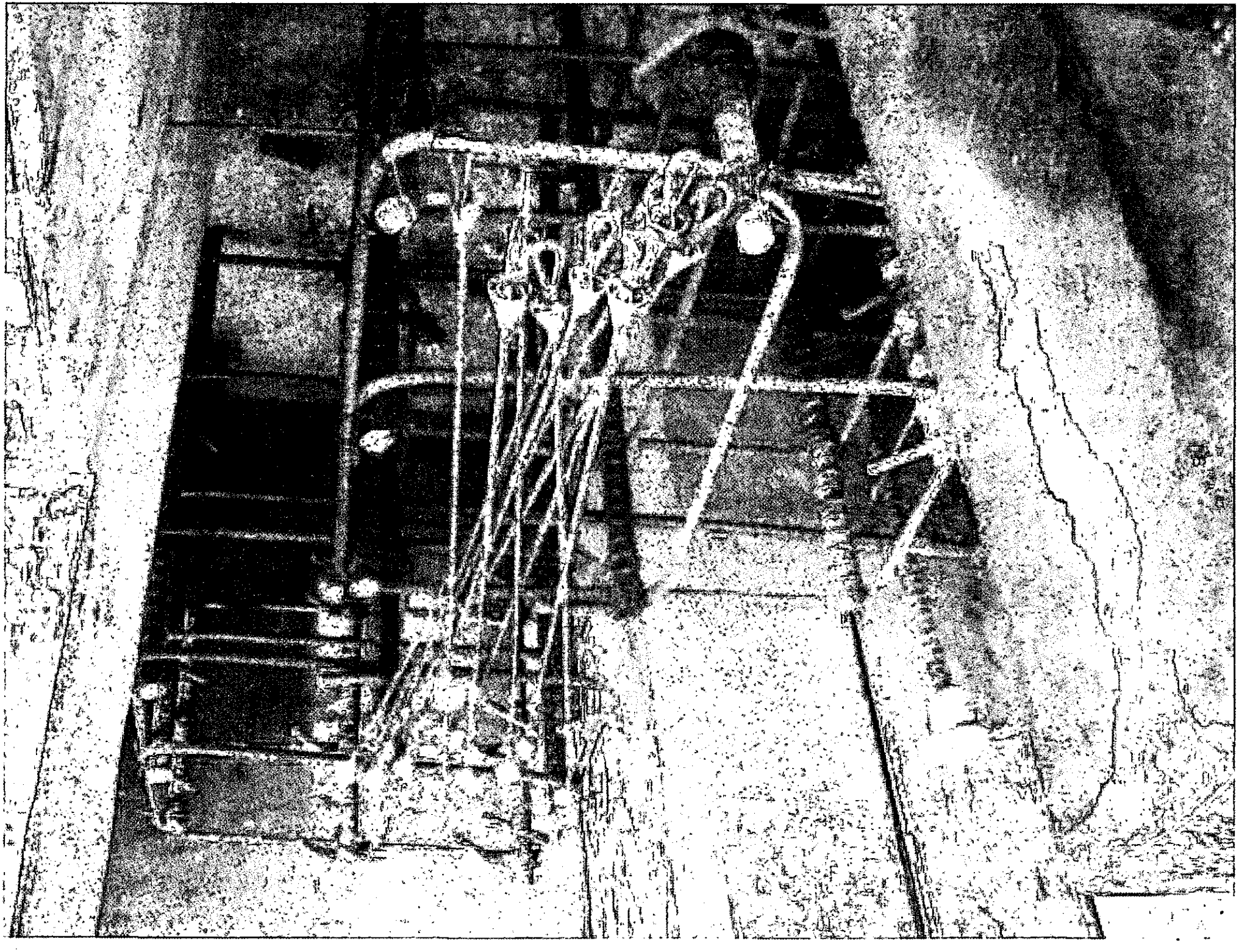
CHRISTIAN KRONENWETTER

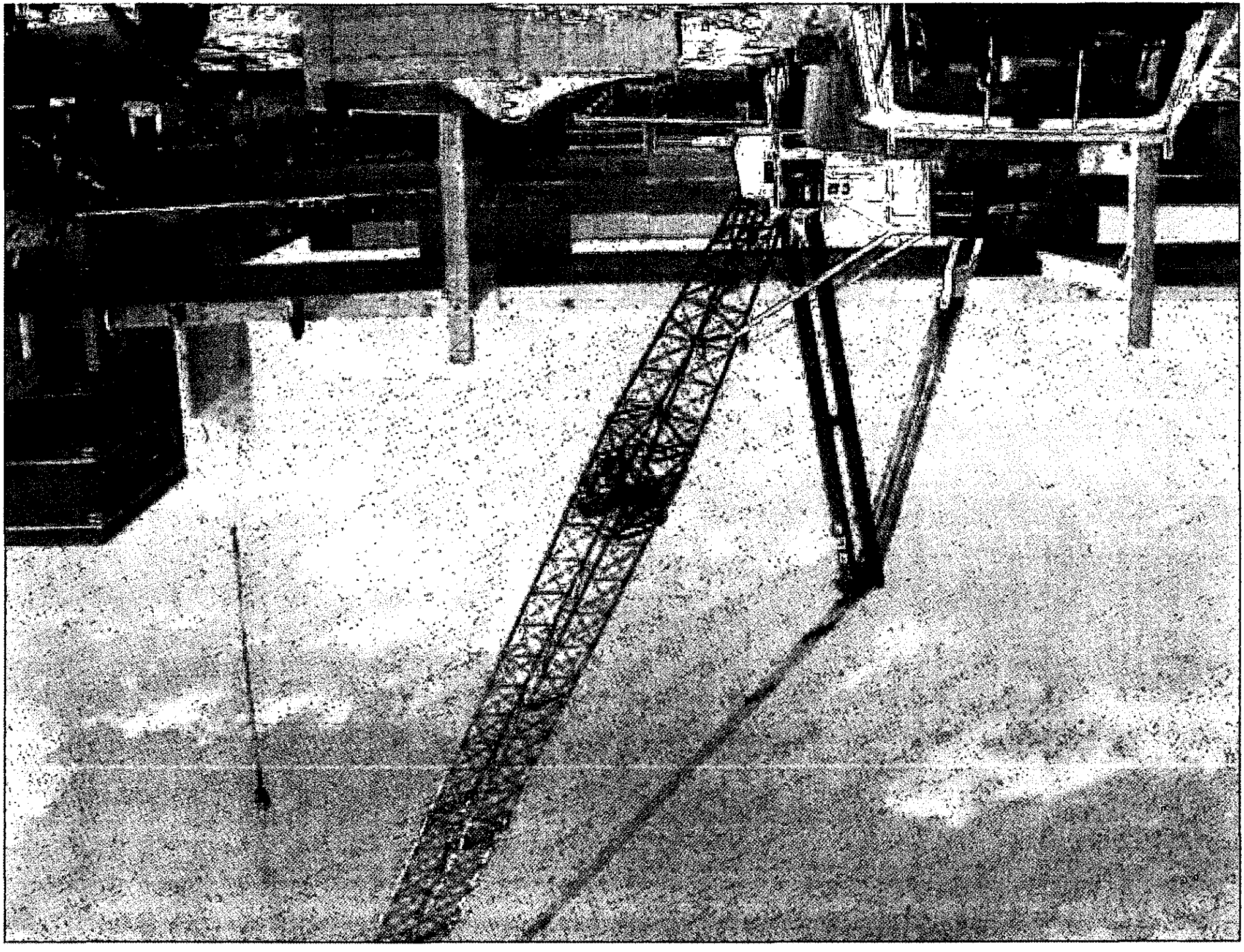




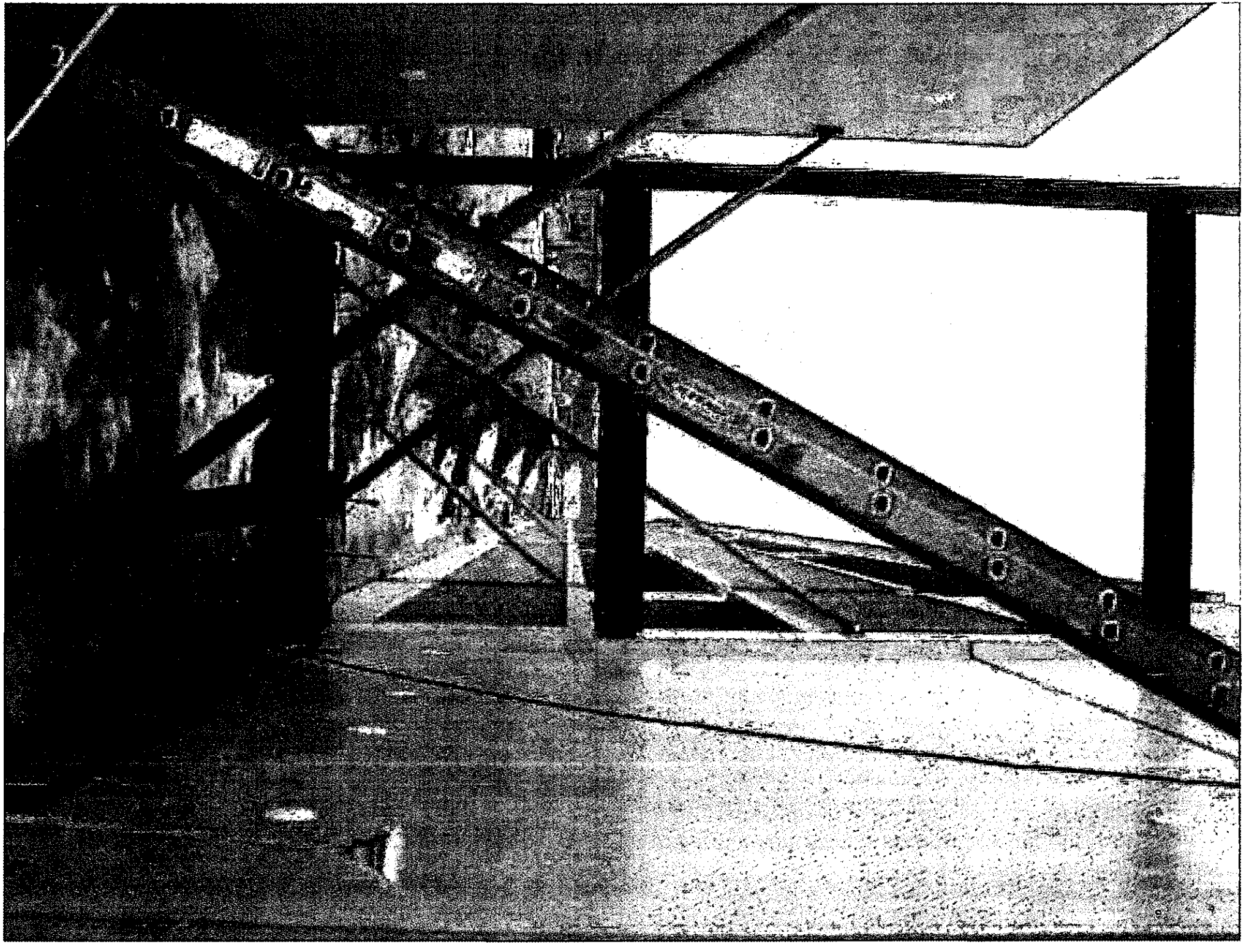


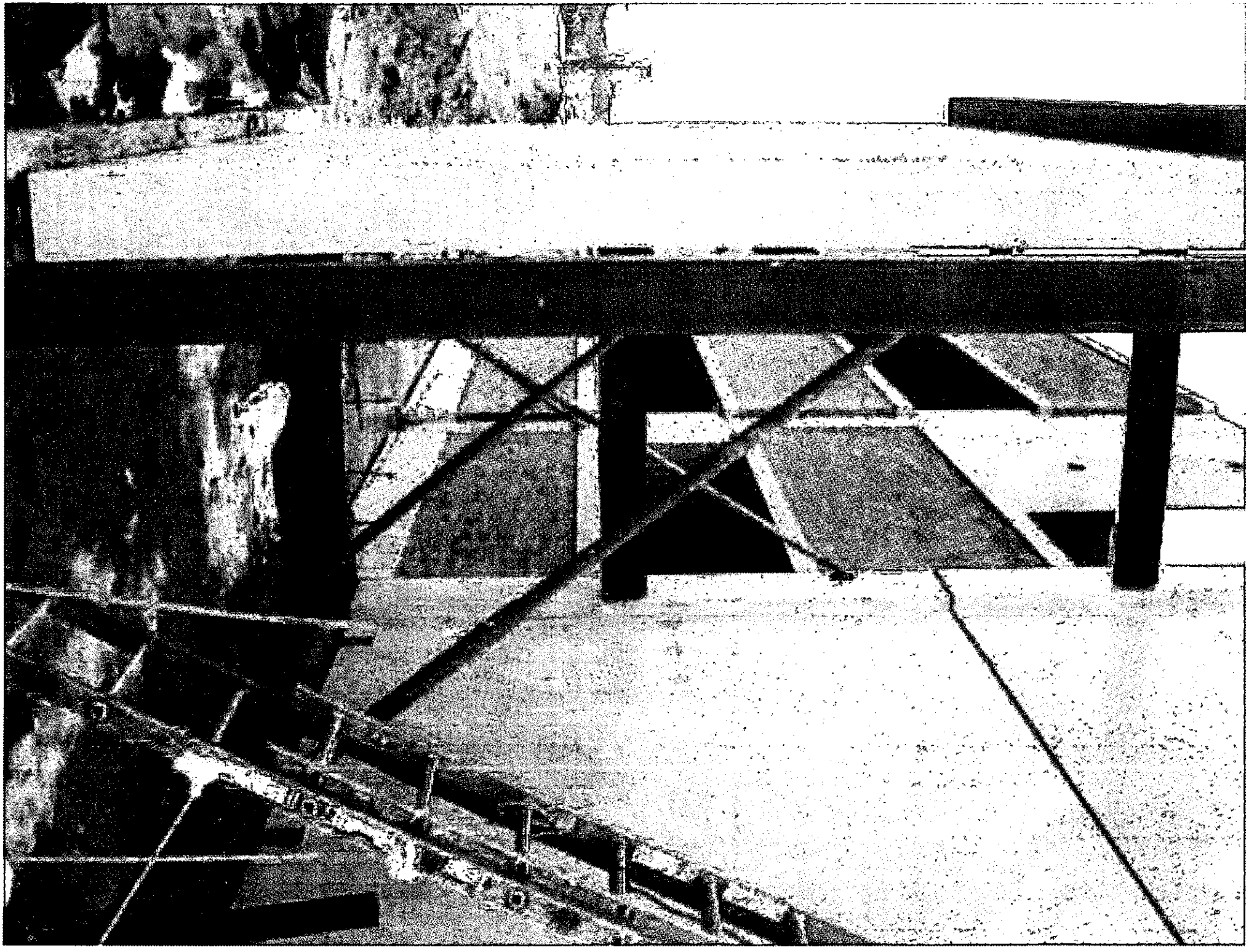


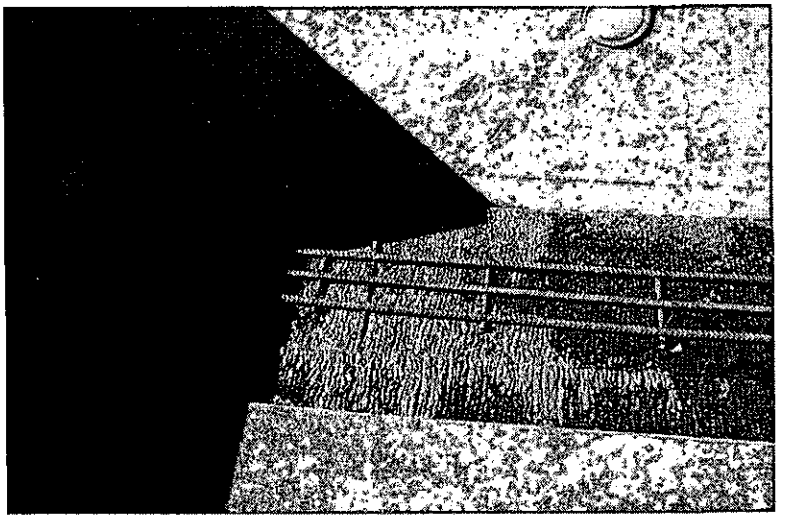






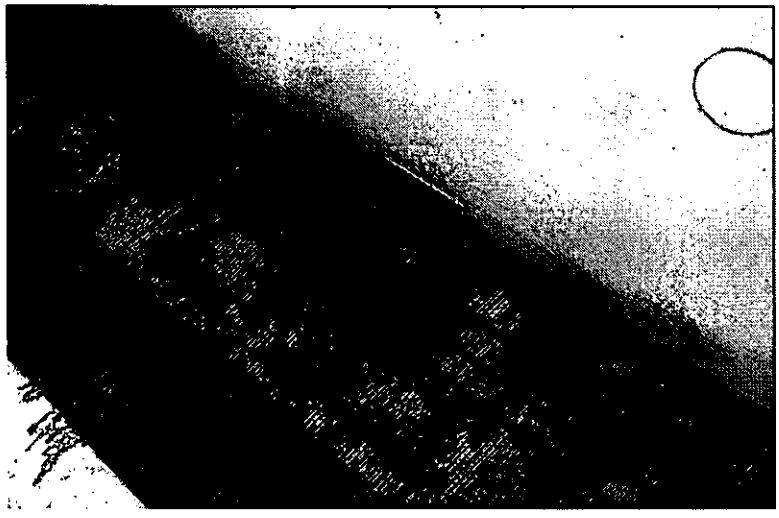


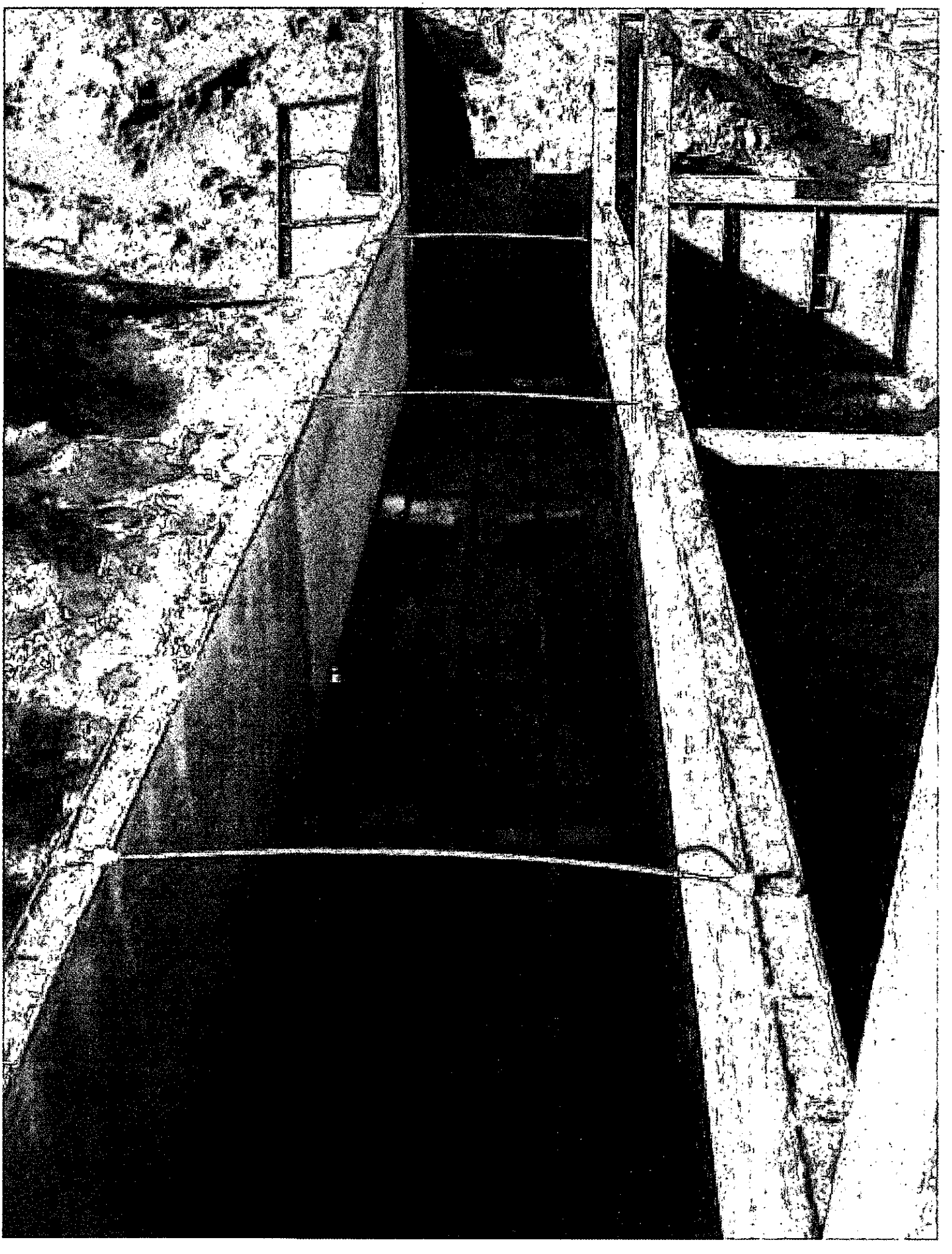


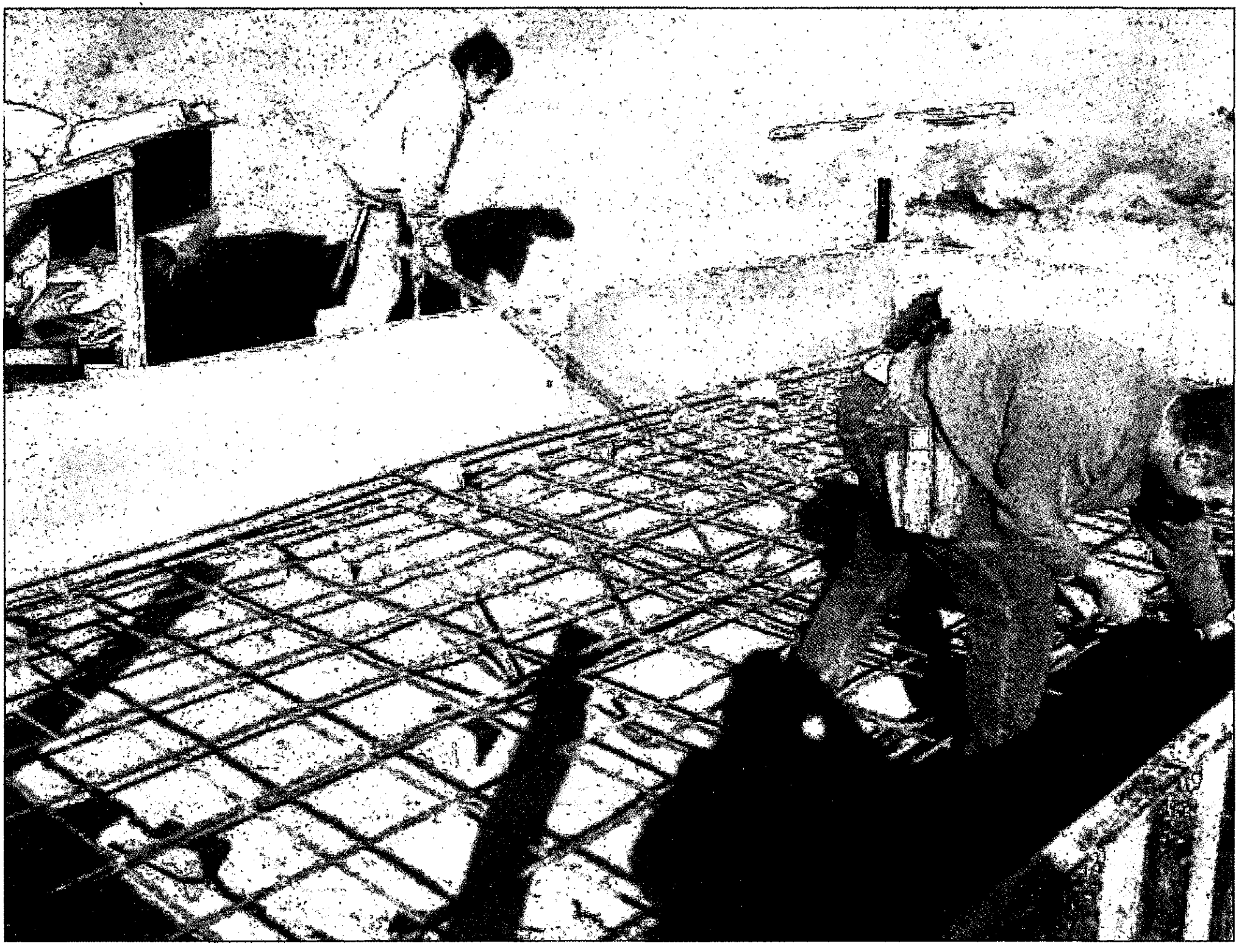


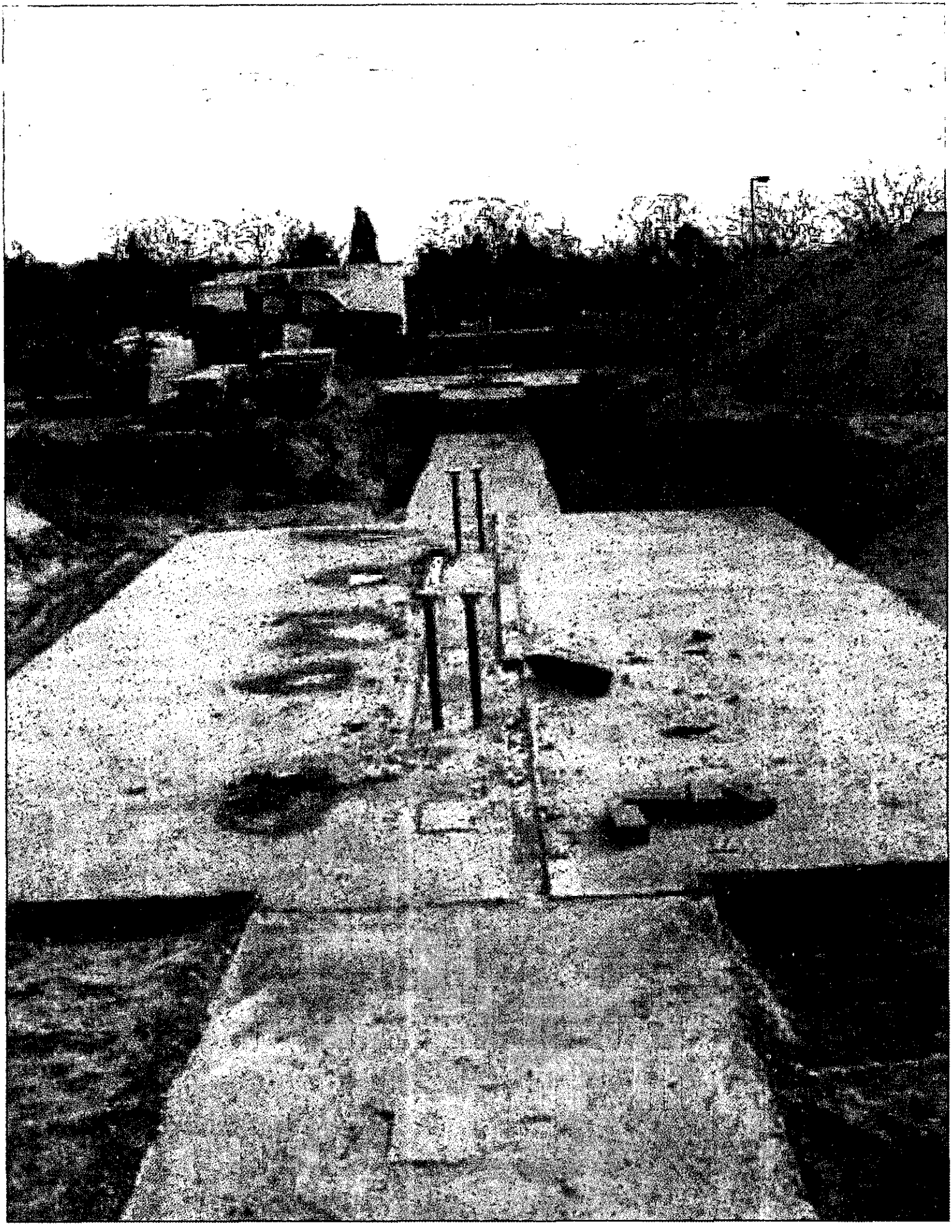
1170 - 18

02-3987











INSPECTOR: K Shafer

DATE: 6/27/03

JOB: Brick Hosp. Phase 4 SECTION: Parking Garage

TYPE OF WORK: Final

WEATHER: Sunny

LOCATION: off Rt 88

TEMPERATURE: 90's

BLOCK: 1170 LOT:

ENGINEERING RECOMMENDATIONS FOR CERTIFICATE OF OCCUPANCY INSPECTION CHECK LIST

ITEMS TO BE COMPLETED	COMPLETED	DEFICIENT
1. Driveway	✓	
2. Grading	✓	
3. Sidewalk	✓	
4. Road Pavement	✓	
5. Landscaping & Sodding	✓	
6. Clean-up Procedures	✓	
7. Note on going construction in immediate area	✓	
8. Safety	✓	

COMMENTS REFERENCING ITEM NUMBER:

A Parking Garage Only

RECOMMENDATIONS:

☐ TEMP. C.O.

☒ FINAL C.O.

☐ DETAILED REINSPECTION

☐ HOLD INSPECTION UNTIL LOT ELEVATION FIELD VERIFIED

PLANNING BOARD ENGINEER

MUNICIPAL ENGINEER

I _____, Authorized representative of _____, hereby acknowledge the above deficiencies, and further realize that the Certificate of Occupany will be conditioned upon the acceptable resolution thereof within _____ days of the issuance of Certificate of Occupancy.

THE FACE OF THIS DOCUMENT IS PRINTED BLUE - THE BACK CONTAINS A SIMULATED WATERMARK

Payable through FLEET BANK Hazleton, Pennsylvania
At FLEET BANK, Cherry Hill, New Jersey, 08034

60-234
313

Meridian Hospitals Corporation
1350 Campus Parkway
Neptune, New Jersey 07753

CHECK NUMBER	CHECK DATE	CHECK AMOUNT
445951	06/26/03	*****$16,411.50

PAY *Sixteen thousand four hundred eleven and 50/100 Dollars*

TO THE ORDER OF
TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE ROAD
BRICK, NJ 08723

BY _____ AUTHORIZED SIGNATURE

⑈0445951⑈ ⑆031302340⑆ 900 205 679⑈

From: Lisa Rose Tavalaiccio, Office of Affordable Housing
Re: Affordable Housing Fees

Business/Development: Medical Center of O.C.

Owner/Applicant: Wm. Blanchard

Property Address: 425 Jack Martin Blvd - Parking Garage

Block: 1170 Lot: 18 & 18.02

DEPOSIT RECEIVED
Mandatory Development Fee
(Commercial)
Residential
Inclusionary Development Fee

DATE: 6-27-03

Check Number 445951

Preliminary Fee Paid _____

Final Fee Paid 16411.50

FOR DEPOSIT ONLY - AFFORDABLE HOUSING TRUST ACCOUNT 36 367087

Collection of said fees as authorized by Township Ordinance
354-2C-93, is pursuant to N.J.S.A. 52:27D-301 et seq. And N.J.A.C. 5:92-18 et seq.

Received in Treasurer's Office by:

Kathleen Tinbergen
Signature

6-27-03
Date

OFFICE OF AFFORDABLE HOUSING

AHBT FINAL APPROVAL

OFFICE OF AFFORDABLE HOUSING
CERTIFICATE OF COMPLIANCE

BLOCK 1170 LOT 18 + 18.02 SITE ADDRESS 425 Lake Marion Blvd. - Parking Garage
TYPE OF SITE Residential / (Commercial) NAME OF BUSINESS Medical Center of OC
APPLICANT Wm. Blanchard PHONE NUMBER 973-376-9100
APPLICANT ADDRESS 199 Mountain Ave. CITY & STATE Springfield, NJ. 07081

Bob Wiehe - 732-840-4510

INCLUSIONARY DEVELOPMENT

Affordable	Fee Required		Date
	Down Payment		Date
	Balance		Date
	Paid In Full		Date
Market Rate	No Fee Required		

MANDATORY DEVELOPER FEES

◊ Residential is .005 %

X Commercial is .01%

X The estimated equalized assessed value of the proposed construction is

131,293 $ 3,282,300

Frederick R. Millman, CTA, Tax Assessor — Date 10/4/02

◊ The final equalized assessed value of the construction at the above referenced site is:

$ 3,282,300

Frederick R. Millman, CTA, Tax Assessor — Date 6/13/03

Prelininary Fee Required	~~164.12~~ 16411.50	Date	10/10/02
Preliminary Paid	16411.50	Check #	410483
		Receipt #	1465
Final Total Fee Required	328.23.00		
Preliminary Paid	16411.50	Date	6-27-03
Final Paid	16411.50	Check#	445951
Balance Due	-0-	Receipt #	325024

Fees Imposed To Date _____
Fees Reached $15,000 _____ Date

I hereby certify that the above applicant has complied with all rules and regulations of the Office of Affordable Housing and has paid all required fees and charges.

Office of Affordable Housing

10/3/02 - Ta prelim.
10/7/02 - mailed ltr.
6/23/03 - Ta. final

THE FACE OF THIS DOCUMENT IS PRINTED BLUE - THE BACK CONTAINS A SIMULATED WATERMARK

Payable through FLEET BANK Hazleton, Pennsylvania
At FLEET BANK, Cherry Hill, New Jersey, 08034

60-234
313

Meridian Hospitals Corporation
103 East Front Street
Red Bank, New Jersey 07701

1465

CHECK NUMBER	CHECK DATE	CHECK AMOUNT
410983	10/09/02	*****$98,355.00

PAY *Ninety eight thousand three hundred fifty five and 00/100* Dollars

TO THE ORDER OF
TOWNSHIP OF BRICK
401 CHAMBERS BRIDGE ROAD
BRICK, NJ 08723

BY _____ AUTHORIZED SIGNATURE

MP

⑈041098③⑈ ⑆031302340⑆ 900 205 679⑈

From: Lisa Rose Tavalaccio, Office of Affordable Housing
Re: Affordable Housing Fees

Business/Development: Medical Center of O.C - Parking garage + Eastwing
Owner/Applicant: Meridian Health Corp.
Property Address: 425 Jack Martin Blvd
Block: 1170 Lot: 18, 18 + 18.02

DEPOSIT RECEIVED
Mandatory Development Fee
(Commercial) ~~Residential~~
Inclusionary Development Fee

DATE: 10/11/02

Check Number 410983
Preliminary Fee Paid 98,355.00
Final Fee Paid _____

FOR DEPOSIT ONLY - AFFORDABLE HOUSING TRUST ACCOUNT 36 367087

Collection of said fees as authorized by Township Ordinance 354-2C-93, is pursuant to N.J.S.A. 52:27D-301 et seq. And N.J.A.C. 5:92-18 et seq.

Received in Treasurer's Office by:

Kathy Tinbergen
Signature

10-11-02
Date

OFFICE OF AFFORDABLE HOUSING

COURT PRELIMINARY APPROVAL

OFFICE OF AFFORDABLE HOUSING
CERTIFICATE OF COMPLIANCE

BLOCK 1111 LOT _____ SITE ADDRESS _____
TYPE OF SITE Residential / Commercial NAME OF BUSINESS _____
APPLICANT _____ PHONE NUMBER _____
APPLICANT ADDRESS _____ CITY & STATE _____

INCLUSIONARY DEVELOPMENT

Affordable	Fee Required _____	Date _____
	Down Payment _____	Date _____
	Balance _____	Date _____
	Paid In Full _____	Date _____
Market Rate	No Fee Required	

MANDATORY DEVELOPER FEES

- ◊ Residential is .005 %
- ☒ Commercial is .01%
- ◊ The estimated equalized assessed value of the proposed construction is

131,293 $ 3,280,300

_____ 10/4/08
Frederick R. Millman, CTA, Tax Assessor Date

- ◊ The final equalized assessed value of the construction at the above referenced site is:

$ _____

_____ _____
Frederick R. Millman, CTA, Tax Assessor Date

Prelininary Fee Required _____ Date _____
Preliminary Paid _____ Check # _____
Receipt # _____

Final Total Fee Required _____
Preliminary Paid _____ Date _____
Final Paid _____ Check# _____
Balance Due _____ Receipt # _____

Fees Imposed To Date _____
Fees Reached $15,000 _____ Date

I hereby certify that the above applicant has complied with all rules and regulations of the Office of Affordable Housing and has paid all required fees and charges.

_____
Office of Affordable Housing

New Jersey Natural Resources Conservation Program

OCEAN COUNTY SOIL CONSERVATION DISTRICT

714 LACEY ROAD, FORKED RIVER, N.J. 08731
(609) 971-7002 Fax (609) 971-3391

REPORT OF COMPLIANCE

TO: CONSTRUCTION CODE OFFICIAL MUNICIPALITY: BRICK

PROJECT: PARKING GARAGE SCD NO.: 7839

BLOCK NO.(s) 1170 LOT NO.(s) 18 + 18.02

Final Compliance ☑ Conditional Compliance ☐

Block No.	Lot No.	Conditions
		PARKING GARAGE ONLY! APPLICANT REMAINS RESPONSIBLE FOR COMPLETE GERMINATION OF ALL SEEDED AREAS.

TOTAL FEES DUE: $ —

This verifies that the soil erosion and sediment control measures for the above designated block and lot numbers are in compliance to the extent indicated above with the soil erosion and sediment control plan as certified by the Ocean County Soil Conservation District and required by Chapter 251, P.L. 1975 as amended, the Soil Erosion and Sediment Control Act, (N.J.S.A. 4:24-39 et. seq.).

AGENT RESPONSIBLE FOR PROJECT: _____

AUTHORIZED DISTRICT SIGNATURE: _____

DATE: 6/23/03

DISTRIBUTION: WHITE - Township
CANARY - Applicant
PINK - District

Land Use/ Bldg Dept Fax:732-262-8954

** Transmit Conf.Report **

P.1 Mar 24 2003 14:10

Telephone Number	Mode	Start	Time	Page	Result	Note
7328409491	NORMAL	24,14:09	0'48"	1	* O K	

Land Use/ Bldg Dept Fax:732-262-8954

** Transmit Conf.Report **

P.1 Mar 24 2003 14:08

Telephone Number	Mode	Start	Time	Page	Result	Note
7328925828	NORMAL	24,14:07	0'36"	1	* O K	

WR 100 400 461

CUT-IN-CARD

MUNICIPALITY Brick town UTILITY CO OP

LOCATION Medical Ctr of Ocean County BLK ____ LOT ____

OWNER Medical Ctr OC OCCUPANT ____

"Installation in the above premises has been inspected and is in accordance with N.E.C., utility and DCA requirements."

☐ FINAL X TEMPORARY This approval void after ____ days

DESCRIPTION OF SERVICE 250 Amp under ground Service

INSTALLED BY Hicks Elect LICENSE NO 7760

DATE 3-24-03 PERMIT #02-398 INSPECTOR ____

☐ CALLED IN ____/____/____ Lic. No: 6455

U.C.C. Form F-5000 1 WHITE—UTILITY 2 CANARY—OFFICE FILE 3 PINK—CONTRACTOR

CUT-IN-CARD

MUNICIPALITY BR. Elizabeth Ave UTILITY CO OP

LOCATION 30 Elizabeth Ave BLK 812 LOT 32

OWNER Lenny arms OCCUPANT ____

"Installation in the above premises has been inspected and is in accordance with N.E.C., utility and DCA requirements."

☐ FINAL X TEMPORARY This approval void after ____ days

DESCRIPTION OF SERVICE Temp 100 Amp Service

INSTALLED BY Hicks Elect LICENSE NO 11009

DATE 3-24-03 PERMIT # 03-394 INSPECTOR ____

☐ CALLED IN ____/____/____ Lic. No: 6455

U.C.C. Form F-5000 1 WHITE—UTILITY 2 CANARY—OFFICE FILE 3 PINK—CONTRACTOR

+A/E, P, F
+B, F
+C/P

02-3987
GARAGE

New Jersey Natural Resources Conservation Program

OCEAN COUNTY SOIL CONSERVATION DISTRICT

714 LACEY ROAD, FORKED RIVER, N.J. 08731
(609) 971-7002 Fax (609) 971-3391

REPORT OF COMPLIANCE

TO: CONSTRUCTION CODE OFFICIAL MUNICIPALITY: BRICK

PROJECT: PARKING GARAGE SCD NO.: 7839

BLOCK NO.(s) 1170 LOT NO.(s) 18 + 18.02

Final Compliance ☑ Conditional Compliance ☐

Block No.	Lot No.	Conditions
		PARKING GARAGE ONLY! APPLICANT REMAINS RESPONSIBLE FOR COMPLETE GERMINATION OF ALL SEEDED AREAS.

TOTAL FEES DUE: $ —

This verifies that the soil erosion and sediment control measures for the above designated block and lot numbers are in compliance to the extent indicated above with the soil erosion and sediment control plan as certified by the Ocean County Soil Conservation District and required by Chapter 251 P.L. 1975 as amended, the Soil Erosion and Sediment Control Act, (N.J.S.A. 4:24-39 et. seq.).

AGENT RESPONSIBLE FOR PROJECT: _____

AUTHORIZED DISTRICT SIGNATURE: _____

DATE: 6/23/03

DISTRIBUTION: WHITE - Township
CANARY - Applicant
PINK - District

Revised 6/98

A5703^

Wilke, Bob

From: Gibbons, Kevin [GIBBONS2@Granaryassoc.com]
Sent: Thursday, June 26, 2003 6:39 PM
To: bwilke@wmblanchard. com (E-mail)
Cc: Murray, Doug; sdiflora@klengineers. com (E-mail); skozal@wmblanchard. com (E-mail); plorello@wmblanchard. com (E-mail); rfochesto@meridianhealth. com (E-mail); cbuboltz@meridianhealth. com (E-mail); Joe Gordon (E-mail)
Subject: Fire department Inspection

Bob,

As I advised you this PM, Kevin Batzel (Brick Township Fire Inspector) contacted me to advise of the following:

1. Following his discussions with DCA, they are insisting on the smoke detectors at the elevator lobbies as they are enclosed on three of four sides. This is the opposite of his direction and confirmation last week as you had seen in my correspondence to him. Regardless, please contract LSE to provide these units as applicable ASAP. As discussed, they are approved to work Saturday if required.

2. FD lock box for keys to electrical, elevator machine rooms, etc. Stan already ordered and will be on-site in AM. Let Kevin pick the location.

Kevin stated as long as we are moving on these items and same will be completed, he will provide a T.C.O. for this portion.

Please update on tomorrow's inspection as I will not be on-site. Thank you and Stan for your diligence in resolving these issues. Please advise if I can assist. Also, please print this e-mail and forward to Kevin during the inspection.

Thanks,

Kevin

Township of Brick
Counter Form
(PLEASE PRINT)

C25-70

Site Location: East Wing Addition & Parking Garage
Block: 1170 Lot: 18 & 18.02
Owner's Name: Medical Center of Ocean County
Owner's Mailing Address: 425 Jack Martin Blvd
Brick, NJ. 08724
Phone: (732) 840-3296

BUILDING

Contractor: Wm. Blanchard Co.
Address: 199 Mountain Ave.
Springfield, NJ. 07081
Phone#: 973-376-9100
Lis #
Federal Emp # or ~~SSN~~ 22-168 8982

Technical Data

Description of Work:

NEW 3 STORY PARKING GARAGE AND RELATED SITE IMPROVEMENTS

Type of Work

X New Building	___ Siding
___ Addition	___ Fence
___ Alteration	___ Pool
___ Roofing	___ Demolition
___ Asbestos Abatement	___ Sign _____ sq ft

Building Characteristics

Use Group Present:_____ Proposed:_____
No of Stories: 3
Height of Structure: 25'
Area of the largest floor: ~~47396 sf~~ 131,293
Area of New Structure: 1,141,125
Volume of New Structure:
Total Land Disturbed:

Cost of Alteration: $

Cost of New Building: $ 2,500,000

Total Cost of New Building Work: $ 2,500,000

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:

Please Print Name ROBERT WICKE

ELECTRICAL

Contractor:
Address:

Phone#:
Lis #:
Federal Emp # or SSN

Technical Data

Item	Quantity
Lighting Fixtures	
Receptacles	
Switches	
Detectors	
Light Poles	
Motors w/ Fract. HP	
Emergency & Exit Lights	
Communication Points	
Alarm Devices/FAC Panel	
Total	
Pool (Receptacles, Switches, Lights, Motor 1HP)	
Spa/Hot Tub/Storable Pool	
Electric Range	KW
Oven/Surface Unit	KW
Electric Water Heater	KW
Electric Dryer	KW
Dishwasher	KW
Garbage Disposal	HP
A/C Unit –Central Air	KW
Space Heater/Air Handler	KW
Baseboard Heating	KW
Motors 1+ HP	
Transformer/Generator	KW
Light Stander	AMP
Service	AMP
Subpanel	AMP
Motor Control Center	AMP
Sign/Outline Light	KW
Furnace	
Steam Boiler	
Other:	

Estimated Cost of Electrical Work:

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:

Please Print Name

CONTRACTOR'S SEAL

Counter Form
PLEASE PRINT

PLUMBING

Contractor:_____
Address:_____
_____
Phone #:_____
Lis #:_____
Federal Emp # or SSN_____

Technical Data

Fixtures Quantity

Water Closets (Toilet)_____
Urinals/Bidets_____
Bath Tub (w/or w/out shower head)_____
Lavatory (BR Sink)_____
Shower_____
Floor Drain_____
Sink_____
Dishwasher_____
Drinking Fountain_____
Washing Machine_____
Hose Bib_____
Gas Piping_____
Fuel Oil Piping_____
Water Heater_____
Steam Boiler_____
Hot Water Boiler_____
Sewer Pump_____
Interceptor/Separator_____
Backflow Preventer_____
Greasetrap_____
Air Conditioner (Condensate Drain)_____
Septic Tank Closure_____
Sewer Service Connection_____
Water Service Connection_____
Active Solar System_____
Auxiliary Meter_____
Sprinkler Heads_____
Sump Pump_____
Pool Heater_____
Other:

Estimated Cost of Plumbing Work_____

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:_____

Please Print Name:_____

CONTRACTOR'S SEAL

FIRE

Contractor:_____
Address:_____
_____
Phone #:_____
Lis #:_____
Federal Emp # or SSN_____

Technical Data

Description of Work:

Heating Type: ____Gas ____Oil ___Electric ____Solar
Heating System is ___New ___Existing
Location of Furnace/Boiler:_____
Water Supply Source_____
Method of Valve Supervision_____
Local Alarm Supervision_____
Central Supervision:_____
Proprietary Supervision:_____

Flammable Storage Tanks _____capacity_____fuel
Combustible Storage Tanks_____capacity_____fuel
LPG Storage Tanks_____capacity_____fuel

Item Quantity

Wet Sprinkler Heads_____
Dry Sprinkler Heads_____
Total_____

Smoke Detectors_____
Heat Detectors_____
Total_____

Stand Pipes_____
Kitchen Hood Exhaust System_____

Pre-Engineered Systems:
CO2 Suppression_____
Halon Suppression_____
Foam Suppression_____
Dry Chemical_____
Wet Chemical_____

Gas/ Oil Fired Appliances:
Gas Stove _____
Gas Dryer _____
Furnace (Gas or Oil)_____
Gas Fireplace_____
Gas Logs_____
Total Appliances _____

Wood Burning Stove_____
Wood Fireplace_____
Other:

Estimated Cost of Fire Work_____

I hereby certify that I am the agent/owner of record and am authorized to make this application and perform the work listed on this application.

Signature:_____

Print Name:_____

Medical Center of Ocean County

Meridian Health System

Garage

Brick, New Jersey

Issued for GMP
07-03-02

Project Manual

VITETTA Project No.:
9315.0400

VITETTA
ARCHITECTURE ENGINEERING PLANNING INTERIOR DESIGN
PHILADELPHIA NAVAL BUSINESS CENTER
4747 S. BROAD ST. PHILADELPHIA PA 19112
T 215.218.4747 F 215.218.4740

Mechanical, Plumbing & Electrical Engineers
KALLEN & LEMELSON
520 Eighth Avenue, 17th floor
New York, NY 10018
Tel. (212) 643-9898
Fax (212) 643-2332

Civil Engineers
MENLO ENGINEERING ASSOCIATES
261 Cleveland Avenue
Highland Park, NJ 08904
Tel. (732) 846-8585
Fax (732) 846-9439

SECTION 00003

TABLE OF CONTENTS

Section Number	VOLUME 1	Latest Rev. Date
00003	Table of Contents 03	020703
00004	List of Drawings 03	020703
00220	Geotechnical Data 02	020703
00400	General Conditions (AIA A201/GCa – 1992) ..... 1+34	020703
00410	Supplemental General Conditions 09	020703
00411	Bid Bond/Consent of Surety 02	020703
	DIVISION 1 - GENERAL REQUIREMENTS	
01010	Summary of the Work 03	020703
01027	Applications for Payment 06	020703
01028	Change Order Procedures 03	020703
01029	Schedule of Values 04	020703
01040	Coordination – Single Prime Contract 06	020703
01050	Field Engineering 03	020703
01090	Definitions and Standards 07	020703
01310	Construction Schedules 05	020703
01340	Shop Drawings, Product Data and Samples 15	020703
01630	Products and Substitutions 08	020703
01700	Project Closeout 09	020703
01710	Final Cleaning 03	020703
01720	Record Documents 04	020703
01731	Cutting and Patching 05	020703
	DIVISION 2 - SITE WORK	
02201	Earthwork-Site 09	020703
02260	Modular Retaining Wall 04	020703
02300	Earthwork – Building Pad 09	020703
02513	Asphalt Concrete Paving 03	020703
02528	Concrete Curbs & Sidewalks 02	020703
02550	Site Utilities 05	020703
02580	Pavement Markings 03	020703
02721	Storm Drainage System 04	020703
02810	Fine Grading, Temporary Grassing and Erosion Control 05	020703
02920	Soil Preparation 05	020703
02930	Lawn & Sod 08	020703
02940	Landscape Planting 12	020703
02950	Trees, Shrubs, Vines and Groundcover 10	020703
02960	Landscape Irrigation 16	020703
02970	Landscape Maintenance 09	020703

DIVISION 3 - CONCRETE

03300	Cast-In-Place Concrete	23	020703
03375	Concrete Sealers	06	020703
03410	Structural Precast Concrete	12	020703

DIVISION 4 - MASONRY

04810	Unit Masonry Assemblies	17	020703

DIVISION 5 - METALS

05120	Structural Steel	04	020703
05310	Steel Deck	03	020703
05521	Pipe and Tube Railings	09	020703

DIVISION 6 - WOOD AND PLASTICS

06105	Miscellaneous Carpentry	10	020703

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07540	Thermoplastic Membrane Roofing	08	020703
07620	Flashing and Sheet Metal	06	020703
07920	Joint Sealers	15	020703

DIVISION 8 - DOORS AND WINDOWS

08110	Steel Doors and Frames	06	020703
08410	Aluminum Entrances and Storefronts	12	020703
08711	Door Hardware	21	020703
08800	Glazing	13	020703
08920	Glazed Aluminum Curtain Walls	07	020703

DIVISION 9 – FINISHES

09912	Painting	11	020703

DIVISION 10 - SPECIALTIES

10200	Louvers and Vents	07	020703
10431	Signs		To Follow
10520	Fire-Protection Specialties	06	020703

DIVISION 14 - CONVEYING SYSTEMS

14240	Hydraulic Elevators	12	020703

DIVISION 15 - MECHANICAL

15000	Special Requirements for Mechanical and Electrical Work		To Follow

DIVISION 15 – PLUMING

15100	General Provisions for Plumbing and Fire Protection Work	03	020703
15110	Piping for Plumbing Work	03	020703
15130	Hangers and Supports for Plumbing and Fire Protection Work	04	020703
15160	Plumbing Equipment, Specialties and Accessories	03	020703
15335	Dry Standpipe System	02	020703
15380	Testing and Adjustments	02	020703
15390	Approved Manufacturers for Plumbing and Fire Protection Work	02	020703

DIVISION 16 - ELECTRICAL

16000	General Provisions for Electrical Work	08	020703
16111	Raceways and Installation Components	11	020703
16117	Ductbanks and Manholes	05	020703
16123	Wire and Cable (600 Volts)	07	020703
16141	Wiring Devices and Installation Components	04	020703
16165	250 & 600 Volt Fuses	03	020703
16170	Grounding and Bonding	03	020703
16180	Power, Control and Alarm Wiring System	05	020703
16421	Utility Service Entrance	02	020703
16440	Safety and Disconnect Switches	03	020703
16461	Dry-Type Transformers	03	020703
16470	Panelboards - Lighting and Distribution	04	020703
16510	Lighting Fixtures	08	020703
16670	Lightning Protection System	05	020703
16741	Empty Race Way Systems (Telephone & Computer Data)	02	020703
16902	Electric Controls and Relays	03	020703

END OF TABLE OF CONTENTS

DOCUMENT 00004

LIST OF DRAWINGS

1. RELATIONSHIP OF DOCUMENTS

1.01 The Drawings listed below form a part of the Contract Documents.

2. LIST OF DRAWINGS

CIVIL

CV-1 – COVER SHEET

EOP-1 – EXISTING OVERALL PLAN

OP-1 – OVERALL PLAN

DM-1 – DEMOLOTION PLAN

GE-1 – GEOMETRY PLAN

SGN – SIGNAGE PLAN

GU-1 – GRADING & UTILITY PLAN – 1
GU-2 – GRADING & UTILITY PLAN – 2

CS-1 – CONSTRUCTION STAGING PLAN – 1
CS-2 – CONSTRUCTION STAGING PLAN - 2

LA-1 – LANDSCAPING PLAN – 1
LA-2 – LANDSCAPING PLAN – 2

LI-1 – LIGHTING PLAN – 1
LI-2 – LIGHTING PLAN – 2

SE-1 – SOIL EROSION & SEDIMENT CONTROL PLAN

UP-1 – UTILITY PROFILES

DE-1 – DETAIL SHEET – 1
DE-2 – DETAIL SHEET – 2
DE-3 – DETAIL SHEET – 3
DE-4 – DETAIL SHEET – 4

ARCHITECTURE

CS.1 – COVER SHEET

ARCHITECTURE (continued)

A1.01 – CODE NOTES

A2.01 – GROUND LEVEL PLAN
A2.02 – SECOND LEVEL PLAN
A2.03 – THIRD LEVEL PLAN

A3.01 – BUILDING ELEVATIONS
A3.02 – BUILDING SECTIONS

A4.01 – PLAN DETAILS
A4.02 – SIGNAGE PLANS

A5.01 – LARGE SCALE STAIR AND ELEVATOR PLANS
A5.02 – ELEVATOR SECTION
A5.03 – ELEVATOR AND STAIR SECTIONS
A5.04 – STAIR SECTIONS

A6.01 – ELEVATOR AND STAIR DETAILS

A8.01 - ROOF DETAILS
A8.02 – ROOF AND CANOPY DETAILS

A9.01 – CURTAIN WALL ELEVATIONS
A9.02 – DOOR ELEVATIONS, DOOR SCHEDULE, DOOR & WINDOW DETAILS

STRUCTURAL

S1.01 – STRUCTURAL NOTES

S2.01 – FOUNDATION PLAN
S2.02 – SECOND LEVEL FRAMING PLAN
S2.03 – THIRD FLOOR FRAMING PLAN

S3.01 – FOUNDATION SECTIONS, DETAILS & SCHEDULES

S4.01 – FRAMING SECTIONS & DETAILS
S4.02 – FRAMING SECTIONS & DETAILS

S6.01 – TYPICAL DETAILS

PLUMBING

PG2.00 – SYMBOL LIST AND RISER DIAGRAMS

PG2.01 – FIRST FLOOR PLAN
PG2.02 – SECOND FLOOR PLAN
PG2.03 – THIRD FLOOR PLAN

ELECTRICAL

EG1.00 – SYMBOL LIST, ABBREVIATIONS, GENERAL NOTES AND RISER DIAGRAMS
EG1.0S – SITE PLAN

EG2.01 – GARAGE GROUND PLAN
EG2.02 – GARAGE SECOND LEVEL PLAN
EG2.03 – GARAGE THIRD LEVEL PLAN

EG3.00 – LIGHTING CONTROL DETAILS

END OF DOCUMENT

SECTION 00220

GEOTECHNICAL DATA

1. GENERAL

A. Site conditions and subsurface investigation data is not part of the Contract Documents whether contained herein, indicated on the drawings or obtained directly or indirectly from the Owner or Architect.

2. DESCRIPTION OF DOCUMENTS

A. In the preparation of the Contract Documents, the Architect has relied upon boring logs and other data.

B. The data is not guaranteed as to accuracy or completeness, and may be inadequate for purposes of bidding. Where estimated quantities have been shown for contract items, such quantities are solely for the purpose of comparing bids, and are not intended to constitute an explicit or implicit representation as to the nature of subsurface materials which may be encountered.

C. Availability of this data is not intended to relieve Bidders of their responsibility to familiarize themselves with conditions that may affect cost, progress or performance of the Work.

D. The submission of a bid constitutes an agreement by the Bidder that he shall make no claim against the Owner or Architect because subsurface data made available is not representative of actual subsurface conditions.

E. In event that subsurface conditions actually encountered vary from those used for design purposes to the extent that, in the sole opinion of the Architect, a change in the work is necessary, such change will be made as provided by the Conditions of the Contract.

3. SUBSURFACE INVESTIGATION REPORT

A. A copy of a geotechnical report with respect to the Building site is available for viewing at the office of the Architect. A copy may be obtained by submitting a written request on the Bidder's Company Letterhead, a sample request letter is at the end of this document. The geotechnical report is titled: REPORT SOILS AND FOUNDATION INVESTIGATION, PROPOSED BUILDING ADDITIONS AND PARKING GARAGE, BRICK TOWNSHIP, NJ, SHORE REHAB INSTITUTE @ THE MEDICAL CENTER OF OCEAN COUNTY. The report is dated December 11, 2001, and was prepared by Mellick-Tully and Associates, P.C., 117 Canal Road, South Bound Brook, NJ 08880, Tel.: 732.356.3400/Fax: 732.356.9054; MTA project no. 4548-003*1G.

SAMPLE GEOTECHNICAL REPORT REQUEST LETTER

DATE: _____

PROJECT MANAGER

VITETTA
PHILADELPHIA NAVAL BUSINESS CENTER

4747 SOUTH BROAD STREET
PHILADELPHIA, PA 19112

FAX 215-218-4740

PROJECT NO.: 9314.0000

GENTLEMEN:

Please forward a copy of the Geotechnical Report (subsurface information) for the subject Project. The Bidder, who's company name is shown above and signature below releases the Owner and Architect from any responsibility or obligation as to the accuracy or completeness or for any additional compensation for work performed under the Contract due to assumptions based on use of such furnished information. We understand that this Geotechnical Report (subsurface information) is not part of the Contract Documents.

Thank you.

Sincerely,

(Signature of Authorized Representative of requesting company).

END OF DOCUMENT

DOCUMENT 00400

GENERAL CONDITIONS

AIA Document A201/CMa, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, GENERAL CONTRACTOR EDITION, 1987 Edition, is included in the Project Manual, and is incorporated by reference in the Contract Documents.

This document consists of the following 34 pages.

END OF DOCUMENT

SECTION 00410

SUPPLEMENTAL GENERAL CONDITIONS

SUPPLEMENTAL GENERAL CONDITIONS amend and supplement the printed form of General Conditions of the Contract for General Construction, American Institute of Architects AIA) Document No. A201, 1987 Edition, as follows:

Para. 1.2 - EXECUTION, CORRELATION, AND INTENT

1.2.1 Add new sentence: One of the signed sets shall be deposited with the Architect.

1.2.6 Add new subparagraph: In case of discrepancies between the Contract Documents, the Architect shall be notified before any affected work is started. Where discrepancies occur in the Contract Documents the most stringent determination, as interpreted by the Architect, shall be implemented.

Para. 2.4 - OWNER'S RIGHT TO CARRY OUT THE WORK

2.4.1 Delete the next to the last sentence.

Para. 3.2 - REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.4 Add new subparagraph: The Contractor shall give the Architect timely notice of any additional instructions required to define the work in greater detail, or to permit the proper progress of the work. He shall not proceed with any work not clearly and consistently defined in the Contract Documents, but shall request additional instructions from the Architect as provided above. If the Contractor proceeds with such work without obtaining further instructions, he shall correct any work incorrectly done at his own expense.

Para. 3.3 - SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.5 Add new subparagraph: Reference to particular construction means, methods, techniques, sequences or procedures, or implication that such are to be used to perform the work, indicates only that the operations selected by the Contractor shall produce at least the quality of work implied by the operations specified. The actual determination of whether or not the described operations may be safely and suitably employed on the work shall be the responsibility of the Contractor. Any loss, damage or liability, or cost of correcting defective work arising from the construction operations shall be borne by the Contractor.

3.3.6 Add new paragraph: The Contractor shall be responsible to assign a full-time on-site superintendent to the project.

The Owner shall have the right to review any proposed Superintendent's qualifications and have the right to accept or reject such proposed superintendent.

The Owner shall have the right, upon proper notice, to have any superintendent replaced at no additional cost to the Owner.

Para. 3.4 - LABOR AND MATERIALS

3.4.2 Add new sentence: This provision shall include all persons on the site controlled directly or indirectly by the Contractor.

3.4.3 Add new subparagraph: Directions, specifications, and recommendations by manufacturers for installation, handling, storage, adjustment, and operation of their materials or equipment shall be complied with; but the Contractor shall nonetheless have the responsibility for determining whether such directions, specifications, and recommendations may safely and suitably be employed in the work and of notifying the Architect in advance in writing of any deviation or modification necessary for installation safety or proper operation of item.

3.4.4 Add new subparagraph: The Contractor shall take all necessary steps to ensure labor harmony in the Project. Perform work in accordance with local labor regulations; no extra payment shall be due for doing work under this provision, or for delays or damages for failure to observe such requirements.

The Contractor and Owner shall agree upon a schedule for the progress of the Work (hereinafter "Progress Schedule") within fifteen (15) days of the Notice to Proceed, which schedule shall designate the commencement date and date of substantial completion for the Work. The Progress Schedule shall be binding, time being of the essence.

Para. 3.5 - WARRANTY

3.5.1 In line 3, add: "and of recent manufacture" after the word "new.

Para. 3.7 - PERMITS, FEES, AND NOTICES

3.7.1 Add new sentence: "In addition to the Contractor securing and paying for the building permit, and all other permits, fees, licenses and inspections, the Contractor shall furnish to the Architect, copies of the building permit, and all other permits, fees, licenses and inspections. Contractor shall obtain all needed Certificates of Occupancy and submit copies to the Architect/Owner. Contractor shall allow a minimum of forty (40) business days, from the date the Contractor submits the Construction Documents and Permit Applications to the Permitting Agency for obtaining actual construction permits. Until the Contractor receives all permits, the Contractor shall not proceed with any on-site construction activities. Additionally, no payments will be approved nor paid to the Contractor without evidence that the application for the permits have been submitted to the authorities for review. Until the Contractor provides evidence that the permits have been obtained, the Owner reserves the right to withhold any and all progress payments on the Project. Final payment will not be approved nor paid without evidence of approval and issuance of the Certificate of Occupancy.

Para. 3.12 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

3.12.12 Add new subparagraph: Failure to submit shop drawings in ample time for checking, review, and resubmission (if required) shall not affect the agreed upon completion date, if any.

Para. 3.13 - USE OF SITE

3.13.2 Add new subparagraph: The Contractor shall use only specifically assigned areas for storage of materials and construction operations unless other areas are authorized by the Owner.. Such areas will be identified after award of Contract by Owner. Comply with local municipal regulations regarding use of and parking on public streets.

3.13.3 Add new subparagraph: The Contractor shall repair streets, drives, curbs, sidewalks, and the existing improvements where disturbed by construction operations and leave them in as good a condition after completion of the work as before operations started.

3.13.4 Add new subparagraph: The Contractor shall not erect any sign without permission of the Architect and Owner.

Para. 3.18 - INDEMNIFICATION

Delete Paragraphs 3.18.1, 3.18.2 and 3.18.3 in its entirety and substitute the following:

3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's Consultants, and agents and employees of any of them from and against all claims, damages, and expenses, including, but not limited to attorney's fees. arising out of or resulting from performance of the Work. This indemnification agreement in favor of the Owner shall be applicable and the Owner its agents, servants and employees, shall be indemnified so long as there is not determination by a court of competent jurisdiction or arbitrators that the bodily injury, sickness, disease or death or damage or damage to or destruction of the property which is the alleged basis of the claim, was caused by the sole negligence of the Owner. its agents. servants or employees. The Contractor agrees that pursuant to this indemnification provision, it will pay the attorney's fees, expenses, judgments and settlements made by or on behalf of the Owner, its servants, agents or employees, arising out of claims related to the project unless and until there should be a finding by a court of competent jurisdiction or arbitrators that the damages alleged were caused by the sole negligence or fault of the Owner, its agents. servants or employees. This indemnification agreement in favor of the Architect. the Architect's Consultants, and their agents and employees, shall be applicable to the Architect, the Architect's Consultants, and their agents, servants and employees, who shall be indemnified completely so long as there is no determination by a court of competent jurisdiction or arbitrators that the bodily injury, sickness, disease or death or damages or destruction of property which is the alleged basis of the claim, was caused by the sole negligence of the Architect, the Architect's Consultants, their agents, servants or employees. The Contractor agrees that pursuant to this indemnification provision, it will pay the attorney's fees, expenses, judgments and settlements made by or on behalf of the Architect, its servants, agents or Consultants, arising out of claims related to the project unless and until there should be a finding by a court of competent jurisdiction or arbitrators that the damages alleged were caused by the sole negligence or fault of the Architect, its agents, servants or consultants.

3.18.2 In any and all claims by an employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Contractor shall not be limited on the amount or type of damages, compensation or benefits payable by or for the Contractor of any subcontractor under workers' workmen's compensation acts, disability benefit acts of other employee benefit acts.

3.18.3 The obligation of the Contractor under Paragraph 3.18.1 above shall not extend to the liability of the Architect, the Architect's Consultants, and agents and employees and any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications provided that such preparation or approval is the primary cause of the injury or damage, or (2) the giving of or the failure to give directions or instructions by the Architect, the Architect's Consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage. This limitation upon the obligation of the Contractor to indemnify the Architect, the Architect's Consultants, and agents and employees of any of them, shall not be applicable unless and until there is a determination by a court of competent jurisdiction or arbitrators that the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or

specifications, or the giving of or the failure to give directions or instructions by the Architect, the Architect's Consultants, and the agents and employees of any of them, is the primary cause of the injury or damage:

Para. 4.2 - ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.6 Add new sentence: Any such rejection of work shall not relieve the Contractor of the responsibility for maintaining protection of the work and the Owner's property. The Contractor shall provide the means necessary to protect the work until accepted by the Owner.

Para. 4.3 - CLAIMS AND DISPUTES

4.3.1 Add the following to the end of the existing paragraph: "An extension of time shall be the Contractor's exclusive remedy for a delay in the progress of the work for reasons indicated in Paragraphs 4.3.6 and 8.3.1. There shall be no increase in the Contract Sum. The Contractor shall have no course of action against the Owner, Architect or any separate contractor for delay damages."

4.3.3 Delete "21 days" where occurs, and replace with "five (5) calendar days".

Delete "either party" and replace with "Contractor".

4.3.6 Delete this paragraph in its entirety and replace with the following: "If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract documents or (2) unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than five (5) calendar days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially, the Contract Time shall be equitably adjusted by Change Order. In no event shall the Contractor be entitled to, or shall the Contractor claim any additional costs or compensation for concealed conditions.

4.3.7 Add the following to the end of the existing paragraph: "An extension of time shall be the Contractor's exclusive remedy for a delay in the progress of the work for reasons indicated in Paragraphs 4.3.6 and 8.3.1. There shall be no increase in the Contract Sum. The Contractor shall have no course of action against the Owner, Architect or any separate Contractor for delay damages.

Para. 4.5 - ARBITRATION

Delete all subparagraphs in their entirety, and delete all other references to arbitration indicated in General Conditions of the Contract for Construction.

Para. 5.2 - AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.3 Delete paragraph in its entirety and replace with the following: "If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has not reasonable objection. It shall be clearly understood and agreed to that the Contractor shall do so solely at the Contractor's expense, and that the Contract time shall not be increased."

Para. 5.3 - SUB CONTRACTUAL RELATIONS

5.3.2 Add new subparagraph: The Contractor shall be fully responsible for coordinating and expediting the work of all subcontractors, and shall employ the necessary and qualified personnel to produce the required quality of labor and materials and to prevent delays in the progress of the Work. Each trade shall be afforded all reasonable opportunities for the installation of this work and for the storage and handling of its materials. The Contractor shall ensure that all work, including incidental work is performed by personnel skilled in the particular trade involved.

Para. 7.2 - CHANGE ORDERS

7.2.4 Add new subparagraph: All changes in the work shall be approved before the start of any work through written consent of the Owner in accordance with the procedure above. Changes not approved in writing by the Owner in advance shall not be recognized as a valid claim at a later date, except where the Owner agrees in writing that the change shall be started, subject to an equitable price adjustment at a later date in the interest of job progress.

The Contractor's overhead and profit on changes, where allowed, shall be determined as a percentage of the actual or estimated cost of such changes. In no case shall the percentage exceed the following:

Work performed by the Contractor's own forces: For additions to the Contract Sum, the Contractor may add not more than 15 percent totally for overhead and profit. For deductions from the Contract Sum, overhead and profit shall not be less than 5 percent.

Work performed by Sub-Contractors to the Contractor: For additions to the Contract Sum, the Sub-Contractor may add not more than 15 percent totally for overhead and profit and the Contractor may add not more than an additional 5 percent. For deduction from the Contract Sum, overhead and profit shall not be less than 5 percent.

Among items considered as overhead are engineering costs, costs for shop drawing and change order review, salaries of managers, superintendents, technical engineers, timekeepers. clerks and other office personnel, and costs of small tools, and home office expenses.

The Owner will only pay the labor rates stated in the Prevailing Wage Rates in effect for this Project.

Additionally, it shall be clearly understood and agreed to, that all change orders shall include all impact, ripple, or delay costs associated with the execution of that work, and that the Contractor shall not be entitled to any additional compensation or extensions of time due to multiple changes, delays, or causes beyond their control or due to execution of that work.

ARTICLE 8.1 - DEFINITIONS

Para. 8.1.5 Add the following Definition and subparagraphs.

Notice to Proceed

Written Notice to Proceed shall be deemed to have been duly served to the Contractor upon at least one (1) of the following occurrences:

(a) A written purchase order issued by the Owner to the Contractor;
(b) A written Notice to Proceed issued by the Owner or the Architect to the Contractor;
(c) A Notice of Intention to accept his proposal, issued by the Owner or the Architect, accompanied by Agreements for execution by the Contractor..
(d) Executed Agreements between the Owner and the Contractor properly completed with Performance and Payment Bonds, and Certificates of Insurance.

In no case, however, shall the Contractor commence on-site work or construction without proper and fully executed Performance and Payment Bonds and Certificates of Insurance.

Para. 8.2 - PROGRESS AND COMPLETION

8.2.4 Add the following: "The General Contractor shall be responsible for the preparation of a complete and comprehensive progress schedule giving the dates of beginning and completion of the various divisions of the Work. The Contractor shall be charged with the duty of coordinating the work of all sub-contractors involved. He shall advise then when the work at the site will be ready for their installations and cooperate with each to expedite the work.

The Contractor shall prepare and furnish, the Architect and Owner, six (6) copies of the completed agreed-upon progress schedule, within fifteen (15) days after receipt of the executed copy of his Agreement, for the Owner and Architect's information. By submitting his proposal, the Contractor will be deemed to have agreed that the completion date stated in his proposal provides a reasonable time for performance of the work hereunder, taking into consideration the average climatic range and usual industrial conditions prevailing in the locality of the project.

Para. 8.3 - DELAYS AND EXTENSIONS OF TIME

8.3.1 Add the following to the end of the existing paragraph: "An extension of time shall be the Contractor's exclusive remedy. There shall be no increase in the Contract Sum due to delays. The Contractor shall have no course of action against the Owner, Architect or any separate Contractor for delay damages."

8.3.3 Delete paragraph in its entirety and add the following: "Should the Contractor complete the project prior to the scheduled completion date, it shall be clearly understood and agreed that the Contractor shall do so solely at the Contractors' expense. In no event shall the Contractor be entitled to or shall the Contractor claim any additional costs or compensation for acceleration of the Work, or for completing the work before the substantial completion date indicated on the progress schedule prepared by the Contractor."

Para. 9.3 - APPLICATIONS FOR PAYMENT

9.3.2 Add new sentence: "The Contractor shall assume responsibility to protect all such materials from loss or damage at no cost to the Owner until Substantial Completion, whether or not they have been paid for by the Owner. The Contractor shall be held responsible for the cost of repairing or replacing any materials that are damaged or missing.

Para. 9.7 - FAILURE OF PAYMENT

9.7.1 In the second (2nd) line; change "seven days" to read "twenty-one" business days.

In the fifth (5th) line, change "seven days" to read "fourteen (14) business days".

In the seventh (7th) line, change "seven days" to read "twenty-one (21) days."

Para. 10.2 - SAFETY OF PERSONS AND PROPERTY

10.2.6 Add new sentence: "The Contractor shall protect and maintain in operation all pipe lines, conduits, sewers, drains, poles, wiring and the like that in any way interfere with the work, whether or not they are specifically shown on the drawings. The Contractor shall see that all items to be abandoned are abandoned in a proper manner and that other items are protected, supported and/or moved as necessary to accommodate the new work."

Para. 10.3 - EMERGENCIES

10.3.2 Add new subparagraph: "The Contractor shall furnish to the Owner and Architect, in writing, the names, addresses, and telephone numbers of members of his organization to be contacted in the event of an out-of-hours emergency."

Para. 11.1 - CONTRACTOR'S LIABILITY INSURANCE

Delete Paragraph 11.1 in its entirety and substitute the following:

11.1.1 "The Contractor shall provide and maintain at his own expense and without expense to the Owner, until final acceptance of the work covered by the Contract, insurance as will protect him from claims imposed by law and of the kinds and in the amounts hereinafter provided, covering all operations under the Owner-Contractor Agreement whether performed by him or by subcontractors or by anyone directly or indirectly employed by any of them or anyone for whose acts anyone of them may be liable.

11.1.2 Workmen's Compensation: A policy covering the workers compensation, disability benefit and other similar employee benefit obligations of the Contractor, as required by the State of New Jersey, covering all operations under the Owner Contractor Agreement.

11.1.3 Liability Insurance: A policy covering claims for damages because of bodily injury, occupational sickness or disease or death of his employees and all other persons, and claims insured by usual personal injury liability coverage, including claims arising out of the ownership, maintenance, or use of any motor vehicle. Each policy with limits of not less than $500,000 for each person and $1,000,000 for each accident.

11.1.4 Property Damage Liability: A policy covering claims for damages because of injury or to destruction of tangible property, including claims arising out of the ownership, maintenance, or use of any motor vehicle, including the loss of use resulting therefrom. Each policy with limits of not less than $500,000 for each claimant and aggregate of $1,000,000 for each accident. Policies of the following types shall be furnished:

(a) Contractor's Liability Insurance issued to and covering the liability for damages imposed by law upon the Contractor with respect to all work performed by him under the Owner-Contractor Agreement.

(b) The Contractor's Liability Insurance issued to and covering the liability for damages imposed by law upon each subcontractor with respect to all work performed by said subcontractor under the Owner-Contractor Agreement.

(c) Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the work. These Certificates shall contain a provision that coverage afforded under the policies will not be cancelled until at least thirty days prior written notice has been given to the Owner.

11.1.5 In addition, the Contractor shall obtain and maintain a separate Owner/Architects Protective Insurance Policy naming the owner and Architect as named insured, in the same amount as specified above for the Contractor's Insurance, to protect the Owner and Architect from contingent liability or liability for damages, expenses, attorneys fees, etc., which may arise from the Contractor's or subcontractor's operations under the Owner/Contractor Agreement. The above required insurance is not to be confused with professional liability insurance commonly referred to as error and omissions insurance.

11.1.6 Unless otherwise provided for, the Owner and Architect shall be named as additional insured on all required policies with the exception of Workmen's Compensation.

11.1.7 The Contractor shall give prompt written notice to the Owner of all occurrences under the coverage of Article 11.

Para. 11.3 - PROPERTY INSURANCE

11.3.1 Add new sentence: This insurance does not cover any tools owned by mechanics; any tools, equipment, scaffolding, staging towers, and other property owned or rented by the Contractor, the capital value of which is not included in the cost of the work.

Para. 13.1 - GOVERNING LAW

13.1.2 Add new subparagraph: "All applicable provisions of governing laws shall take precedence over any provision of the Contract Documents which conflict with the governing law. Such precedence shall be limited to the conflicting provisions and in no way shall invalidate the remaining provisions of the Contract.

Para. 13.6 - INTEREST

13.6.1 Delete paragraph 13.6.1 in its entirety.

Para. 14.4 - TERMINATION BY THE OWNER FOR CONVENIENCE

14.4.1 Add the following: "The Owner may, without cause, terminate the Contract if the Owner, at its sole discretion, determines that such termination is in the Owner's best interest. In the event that the Owner terminates the Contract for its convenience, then the Contractor shall be entitled to compensation for the work performed prior to termination, including the Contractor's cost plus reasonable allowance for overhead and profit.

14.4.2 Add the following: "In the event that the Owner wrongfully terminates this Contract under the provisions of Paragraph 14.2, then its termination shall be deemed a termination for convenience in accordance with the terms of Paragraph 14.4.1.

END OF DOCUMENT

BID BOND/CONSENT OF SURETY
NEW JERSEY PUBLIC CONTRACTS

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____, as Principal and _____, as Surety, are hereby held and firmly bounded unto _____ in the penal sum of _____ Dollars ($ _____), lawful money of the United States for the payment of which well and truly to be made, executors, administrators, successors and assigns. Signed, this _____ day of _____, 19 ___.

THE CONDITION of the above obligation is such that whereas the _____, a certain bid attached hereto and hereby made a part hereof, to enter into a contract in writing for the (insert type of work) _____.

NOW THEREFORE:

If said bid shall be rejected, or in the alternate,

If said bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Agreement required by the Bid Document and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all respects perform the agreement created by the acceptance of said bid.

THEN, this obligation shall be void, otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The SURETY for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall in no way be impaired or affected by an extension of the time within which the "OBLIGEE" may accept such bid. Any said surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as corporations have caused their corporate seals to be hereto fixed and these presents to be signed by the proper officers, the day and year set forth above.

_____ L.S.
Principal

_____
Surety

_____
(By)

(SEAL)

CONSENT OF SURETY

_____, Surety, authorized to carry on business in New Jersey, by its signature hereupon or that of its attorney-in-fact, certifies to and promises the Township of Pemberton, New Jersey, that if a Contract for _____ is awarded to _____, Principal, that it as Surety will execute the bond or bonds as required by the Specifications and will become surety in the full amounts set forth in the bid of its Principal for the faithful performance of all obligations of its Principal as Contractor.

This Consent of Surety shall be valid for a period of ninety (90) days from the date of the bid opening.

_____
(SURETY)

_____
(address)

_____

_____

_____, 199__
(date signed)

By: _____
(Attorney-in-Fact

POWER OF ATTORNEY FOR ATTORNEY-IN-FACT MUST BE ATTACHED HERETO.

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Project Description.

B. Related Sections:

1. Division 1 sections are applicable to all specification sections for establishing general requirements for administration, procedures and temporary measures necessary to complete the work.

1.02 PROJECT DESCRIPTION

A. Project/Work Identification:

1. Project Name: Garage at the Medical Center of Ocean County

2. The Owner is: Meridian Health Systems

3. The Construction Manager is: Wm. Blanchard Co.
199 Mountain Avenue
P.O. Box 298
Springfield, NJ 07081

4. The Architect is: VITETTA
Philadelphia Naval Business Center
4747 South Broad Street
Philadelphia, PA 19112

5. The Mechanical, Electrical, & Plumbing and Fire Protection Engineer is:
Kallen & Lemelson
520 Eighth Avenue, 17th floor
New York, NY 10018

6. The Civil Engineer is:
Menlo Engineering Associates
261 Cleveland Avenue
Highland Park, NJ 08904

B. The work consists of the construction of a new three-story precast concrete parking structure for 389 cars. The Medical Center will maintain operations through the duration of the project. Partial demolition of the existing parking areas and other components are required to clear the way for the garage. The Work includes, but is not limited to, the following:

1. Demolition of existing parking lot, curbing, asphalt paving, etc.

2. Site preparation and sitework including but not limited to grading, earthwork, paving, on and off-site utility work, site lighting relocation, parking, curbs, fencing and landscape work.

3. General Construction including concrete foundations; concrete work; masonry curtain wall, membrane roofing and roofing accessories, doors and hardware, finish work, and specialties.

4. Structural Precast Concrete including long-span units, wall panels and precast stairs.

5. Structural steel and miscellaneous metal work.

6. Plumbing and Fire Protection Work.

7. HVAC work.

8. Electrical work.

9. Elevators.

10. Management of the project in full accordance with the requirements of Division 00 and Division 01 of the Project Manual.

11. All testing, record documents, instruction, owner related work and services.

12. Obtaining and paying for licenses, permits, and connections to outside services.

13. Maintenance of a clean worksite, coordination with local officials for project traffic, street closures, site safety, and minimized interference with the on going operation of local business.

14. Provision of Bonds, Insurance, Warranties, and other instruments required by the Contract Documents.

15. Coordination.

1.03 USE OF THE PREMISES

A. The Existing Medical Center building and adjacent parking areas will be occupied during all construction operations. During the entire construction period the Contractor shall have the exclusive use of the premises within the indicated limits of Contract, for construction operations, subject to the following:

1. Comply with governing regulations relative to traffic, safety, erosion, noise, pollution control, and other matters of public concern.

2. Arrange temporary facilities, including work, storage and parking so that disturbances to adjacent properties and facilities are minimized.

3. Arrange and utilize temporary facilities to insure against damage to adjacent properties and facilities, or to on-site facilities, trees, plantings, or other work designated to remain.

4. Coordinate use of site and access with other Contractors.

1.04 MISCELLANEOUS PROVISIONS

A. Contractor's Responsibilities:

1. The Contractor has the responsibility for being the supervisor, manager, overseer, coordinator and expediter of all of the Subcontractors and of the total construction process and all of its parts, in accordance with the Contract Documents. The Contractor shall provide sufficient executive and supervisory staff in the field to accomplish efficient and expeditious handling of all matters. There shall be at least one (1) full time Project Manager assigned by the Contractor, as well as the field staff. The Project Manager shall attend each Progress Meeting at the site. The Contractor shall include in his bid a sum sufficient to perform these responsibilities.

2. Owner's Reliance Upon Contractor:

a. The Owner relies upon the organization, management, skill, cooperation and efficiency of the Contractor to supervise, direct, control and manage the Work so as to deliver the completed project in conformance with the Contract Documents and within the scheduled time.

b. The Contractor shall include in his bid an amount sufficient to cover his cost of furnishing necessary administrative and supervisory forces to coordinate his work and that of his Subcontractors. It must be clearly understood that the Owner will rely on the fact that the Contractor has included in his bid sufficient funds to perform this function.

END OF SECTION

SECTION 01027

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Work Includes:

1. Prepare and submit monthly Applications for Payments, including progress payments and final payment, with monthly substantiating data as required.

2. Coordinate Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts and Submittal Schedule.

3. The Contractor shall identify in tabular form, all payments to be paid directly to Subcontractors for work and materials, in compliance with New Jersey Statutes 40A: 11-16.

1.02 RELATED REQUIREMENTS

A. The basis for each payment amount, period covered by each Application for Payment, conditions for payment for materials stored off site, and other conditions relating to payments, are set forth in the Agreement, General Conditions and Supplementary Conditions.

B. Detailed requirements for documents required to accompany or precede Applications for Payments include but not limited to the following:

1. General Conditions, Supplementary Conditions and remaining Division 1, General Requirements, apply to work of this section.

2. Section 01029 - Schedule of Values.

3. Section 01310 - Construction Schedules.

4. Section 01380 - Project Photographs.

5. Section 01630 - Products and Substitutions.

6. Section 01700 - Project Closeout.

7. Section 01720 - Project Record Documents.

1.03 FORMAT AND CONTENT

A. Format: AIA Documents G702, Application and Certificate for Payment, and G703, Continuation Sheet. All entries shall be typewritten.

B. Continuation Sheet(s):

1. Line Items, Description of Work and Scheduled Values: Those of the accepted Schedule of Values, and additional line items and related values for Change Orders or Construction Change Directives executed prior to date of submission. Unless directed otherwise, assign one line item to each Change Order or Construction

Change Directive. In addition, include a line item for maintenance of Project Record Documents.

a. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.

2. Columns C through I: In accordance with instructions printed on document. Round off values to nearest dollar. Unless directed in the course of the work to identify retainage for specific line items, identify retainage only as a percentage of the total of all line items.

3. Separate Continuation Sheets for each of the Subcontractors to be paid directly for work and materials in compliance with New Jersey Statutes, and a Summary Continuation Sheet with Line Item Value for the Contractor and each of the Subcontractors.

C. Application and Certification:

1. Complete items in Contractor's Application for Payment sections, using total dollar values transferred from the Continuation Sheets. Incomplete applications will be returned without action.

2. Execute certification by notarized signature of an officer of the Contractor, legally authorized to so certify. Not less than 3 copies of each Application shall bear original Contractor and Notary Public signatures and seals.

1.04 DOCUMENTS ACCOMPANYING OR PRECEDING APPLICATIONS FOR PAYMENT

A. First Application for Payment:

1. List of Subcontractors,

2. Schedule of Values,

3. Construction Schedule,

4. Construction Progress Schedule,

5. Initial Submittals Schedule,

6. Initial product List Schedule,

7. Initial List of principle suppliers and fabricators,

8. Copies of building permits,

9. Copies of authorizations and licenses from governing authorities for performance of the Work,

10. Certificates of insurance and insurance policies,

11. Performance and payment bonds,

12. Data needed to acquire Owner's insurance,

13. Initial settlement survey and damage report.

B. Second Application for Payment:

1. Permanent Submittals Schedule,

2. Permanent Product List Schedule,

3. Permanent List of principle suppliers and fabricators.

C. Subsequent Applications for Payment:

1. Construction photographs, in accordance with the requirements set forth in Specification Section 01380.

2. Documentation of location, title, access and security for products stored off-site, when payment for such materials is requested.

3. Updated documents shall accompany subsequent applications for payment, except application for final payment.

4. At the sole option of the Owner, Architect and Construction Manager, payments will be approved for material stored offsite. Prior to the issuance of these payments, the Contractor must submit all required certifications including, but not limited to, bills of sale and certificates of insurance.

5. Transmit reports for certified payroll, monthly manpower utilization and any other monthly reports required by the Owner with each application. The period addressed by these reports may not extent beyond the payment period greater than one month.

D. Application for Payment at Substantial Completion:

1. Following issuance of the Certificate of Substantial Completion, submit an Application for Payment, reflecting any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

2. Administrative actions and submittals:

a. Occupancy permits and similar approvals.

b. Warranties (guarantees) and maintenance agreements.

c. Test/adjust/balance records.

d. Maintenance instructions.

e. Meter readings.

f. Start-up performance reports.

g. Change-over information related to Owner's occupancy, use, operation and maintenance.

h. Final cleaning.

i. Application for reduction of retainage, and consent of surety.

j. Advice on shifting insurance coverages.

k. Final progress photographs.

l. List of incomplete Work, recognized as exceptions to.

m. Architect's Certificate of Substantial Completion.

E. Application for Final Payment administrative actions and submittals:

1. Completion of Project closeout requirements.

2. Completion of items specified for completion after Substantial Completion.

3. Assurance that unsettled claims will be settled.

4. Assurance that Work not complete and accepted will be completed without undue delay.

5. Transmittal of required Project construction records to Owner.

6. Certified property survey.

7. Proof that taxes, frees and similar obligations have been paid.

8. Removal of temporary facilities and services.

9. Removal of surplus materials, rubbish and similar elements.

10. Change of door locks to Owner's access.

1.05 SUBSTANTIATING DATA

A. When requested, submit suitable information with a cover letter identifying:

1. Project,

2. Application number and date,

3. Detailed list of enclosures,

4. Labor hours and rates, invoices, receipts or other evidence of costs or payments, as requested for each work item.

1.06 SUBMITTAL

A. Pre-Submission Review: Prior to submission of each Application for Payment, the Architect will review proposed Application with Contractor and will suggest revisions which appear appropriate, to minimize processing time.

B. Submit three (3) copies of each notarized application, with original signatures and all required accompanying documents.

1. Mail or deliver, one (1) additional copy directly to Owner for information.

2. When the project consists of multiple prime contracts, mail or deliver one (1) additional copy directly to the Contractor for General Construction for information.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01028

CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Documentation of change in Contract Sum/Price and Contract Time.
2. Change procedures.
3. Construction Change Authorization.
4. Stipulated Sum change order.
5. Time and Material change order.
6. Execution of change orders.
7. Correlation of Contractor submittals.
8. Changed Cost Summary Form.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions, and Division 1, General Requirements, apply to work of this section.

1.02 SUBMITTALS

A. Prepare and transmit submittals under provisions of Section 01340.

B. Submit name of the individual authorized to accept changes, and to be responsible for informing others in Contractor's employ of changes in the Work.

C. Change Order Forms: AIA G701.

1.03 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Maintain detailed records of work done on a time and materials basis. Provide full information required for evaluation of proposed changes, in the Work.

B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

C. On request, provide additional data to support computations:

1. Quantities of products, labor, and equipment.
2. Taxes, insurance and bonds.

3. Overhead and profit.

4. Justification for change in Contract Time, as set forth in Article 4.3.8.3 of the Supplementary Conditions.

5. Credit for deletions from Contract, similarly documented.

D. Support each claim for additional costs, and for work done on a time and material basis, with additional information.

1. Origin and date of claim.

2. Dates and times work was performed, and by whom.

3. Time records and wage rates paid.

4. Invoices and receipts for products, equipment, and subcontracts similarly documented.

1.04 PRELIMINARY PROCEDURES

A. The Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by AIA A201 1987 Edition by issuing supplemental instruction on AIA Form G710 Architect's Supplemental Instructions.

B. The Architect may submit a Proposal Request which includes: detailed description of change with supplementary or revised Drawings and Specifications, the projected time for executing the change, with a stipulation of overtime work required, and the period of time during which the requested price will be considered.

C. Contractor may initiate a change by submittal of a request to Architect describing the proposed change with a statement of the reason for the change, the effect on Contract Sum and Contract Time with full documentation, and a statement of the effect on Work of separate contractors. Document requested substitutions in accordance with Section 01630.

1.05 CONSTRUCTION CHANGE AUTHORIZATION

A. Architect may issue a directive, signed by Owner, instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

B. Directive will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time.

C. Promptly execute the change in Work.

1.06 LUMP SUM CHANGE ORDER

A. Will be based on Proposal Request and Contractor's lump sum quotation, or Contractor's request for Change Order as approved by Architect.

1.07 TIME AND MATERIALS CHANGE ORDER

A. Submit itemized account and supporting data after completion of change, within time limits in Conditions of the Contract.

B. Architect will determine the change allowable in Contract Sum and Contract Time as provided in Conditions of the Contract.

C. Maintain detailed records of work done on Time and Materials basis.

D. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.08 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: Architects will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.09 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum as shown on Change Order.

B. Promptly revise Progress Schedules to reflect any change in Contract Time, revise subschedules to adjust time for other items of work affected by the changes, and resubmit.

C. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

Not Applicable.

END OF SECTION

SECTION 01029

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Includes:

1. Administrative information and services for acceptable evaluation and establishment of values of work for payment.

2. Upon request of the Architect, support values given in the Application for Payment with data that will substantiate their accuracy.

3. The Schedule of Values, unless objected to by the Architect, shall be used as a basis for the Contractor's Applications for Payment.

4. The Contractor shall establish values to be paid directly to Subcontractors for work and materials in compliance with New Jersey Statutes 40A: 11-16.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions and remaining Division 1, General Requirements, apply to work of this section.

2. Section 01010 - Summary of Work.

3. Section 01027 - Applications for Payment.

4. Section 01030 - Alternates.

5. Section 01310 - Construction Schedules.

6. Section 01340 - Shop Drawings, Product Data and Samples.

7. Section 01630 - Products and Substitutions.

1.02 SUBMITTALS

A. Submit three copies of Schedule of Values 15 days prior to first Application for Payment. Form and content shall be acceptable to Architect and Construction Manager.

1.03 FORMAT

A. Typewritten on AIA Document G703 - Continuation Sheet.

B. Follow Table of Contents of this Project Manual, identify each line item by document or section number and title.

C. Identify schedule with:

1. Title of project and location.

2. Architect and Architect's project number.

3. Name and address of Contractor.

4. Contract designation.

5. Date of Submission.

1.04 CONTENT

A. List a separate detailed administrative line item cost for each component of Conditions of the Contract and Division 1 Sections, and work installed by each Section of Division 2 through 16 of this Project Manual, omitting divisions not used, and each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar.

1. Sub-divide the Schedule of Values into the Work of the Contractor and the Work of Subcontractors to be paid directly for work and material in compliance with New Jersey Statutes 40A: 11-16. Provide a Summary Continuation Sheet showing the Line Item Value for the Contractor and each of those Subcontractors. Provide separate Continuation Sheets broken down as per above for the Work of those Subcontractors.

2. Update and resubmit Schedule of Values when Change Orders or Construction Change Directives result in a change in Contract Sum.

B. For each major subcontract, list products and operations of that subcontract as separate line items. Further subdivide each item of the Work into components by floor, level, area or other division acceptable to the Architect and Construction Manager.

1. Separation of the Schedule of Values into line item values is an administrative convenience for the Owner, Architect and with Construction Manager. No correlation due value of the Contractor's Subcontractors is intended, or assumed.

C. Coordinate listings with Construction Progress Schedule:

1. Correlate line items in the Schedule of Values with the submittal of required administrative schedules and forms, including:

a. Contractors construction schedule,

b. Initial Application for Payment,

c. List of subcontractors,

d. Schedule of alternates,

e. Products List schedule, including suppliers and fabricators,

f. Submittals schedule.

E. Each component listing shall include a directly proportional amount of Contractor's overhead and profit.

F. For items on which payments requests for stored products, list sub-values for cost of stored products.

1. The cost of the materials, delivered and unloaded with taxes listed separately.

2. The total installed value with overhead and profit.

G. Value of Work Each Month: Develop and submit a table showing the estimated sum to be invoiced each month, based on adherence to the Construction Progress Schedule.

H. Submit a sub-schedule for each phase of Work.

I. The sum of values listed shall equal total Contract Sum.

1.05 SUBSTANTIATING DATA

A. When Architect requires substantiating information, submit data justifying line item amounts in question.

B. Provide one copy of data with cover letter for each copy of Application. Show Application number and date, and line item by number and description.

1.06 SUBSCHEDULE OF UNIT MATERIAL VALUES

A. Submit a subschedule of unit costs and quantities for:

1. Products specified under a unit cost allowance.

2. Products on which progress payment requests for stored products are to be made.

B. Format of submittal shall parallel that of the Schedule of Values, with each line item identified in the same manner as line items in the Schedule of Values.

C. Unit quantity for bulk materials shall include an allowance for normal waste.

D. Unit values for materials shall be broken down into:

1. Cost of material, delivered and unloaded at the site.

2. Installation costs, including Contractor's overhead and profit.

E. Installed unit value multiplied by quantity listed shall equal the cost of that item in the Schedule of Values.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01040

COORDINATION
SINGLE PRIME CONTRACT

PART 1 - GENERAL

1.01 SUMMARY

A. Work Includes:

1. Coordination of Submittals.
2. Coordination meetings.
3. Coordination of trades.
4. Coordination of space.
5. Coordination of measurements.
6. Examination and acceptance of Project conditions.
7. Coordination of project closeout.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions and remaining sections of Division 1, General Requirements, apply to work of this section.
2. Section 01010 - Summary of Work.
3. Section 01050 - Field Engineering.
4. Section 01200 - Project Meetings.
5. Section 01310 - Construction Schedules.
6. Section 01340 - Shop Drawings, Product Data and Samples.
7. Section 01600 - Materials and Equipment.
8. Section 01630 - Product Substitutions.

1.02 COORDINATION OF SUBMITTALS

A. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing equipment in service.

B. Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show interrelationships of components shown on separate Shop Drawings.

2. Indicate required installation sequences.

3. Comply with requirements contained in Section 01340 - Submittals.

C. Coordinate request for substitutions to assure compatibility of space, of operating elements, and effect on work of other sections.

1.03 COORDINATION MEETINGS

A. In addition to other required meetings, hold coordination meetings and conferences with personnel and subcontractors to assure coordination of work.

1.04 COORDINATION OF TRADES

A. Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

C. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Administrative activities include:

1. Preparation of schedules.

2. Installation and removal of temporary facilities.

3. Delivery and processing of submittals.

4. Progress meetings.

5. Project close-out activities.

1.05 COORDINATION OF SPACE

A. Coordinate use of Project space and sequence of installation for Work (eg. mechanical and electrical) which is indicated diagrammatically or schematically on Drawings. Prevent physical interference of components. Follow routings shown for pipes, ducts, and conduits,

with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize installations (including other Work), accessibility, maintenance, and repairs.

1. The Architect reserves the right to make minor changes in locations and sizes of piping, ductwork conduit, raceways and ducts up to time of roughing-in without additional cost to the Contract.

2. Detailed drawings of proposed departures due to actual field conditions or other causes shall be submitted to the Architect for review, any such changes shall be made without additional cost. No departures shall be made without prior review of the Architect.

B. Field verify measurements of existing items and Work which proceeds each sequence. Ensure proper fit and location.

C. In finished areas conceal pipes, ducts, wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.06 COORDINATION OF MEASUREMENTS

A. Prior to ordering material(s) or performing work, the Contractor and Subcontractors shall verify Contract Document dimensions affecting measurements at the project site and shall be responsible for their accuracy and correctness.

B. Differences which may be found, shall be submitted in writing to the Architect for consideration and adjustments made as may be directed, before proceeding with the work.

C. Commencing work implies acceptance of surfaces, areas, and project conditions.

D. No extra cost will be considered because of differences between actual project measurements and contract document dimensions.

1.07 EXAMINATION AND ACCEPTANCE OF PROJECT CONDITIONS

A. Examination of Conditions: Prior to commencement of Work under an individual Specification Section, carefully examine existing conditions and previously executed work (whether performed under other Sections or by Owner or Separate Contractor) to determine adverse affects upon the execution of Work.

B. Acceptance of Conditions: Commencement of work under a specification Section will indicate acceptance, by the Contractor, of existing conditions and previously executed Work and conditions satisfactory to perform Work in accordance with the requirements of the Contract Documents.

1.08 COORDINATION OF CONTRACT CLOSEOUT

A. Coordinate completion and clean-up work in preparation for Substantial Completion or designated portions of Work indicated for Owner occupancy.

B. After Owner occupancy, coordinate access to Site for correction of work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

C. Assemble and coordinate closeout submittals specified in Section 01700.

PART 2 - PRODUCTS

NOT APPLICABLE.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both substrata and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

1. Starting work constitutes acceptance of the existing conditions and the Installer shall then at his expense, be responsible for correcting all unsatisfactory and defective work encountered.

B. Verify size of shafts and chases, the adequate thickness of partitions, clearance in double partitions and hung ceilings for proper installation of work. Trade Contractors shall cooperate in arranging the work with the Architect and other Contractors whose work is in the same spaces. Such spaces and clearances shall be kept to the minimum size required. Arrange for chases, slots and openings in other building components during progress of construction, to allow for timely installation of work.

C. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

D. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

E. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

F. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

G. Recheck measurements and dimensions, before starting each installation.

1. The Architect shall review any change in dimensions shown on the Contract Documents affecting physical size, shape or location of any part of the layout, whether due to field conditions or changes due to use of equipment of manufacture(s) other than those listed.

2. Coordinate work with other trades to eliminate any possible interference before any piping, conduit, equipment, devices, controls, supports, ductwork and fixtures are installed.

3. Where multiple items of mechanical and electrical equipment, devices, piping, conduits, supporting metal work, hangers, pull boxes, outlets, ductwork or controls are shown on any of the Contract Documents of the various trades in the same location, coordinate and adjust items to fit within the designated location(s). Provide and install all necessary offsets, bends, turns, modifications in piping, ductwork, conduit and devices required to install the work without interference with that of other trades or structure, without additional cost to the Owner.

H. Passage of equipment:

1. Establish passage clearances required to deliver, install and erect mechanical and electrical equipment. Wherever necessary, provide equipment in sections or knocked down in order to allow passage of equipment through openings.

2. Where there is not sufficient clearance for passage of mechanical or electrical equipment; deliver, install and protect such equipment before confining walls, floors, slabs and steel work are erected. Schedule and coordinate work with other Divisions.

3. If structures, equipment and systems must be altered to provide passage of equipment, the responsible Trade Contractor shall restore structures, equipment and systems to their original condition without additional compensation.

I. For products specified to be furnished by one Contractor and installed by another Contractor:

1. Contractor specified to furnish or remove product shall be responsible for delivery to or return from the job site, and shall pay transportation costs.

2. Contractor specified to install product shall be responsible for coordinating product delivery, loading or unloading, storing, protecting and installing product as required.

J. Removal and relocation of existing equipment:

1. Trade Contractors shall be responsible for removal, storage, protection, relocation and installation of existing equipment specifically noted or scheduled to be relocated. Trade Contractors shall be responsible for capping services feeding existing equipment which is to be removed.

2. Equipment requiring mechanical or electrical connections shall be the responsibility of the installing Trade Contractors. A composite relocation crew shall be used including mechanics skilled in their various trades.

K. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.

L. Coordinate temporary enclosures with required inspections and tests, to minimize necessity of uncovering completed construction for that purpose.

M. Where mounting heights are not indicated:

1. Install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

2. Install mechanical and electrical systems, materials, and equipment to provide maximum possible headroom. Maintain maximum headroom and space conditions. Where headroom or space conditions (less than 8'-0") appear inadequate, the Architect shall be notified before proceeding with the work.

3.02 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaged effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Field engineering services required for project:

a. Survey work required in execution of Project.

b. Civil, structural, or other professional engineering services specified or required to execute Contractor's construction methods.

2. Owner's Representative will identify existing control points and property line corner stakes indicated on Drawings.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions, and Division 1, General Requirements, apply to work of this section.

1.02 SUBMITTALS

A. Prepare and transmit submittals under provisions of Section 01340.

B. Submit name and address of Surveyor and Professional Engineer to Architect.

C. On request of Architect, submit documentation to verify accuracy of field engineering work.

D. Submit certificate signed by Registered Professional Engineer or Surveyor certifying that elevations and locations of improvements are in conformance or non-conformance with Contract Documents.

1.03 QUALITY CONTROL

A. Qualified engineer or registered land surveyor, acceptable to Contractor and Owner.

1.04 PROJECT RECORD DOCUMENTS

A. Maintain complete, accurate log of control and survey work as it progresses.

B. On completion of foundation walls and major site improvements, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work.

C. Submit Record Documents under provisions of Section 01720.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of discrepancies discovered.

3.02 SURVEY REFERENCE POINTS

A. Promptly report to Architect the loss or destruction of a reference point or relocation required because of changes in grades or other reasons. Replace dislocated survey control points based on original survey control.

B. Verify on the property, grades, lines, levels, and dimensions indicated on Drawings.

C. Locate and protect control points prior to starting site work, and preserve permanent reference points during construction.

1. Make no changes or relocations without prior written notice to Architect.

2. Report to Architect when reference point is lost, destroyed, or requires relocation because of necessary changes in grades, locations, or to perform work.

3. Require surveyor to replace Project control point which may be lost or destroyed.

4. Controlling lines and levels required for mechanical and electrical trades.

3.03 SURVEY REQUIREMENTS

A. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on Project Record Documents.

B. Establish lines and levels, locate and lay out by instrumentation and similar appropriate means:

1. Site improvements, including pavements; stakes for grading, fill and topsoil placement; and utility locations, slopes, and invert elevations.

2. Grid or axis for structures.

3. Building foundations, column locations, and ground floor elevations.

4. Batter Boards for structure.

5. Controlling lines and levels required for mechanical and electrical trades.

C. Periodically verify layouts by same means.

3.04 UNDERGROUND OBSTRUCTIONS

A. Pipe lines, existing underground installation, and underground structures in vicinity of work are shown on Drawings according to best information available. Accuracy of information is not warranted.

B. Verify location of underground pipe lines, conduits, and structures by contracting Owners of underground utilities and by prospecting in advance of excavation.

C. Secure written permission from proper authority before initiating new construction over existing utilities. File one copy of this written permission with Owner before commencing work. Furnish release for proper authority before final acceptance of work.

D. Repair cuts to existing utilities made during construction process as part of Project Work to satisfaction of utility owner. This repair shall be done at no additional cost to the Owner.

END OF SECTION

SECTION 01090

DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Explanatory information applicable to all sections and essential to a complete understanding of the Specifications. In particular, this section includes:

1. Definitions of terms and phrases used throughout the Specifications.

2. Specification format explanation.

3. Drawing symbols.

4. Governing regulations, codes and standards.

5. Applicability of governing industry standards.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions and remaining Division 1, General Requirements, apply to work of this section.

1.02 DEFINITIONS

A. General: Definitions and explanations contained in this section are general for the Work to the extent that they are not stated more explicitly in other elements of the Contract Documents.

B. General Requirements: The requirements of Division 1 sections apply to the Work of the Contract and, where so indicated, to other elements included in the Project.

C. Indicated: A cross-reference to graphic representations, notes or schedules on the Drawings or other Paragraphs or Schedules in the Specifications, and similar requirements in Contract Documents. Terms such as "shown", "noted", "scheduled", and "specified" are used to help the reader locate the reference. There is no limitation on location.

D. Owner's Representative: When used with other definitions means:

An employee of the Owner.

E. Directed, Requested: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "reviewed", "required", "accepted", and "permitted" mean "directed by the Owner's Representative", "requested by the Owner's Representative", and similar phrases. However, no such implied meaning will be interpreted to extend the Owner's Representative's responsibility into the Contractor's area of construction supervision.

F. Reviewed, Accepted: Where used in conjunction with the Owner's Representative's response to submittals, requests, applications, inquiries, reports and claims by the Contractor, the meaning of the terms "reviewed" or "accepted" are held to limitations of the Owner's Representative's responsibilities and duties as stated in General and Supplementary

Conditions. In no case shall the Owner's Representative's review or acceptance be interpreted as a release of the Contractor from responsibilities to fulfill requirements of the Contract Documents.

G. Project Site: The space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings, and may or may not be identical with the description of the land upon which the Project is to be built.

H. Furnish: The term "furnish" is used to mean "supply complete with all essential parts and accessories and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

I. Install: The term "install" is used to describe operations at Project site including the unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, connecting, protecting, cleaning and similar operations necessary for the work to function for its intended use.

J. Provide: The term "provide" means " furnish and install, as defined above, complete in-place and ready for its intended use". The term "provide" thus requires inclusion of all accessories, attachments, supports and services necessary to comply with this definition, whether or not specifically identified or described in the Contract Documents.

K. Regulations: Those laws, statutes, ordinances and lawful orders issued by governing authorities, as well as rules, conventions and agreements within the construction industry which effectively control performance of the Work, regardless of whether they are lawfully imposed.

L. Installer: The entity (person or firm) engaged by the Contractor, its Subcontractor or Sub-subcontractor for performance of a particular unit of work at the Project site, including installation, erection, application and similar required operations. It is a requirement that installers are experienced in the operations they are engaged to perform.

M. Mechanical Trade Contractor, Plumbing Trade Contractor, Fire Protection Trade Contractor, Trade Contractor or Division 15: Whenever used in Division 15 Contract Documents, references to the Contractor(s) responsible for work under Division 15.

N. Temperature Control Trade Contractor or Control Contractor, whenever used in Division 15 Contract Documents, refers to the Subcontractor providing Automatic Temperature Control systems for equipment provided by Mechanical Trade Contractor.

O. General Contractor, Electrical Contractor, Other Trade, or indicated by reference to Division number(s) are those responsible for work under the referenced Division(s).

P. Concealed: Means hidden from view as in trenches, chases, furred spaces, pipe shafts or hung ceilings.

Q. Exposed: Means "not concealed", as defined above.

R. PLBG & F.P.: Means Plumbing and Fire Protection.

S. Trade Contractor when used in Division 16 refers to the Trade Contractor responsible for all work under Division 16.

T. Wiring: Includes conductors, raceways, and connections to equipment, apparatus, outlets and other specialties.

U. Conductor, Wire, and Cable: Means insulated conductor.

V. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the work, either at the Project site or elsewhere, and to report, and if required, interpret results of those inspections or tests.

1.03 SPECIFICATIONS FORMAT EXPLANATION

A. General: This article is included help the user of these Specifications more readily understand the format, language, and implied requirements. None of the following shall be interpreted to modify the substance of the requirements of the Contract.

B. Specification organization is based upon the Construction Specifications Institute's 16-Division format, and MASTERFORMAT numbering system.

1. Divisions are groupings of related or similar sections.

2. Sections are, for convenience, considered as the basic units of work. The section title is descriptive only and not intended to limit the meaning or content of a section or to be completely descriptive of requirements specified therein.

3. Scope of Subcontract Work: Except as may be specifically required, the content of any section is not intended to define the scope of any Subcontract, such scope definition being the responsibility of the Contractor. Refer to Assignment of Specialists paragraph below.

C. Section Numbering is used to facilitate cross-references in the Contract Documents. The numeric sequence is not complete, and the listing of the sections in the "Table of Contents" of the Project Manual must be consulted to determine the numbers and titles of specification sections in the Contract Documents.

D. Pages are numbered independently for each section, and may be recorded in the Table of Contents of the Project Manual. The section number is shown together with the page number at the bottom of each page. The last page of each section is identified by a line "END OF SECTION".

1. Completeness of Sections: During bid period, verify completeness of all sections. Obtain resolution of any inconsistencies from the Architect, whose decision in this matter shall be final whether rendered before or after award of Contract.

E. Bold-faced type is used for the convenience of the Architect. No emphasis or relative importance is implied by bold-faced type.

F. These Specifications employ certain conventions in the use of language:

1. Abbreviations, except as specifically explained, are those in common and general use. Unless explanation is requested prior to entering into Contract, such interpretation is presumed to be accepted.

2. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable and where the full context of the Contract Documents so indicates.

3. Imperative language is used generally in the Specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, contrasting subjective language is used to describe responsibilities which must be fulfilled by specific entities.

4. Methods of Specifying: The techniques or methods of specifying requirements varies throughout the text. The method used for specifying one element of the Work has no bearing on requirements for another element of the Work.

G. Assignment of Specialists: Where the text of the Specifications requires or implies that specific elements of the Work are to be assigned to specialists who must be engaged to perform that element of the Work, the Contractor has no choice or option. Such assignments are intended to establish that the party or entity designated be sufficiently experienced in certain construction processes or operations to be recognized as "expert". The ultimate responsibility for fulfilling all Contract requirements remains with the Contractor.

1. These requirements shall not be interpreted to conflict with the enforcement of building codes and other regulations governing the Work, and are not intended to interfere with local trade union jurisdictional settlements and similar conventions.

2. Refer also to paragraph: Specifications Format, of this section.

H. Trades: The use of titles such as "carpentry" in the Specifications text is not intended to imply that the Work must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter", nor to imply that the requirements specified apply exclusively to work by tradespersons of that corresponding generic name.

1.04 DRAWING SYMBOLS

A. General: Except as otherwise indicated, graphic symbols used on the Drawings are those symbols defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., current edition, and recognized in the construction industry for purposes indicated.

B. Mechanical/Electrical Drawings: Graphic symbols used on Mechanical and Electrical Drawings are generally aligned with symbols recommended by ASHRAE and IEEE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by ASME, ASPE, and other technical associations. Refer uncertainties to the Architect for clarification before proceeding.

1.05 GOVERNING REGULATIONS, CODES AND STANDARDS

A. General: Contact governing authorities directly for necessary information and decisions having a bearing on performance of the Work.

B. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site during the Contract Time, available for reference by parties at the site who have a reasonable need for such reference:

1. Codes governing erosion control, construction, safety, hiring practices, and other related aspects of the Work, as required by authorities having jurisdiction.

C. Trade Union Jurisdictions: The Contractor shall maintain, and shall require prime subcontractors to maintain, complete current information on jurisdictional matters, regulations actions and pending actions, as applicable to the Work. Assign and subcontract the Work, and employ tradesmen and laborers, in a manner which will not unduly risk

jurisdictional disputes which could result in conflicts, delays, claims and losses in the performance of the Work.

1.06 INDUSTRY STANDARDS

A. Applicability of Standards: Except where more explicit or stringent requirements are included in the Contract Documents, applicable construction industry standards are made a part of the Contract Documents by reference and have the same force and effect as if bound into or copied directly into the Contract Documents. Individual Specifications sections identify codes and standards which the Contractor shall keep available at the Project site for reference.

1. Standards referenced directly in the Contract Documents take precedence over non-referenced standards.

2. Non-referenced standards which are recognized in the industry for applicability to the work are applicable to the Work, as definitions of recognized construction industry standards in matters not defined by the Specifications or by referenced standards.

B. Publication Dates: Except where specific publication dates are stated, comply with standards in effect as of date of Contract Documents.

1. Updated Standards: If a referenced industry code or standard has been revised and reissued after the date of the Contract Documents and before the performance of the work affected, so advise the Architect, who will then determine whether or not to proceed with the updated standard.

2. Product Availability: If products complying with a referenced standard were available if ordered within 60 days after execution of the Contract, Contractor shall not be entitled to compensation for any additional costs resulting from revision to referenced standards affecting such products.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and where standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent, to the Architect for a decision before proceeding.

D. Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum for the Work. The actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. Indicated numeric values are either minimum or maximum values, as appropriate for the context of the requirements. Refer uncertainties to the Architect for decision before proceeding.

E. Copies of Standards:

1. The Contract Documents require that each entity performing work be experienced in that part of the Work. Each entity is also required to be familiar with industry standards applicable to that part of the Work.

2. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.

3. Although copies of referenced standards may not be required submittals, the Architect reserves the right to require the Contractor to submit additional copies of these standards.

F. Abbreviations and Names: The following acronyms or abbreviations used in the Contract Documents are defined to mean the recognized name of the trade association, standards generating organization, governing authority or other entity applicable to the text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries. Names are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date as of date of contract documents:

AA	The Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AAN	American Association of Nurserymen, Inc.
ASSHTO	American Association of State Highway Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ADC	Air Diffusion Council
AGA	American Gas Association
AGC	American General Contractors of America
AI	The Asphalt Institute
AIA	American Institute of Architects
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ARI	Air Conditioning and Refrigeration Institute
ASA	Acoustic Society of America
ASACC	American Society of Architectural Hardware Consultants
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AVATI	Asphalt & Vinyl Asbestos Tile Institute
AWI	Architectural Woodwork Institute
AWMA	American Walnut Manufacturers Association
AWPA	American Wood Preservers Association
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preservers Institute
AWS	American Welding Society, Inc.
AWWA	American Water Works Association
BIA	Brick Institute of America
BOCA	Building Officials and Code Administrators International
CBM	Certified Ballast Manufacturer
CDA	Copper Development Association
CISPI	Cast Iron Soil Pipe Institute
CPI	Clay Pipe Institute
CRSI	Concrete Reinforcing Steel Institute

CS	Commercial Standards
CSI	Construction Specifications Institute
CTI	Cooling Tower Institute
EEI	Edison Eelctrical Institute
EIA	Electronic Industry Association
EPA	Environmental Protection Agency
ETL	Electrical Testing Laboratory
FGMA	Flat Glass Marketing Association
FIA	Factory Insurance Association
FM	Factory Mutual Insurance
FS	Federal Specifications
FTI	Facing Tile Institute
GA	Gypsum Association
HEI	Heating Exchange Institute
HPACNA	Heating, Piping, and Air Conditioning Contractors National Association
IBI	Insulation Board Institute
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
ILI	Indiana Limestone Institute of America, Inc.
IPCEA	Insulated Power Cable Engineers Association
LIA	Lead Industries Association, Inc.
MCAA	Mechanical Contractors Association of America
MEMA	Maple Flooring Manufacturers Association
MIA	Marble Institute of America
MIL	Military Specifications
MLA	Metal Lath Association
MSS	Manufacturers Standardization Society
NAAMM	National Association of Architectural Metals Manufacturers
NAFM	National Association of Fan Manufacturers
NAMLM	National Association of Metal Lath Manufacturers
NBHA	National Builder's Hardware Association
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NFiPA	National Fire Protection Association
NFoPA	National Forest Products Association
NLA	National Lime Association
NOFMA	National Oak Flooring Manufacturers Association
NPA	National Particle Board Association
NRMCA	National Ready Mixed Concrete Association
NSA	National Slag Association
NTMA	The National Terrazzo & Mosaic Association, Inc.
NWMA	National Woodwork Manufacturing Association
OSHA	Occupational Safety & Health Act.
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PDCA	Painting & Decorating Contractors of America
PDI	Plumbing and Drainage Institute

PEI	Porcelain Enamel Institute
PI	Perlite Institute
SBI	Steel Boilers Institute
SBTMA	Southern Brick and Tile Manufacturers Association
SCPI	Structural Clay Products Institute
SDI	Steel Deck Institute
SDI	Steel Door Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPIB	Southern Pine Inspection Bureau
SJI	Steel Joist Institute
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America, Inc.
TIMA	Thermal Insulation Manufacturers Association
UL	Underwriter's Laboratories, Inc.
USC	United State Code
USSI	USA Standards Institute
WWPA	Western Wood Products Association (WPA & WCLA)

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to work of this section.

B. Closely-related requirements specified in other sections of Division 01:

1. Summary of the Work.
2. Applications for Payment.
3. Submittals.
4. Project Meetings.

1.02 SECTION INCLUDES

A. Prepare and submit the following Schedules:

1. Construction Progress Schedule, in initial and permanent forms.
2. Submittals Schedule, in preliminary and permanent forms.
3. Schedule of Values.

B. Periodically update all three Schedules, to continuously reflect the status of the work.

C. If multiple prime Contracts are awarded:

1. Each Contractor shall prepare his own Schedules.
2. Except for the Initial Construction Progress Schedule, the Contractor for General Construction shall prepare and maintain the master Construction Progress Schedule, based on the schedules and updates of the other Contractors.

1.03 SUBMITTAL REQUIREMENTS

A. Submit initial Construction Progress Schedule prior to the Preconstruction Meeting, as specified in section 01200: Project Meetings.

B. Submit permanent Construction Progress Schedule, Schedule of Values and preliminary Submittals Schedule, in sufficient time to allow for review, and modification if necessary, prior to submission of the first Application for Payment.

1. No Applications for Payment shall be accepted prior to receipt of acceptable forms of all three Schedules.

C. Submit permanent Submittals Schedule in sufficient time to allow for review, and modification if necessary, prior to submission of the second Application for Payment.

1. Second Application for Payment shall not be accepted prior to receipt of acceptable form of permanent Submittals Schedule.

D. Submit updated schedules monthly, coinciding with Applications for Payment.

E. Quantities:

1. Initial Construction Progress Schedule and Schedule of Values, and subsequent revisions prior to approval: Submit one reproducible original or copy.

2. Permanent Construction Progress Schedule: Submit 3 copies of Schedule based on approved draft, and as follows:

a. Submit one copy each for Owner's Representative and Architect.

b. If Work is awarded as multiple prime Contract, submit one additional copy for each other prime Contractor at each submission.

3. Submittals Schedule: Same as permanent Construction Progress Schedule, except, if work is awarded as multiple prime contracts, omit copies for other prime Contractors.

4. Schedule of Values: Same as Application for Payment.

1.04 CONSTRUCTION PROGRESS SCHEDULE

A. Form:

1. The initial and permanent schedules shall be in Bar Chart form.

2. The minimum breakdown by line item shall be the Table of Contents of this Project Manual, Divisions 01 through 16, omitting divisions not used.

3. Prepare Schedule in a form which permits reproduction for distribution.

B. Content:

1. Show the complete sequence of the work by identifiable activities.

a. Show each Milestone point identified by the Bidding Documents or the Contract Documents.

2. Show the dates for the beginning and completion of each activity.

3. The maximum duration of a scheduled activity shall be (15) working days.

4. Include, if applicable, critical dates for related work by the Owner, by other Contractors, or by utility companies or other agencies.

5. Include final closeout activities, such as startup of equipment and systems, instruction, inspections and corrections, final cleaning and record document deliveries.

6. Include other features of the work identified in section 01010: Summary of the Work, and affecting construction scheduling.

C. Update and Revision:

1. At each monthly submission, identify activities completed since the previous submission.

2. If applicable, revise the schedule to indicate:

a. Revisions to nature or duration of activities.

b. Anticipated changes to Milestone dates, Substantial Completion dates, or other dates affecting scheduling by the Owner or Architect.

3. To minimize any need for resubmission, review significant proposed schedule changes with the Owner's Representative and Architect/Engineer prior to submission.

4. With each monthly submission, submit a brief typewritten statement of the reasons for revisions.

1.05 SCHEDULE OF VALUES

A. Form:

1. Submit Schedule on AIA Form G-703.

2. Construct Schedule using same line items used in Construction Progress Schedule.

B. Content:

1. The value assigned to each line item shall be the cost to the Owner, including overhead, profit and other costs assignable to that line item.

2. Markup costs for each line item must be realistically related to the time and cost of labor and materials for that line item.

3. Applications for Payment shall be based on percentage of work completed and on costs set forth in the Schedule of Values.

C. Revisions: Include, cost revisions resulting from Change Orders or Construction Change Directives in cost breakdowns submitted with each Application for Payment.

1.06 SUBMITTALS SCHEDULE

A. Form: Submit in typed tabular form, organized by same line items as used for Construction Progress Schedule. Within each line item, organize in anticipated chronological order.

B. Extent:

1. The preliminary Submittals Schedule shall include submittals required to be completely reviewed within 60 days after award of Contract.

2. The final Submittals Schedule shall include submittals for the complete Work.

C. Content:

1. Identify submittal type (compliance information, color selection, samples).

2. Identify approximate quantity, if applicable.

3. State date of submittal to Owner's Representative and Architect/Engineer.

4. State date when finally reviewed submittals will be required by Contractor.

D. Coordination Requirements:

1. Coordinate Submittals Schedule with Construction Progress Schedule.

2. Allow adequate time for review, considering nature and quantity of submittal items, and probability of a need for resubmittal.

3. Carefully review submittal requirements for sequence specified in each section including where applicable, acceptability of manufacturer and product.

4. Comply with requirements for coordination of submittals, as specified in Section 01340: Submittals.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Procedural requirements for non-administrative submittals including product data, shop drawings, samples, color charts, quality control, contract closeout, and other work-related submittals.

2. Substitutions and Alternatives: Request clarification and verification of acceptability by correspondence, with supporting data in accordance with requirements of Section 01630, "Products and Substitutions"; do not make such requests by the submittal process specified in this section.

B. Releated Documents and Sections:

1. General Conditions, Supplementary Conditions and Division 1, General Requirements, apply to work of this section. Refer to Conditions of the Contract and other Division 1 sections for administrative submittal requirements.

2. Section 01040, Coordination-Single Prime Contracts.

3. Section 01310, Construction Schedules.

4. Section 01410, Testing Laboaratory Services.

5. Section 01700, Project Closeout.

1.02 SUBMITTAL CLASSES

A. Product data submittals include standard printed technical information describing manufactured products that has not been specially-prepared for this Project, including:

1. Manufacturer's product specifications and installation instructions.

2. Catalog cuts.

3. Roughing-in diagram and templates.

4. Standard wiring diagrams.

5. Printed performance curves.

6. Operational range diagrams.

7. Mill reports.

8. Specimen warranties.

9. In addition, provide the following, as applicable, for each piece of mechanical and electrical equipment and material specified.

a. Manufacturers drawing numbers or specification title and number of material or equipment.

b. Manufacturer, model number, construction materials, (i.e., material, type, gauges, finishes), descriptive details, pressure rating sand dimensions.

c. Electrical data and ratings.

d. Printed performance ratings, curves and tables, with operating point(s) indicated.

e. Acoustical data for motorized mechanical units (Octave bands 0 through 8).

f. Complete power and control wiring diagrams, conforming to NEMA Standard for Industrial Controls and Systems.

g. Locations for external connections and support points.

h. Equipment clearances for service and operation.

i. List of product operations selected.

B. Shop drawing submittals are technical drawings and data that have been specially prepared for this project, including:

1. Fabrication and installation drawings.

2. Setting diagrams.

3. Shopwork manufacturing instructions.

4. Templates.

5. Patterns.

6. Coordination drawings for use on-site.

7. Schedules.

8. Design mix formulas.

9. Contractor's engineering calculations.

10. In addition, provide the following as applicable, for each piece of mechanical and electrical equipment and material specified:

a. Location of equipment with indicated equipment service clearance.

b. Locations and sizes of ductwork and acoustical lining.

c. Locations and sizes of sleeves and chases.

d. Elevation of ceilings and ductwork above floor.

e. Type of ceiling construction.

f. Fire and smoke dampers.

g. Location and sizes of sprinklers and standpipes.

C. Sample submittals are physical examples of work, including:

1. Partial sections of manufactured or fabricated work.

2. Small cuts of, or containers of materials.

3. Complete units of repetitively-used materials.

4. Swatches showing color, texture and pattern.

5. Color range sets.

6. Units of work to be used for inspection and testing.

D. Color chart submittals include printed color charts and, where specified, examples of finishes on actual substrates.

E. Quality control submittals include certain types of documentary data and affirmation of the manufacturer or contractor, including:

1. Design data includes manufactures or fabricators calculations showing verification of specified design or performance requirements.

2. Test reports shows results of tests and inspections of products at their source.

3. Certifications are statements that certify compliance with specified requirements.

4. Field reports includes tests or inspections of installed or completed work to ensure compliance with specified requirements.

F. Contract closeout submittals includes specific for close-out submittals pertaining to work of the individual section, including:

1. Operation Manuals.

2. Maintenance Manuals.

3. Warranty.

G. Extent: Submit only those submittals required by the Contract Documents. The Owner's Representative and Architect reserves the right to decline from reviewing other submittals.

1. Do not include items from more than one Specification section per submittal.

2. Contractor may require additional documentation from subcontractors or suppliers for his own use and at no additional cost to the Owner. Such documentation shall not be submitted for review without prior written request to review.

H. Status: Submittals, whether or not reviewed by Owner's Representative and Architect, are not Contract Documents and cannot in themselves change the requirements of the Contract Documents.

1.03 QUALITY ASSURANCE CLASSES

A. Quality assurance consists of prerequisites, standards, limitations and criteria which establish an overall level of quality for products and workmanship, including:

1. Mock-ups are full size erected assemblies for review of construction, coordination of the work of serval sections, testing, or for operation, and establishes standards by which the work will be judged.

a. Field samples are physical examples illustrating finishes, coatings, or finish materials, and establishes standards by which the work will be judged.

2. Pre-Installation Conference is used to coordinate materials and techniques, and to sequence related work of sensitive and complex items.

1.04 SCHEDULING

A. Make all submittals in accordance with the finally reviewed Submittals Schedule.

B. Coordination:

1. Performance of the Work: Coordinate submittals with other submittals and with related activities such as testing, purchasing, fabrication, and delivery.

2. Interrelated Work: Coordinate submittals so that one submittal is not delayed by need to review a related submittal. The Owner's Representative and Architect reserves the right to withhold action on a submittal until receipt of related submittals.

3. Color Section: Coordinate submittals so that all related color selections can be made at one time.

a. Within each of the following groups, color selections will not be made until each item for color selection has been received and coordinated:

1) Exterior product colors.

2) Interior product colors.

b. For color selection and coordination by Architect, allow 30 days for exterior product colors and 60 days for interior product colors, from receipt of last color selection submittal until return of complete color selections.

c. This requirement is included to permit maximum use of manufacturers' standard colors.

C. Review Time: Allow sufficient time so that work will not be delayed as a result of time required to properly process submittals, including time for resubmittal, if necessary. Advise on a submittal, if the work would be expedited if processing time could be shortened.

1. Allow time as set forth in Submittals Schedule for review of each submittal. Allow longer time periods when processing must be delayed for coordination with subsequent submittals, and when large quantities of closely-related documents are submitted at one time.

2. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the work.

3. No extension of time will be authorized because of submittals which are not submitted in accordance with the Contract Documents or are not sufficiently complete for review.

1.05 QUANTITIES OF SUBMITTALS

A. Product Data: Except for documents requiring color for legibility, submit one (1) reproducible original copy, and a maximum of two (2) reproductions for each submittal. Original and one (1) reproduction will be returned to Contractor.

1. For documents requiring color for legibility, comply with requirements for color selection submittals.

2. Copies intended for Xerographic reproduction shall be 8-1/2 inches by 14 inches maximum size, single sheet, one sided, unbound suitable for automatic feed copying machines.

B. Shop Drawings: For each submittal provide one (1) reproducible sepia transparency, positive side up, and a maximum of two (2) blackline or blueline, white opaque prints. Reproducible and one (1) print will be returned to Contractor.

1. Sheet Size: Not to exceed size of Contract Drawings.

2. Roll reproducible transparencies.

3. Roll or fold opaque prints. If folded, fold to size not exceeding 8-1/2 inches by 11 inches or less than 8 inches by x 10 inches. Roll or fold with title block facing out or up for easy identification.

C. Samples: Except as otherwise specified in technical sections, submit three (3) of each sample. Two (2) of each will be returned to Contractor, of which one (1), when finally reviewed, shall be retained at the jobsite.

D. Color Charts: Submit three (3) originals. Two (2) originals will be returned to Contractor.

E. Quality Control:

1. Design Data: Submit two (2) copies, 8 1/2 inches by 11 inches, single sheet, printed one side, unbound.

2. Test Reports: In accordance with Section 01410.

3. Certifications: Submit two (2) copies, 8 1/2 inches by 11 inches, single sheet, printed one side, unbound.

4. Field Reports: In accordance with Section 01410.

F. Contract Closeout: In accordance with Section 01700.

1.06 SUBMITTAL PROCEDURE SUMMARY

A. Procedure:

1. Contractor:

a. Prepare submittal, review all submittals in accordance with Submittal Preparation requirements of this section.

b. Transmit submittals to the Architect at Architect's Office of record.

3. Architect:

a. Will review submittals.

b. Will coordinate review by Engineer.

c. Will return to Contractor for General Construction with findings of review.

4. Contractor:

a. Retain and distribute copies of submittals.

b. Repeat procedure for submittals noted as "Revise and Resubmit" or "Rejected" or when the Architect indicates a resubmittal of a "Reviewed With Notations" is required.

1.07 SUBMITTAL PREPARATION

A. Preparation includes all actions by the Contractor and his Subcontractors and suppliers preparatory to submittal for review, including:

1. Submittal material development or selection.

2. Contractor review and verification.

3. Preparation of transmittals, and other supporting documents if required.

B. Submittal Material Development:

1. General:

a. Document sizes and quantities are specified elsewhere in this section.

b. Relationship to Work: Clearly indicate part of Work to which submittal applies, by reference to specification section, and by Contract Drawing number, equipment item, space number, grid coordination, schedule code, or other reference as appropriate.

c. Cross-reference between submittals by same preparer, to indicate related information.

d. Include information required by each section of the specifications.

e. Include all information necessary for coordination of adjacent and related work by other trades.

f. Include Engineer's seal where specified.

g. On resubmittals, clearly identify revisions to previous submittals.

2. Product Data:

a. Clearly mark submittal to identify specific products or models being submitted. Identify accessories and optional features included.

b. Show performance characteristics and capacities.

c. Show dimensions and clearances required.

d. Show wiring or piping diagrams and controls, where applicable.

e. Modify illustrations to delete information not applicable to the Work.

f. Supplement standard information as necessary so that submittal is specifically applicable to the Work.

g. Each data document constitutes a submittal.

3. Shop Drawings:

a. Include sufficient information to verify that fabricator correctly interprets the design intent and performance requirements of the Contract Documents.

b. Include assembly and connection details which are not defined by the Contract Documents and are therefore intended to be consistent with fabricator's standard practices and to require fabricator's specific expertise.

c. Clearly identify variations from the Contract Documents proposed because of standard shop practices.

d. Identify all materials and finishes. Where applicable, identify manufactured component products.

e. Indicate all dimensions necessary for work of other trades. Identify dimensions required for installation of work, including locations of grounds, blocking, openings, built-in inserts and anchorage devices, and other provisions. Show location and coordination of conduit, piping, equipment and ductwork based on actual item(s) being provided.

f. Identify field dimensions which Contractor must furnish for fabrication of work.

g. Identify any field variations or changes from contract documents, and provide a written explanation for the request. Failure to comply shall void review of such changes.

h. Mechanical and Electrical Equipment Rooms and General Floor Plan Shop drawings shall be drawn at a scale of not less than 3/8 inch = 1'-0", unless otherwise approved in writing by the Architect.

i. Allow space near the title block for Contractor's stamp and for Architect's stamp.

j. Coordination drawings, are considered shop drawings and shall be equally definitive.

k. Each shop drawing sheet constitutes a submittal.

4. Samples:

a. Submit samples which demonstrate all characteristics specified for each required sample.

b. Products or materials which represent processes or components unique to this work, such as custom color, alloy, dimension, aggregate mix or comparable feature, shall be accompanied by sufficient data to serve as a basis for revision and to assure that the sample can be replicated in the finished work.

c. The Architect may direct the Mechanical or Electrical Trade Contractors to submit samples of equipment and material items. Each sample shall be labeled, identified and securely tagged with the following information:

1) Sample identification (description of item and function related to the work).

2) Reference to Contract Documents (specification section and paragraph or Drawing number).

3) Manufacturer of item and address.

4) Date of submission.

d. Each sample, or group of samples indicating a range of color or finish, constitutes a submittal.

5. Quality Control:

a. Provide data and affirmations required by Section 01410 and Quality Assurance, Source Quality Control and Field Quality Control articles of respective specification sections.

b. Follow submittal process described for other submittal classes.

6. Contract Closeout: Refer to Section 01700 for requirements and procedures.

C. Contractor Review:

1. Prior to submittal, review submittal documents and materials for compliance with the Contract Documents and for compatibility with other components of the Work. Forward for review only submittals which so comply and are so compatible.

2. On submittals prepared by subcontractors or suppliers, the Contractor, as part of his review, shall annotate submittals as necessary so that a submittal as forwarded to Architect represents Contractor's intent. Contractor shall initial such notations.

   a. Mechanical and electrical shop drawings shall be reviewed, signed, and dated by the Contractor, other prime contractors, including Plumbing, Fire Protection, and Electrical Trade Contractors indicating their review and acceptance of equipment arrangements.

3. To each document or sample, affix Contractor's stamp, indicating Contractor's review and approval by signature of Contractor's designated representative. For samples which cannot be so stamped, attach tags with signed stamps.

4. By approving and submitting documents and samples, the Contractor represents that he has verified all field construction criteria, materials, catalog numbers and similar data, that he has determined and verified all required field measurements or will do so, and that he has checked and coordinated each document and sample with the requirements of the work and of the Contract Documents.

5. Architect will not review a submittal which does not bear the stamp and approval signatures of the approprirate Contractors. Submittals without such markings will be returned without review.

D. Transmittals and Supporting Documents:

1. Affix Architect's stamp to each submittal. Architect will furnish a rubber stamp to Contractor for this purpose. A sample stamp is included in this section.

   a. Note on each stamp the Transmittal Number, Submission Number, and Submittal Number, as defined.

2. Prepare transmittal form for each submittal item. Architect will furnish to Contractor a supply of transmittal forms. A sample transmittal form is included in this section. Note, on each transmittal form, the following information:

   a. Transmittal Number: A letter-number combination identifying trade group and sequence of submittal within each trade group, assigned by Contractor. Use following code letters for trade groups:

      1) A - Architectural

      2) S - Structural

      3) M - Mechanical (HVAC)

      4) P - Plumbing

      5) FP- Fire Protection

      6) E - Electrical

      7) Example: First Architectural submittal is A-1. This number is to be consecutive for all subsequent submittals.

2. Relative to the requirements of this paragraph, receipt by the Architect of a submission from the Contractor constitutes a review.

1.11 DISTRIBUTION

A. Contractor shall prepare and distribute reproductions of returned shop drawings and other document submittals to his Subcontractors and suppliers as required and as he deems necessary.

B. If the Work is performed under multiple and separate prime Contracts, Contractor making each submittal shall distribute, to each other Contractor two (2) copies of each shop drawing and other document submittal, as follows:

1. When returned indicated as "Reviewed" or "Reviewed With Notations".

2. When such distribution will or may benefit the performance of the Work.

3. When requested by other Contractor.

C. Contractor shall maintain, at the Project site, one (1) copy each of all submittals with status of "Reviewed" or "Reviewed With Notations".

D. Contractor shall use "Reviewed" or "Reviewed With Notations" submittals as the basis for accepting and evaluating work delivered to the jobsite, and shall not accept work which is not in accordance with "Reviewed" or "Reviewed With Notations" submittals.

1.12 FORMS

A. Examples of the Architect's Stamp and Submittals Form are included in this section, for information. Forms furnished may differ in detail from these examples.

B. Transmittal Form:

C. Architect's Stamp:

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01630

PRODUCTS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to requirements of this Section.

B. Closely-related requirements specified in other Sections:

1. Specific provisions relative to certain products, and specific requirements relative to acceptability of certain products, are specified in Divisions 02 through 16.

1.02 DESCRIPTION OF REQUIREMENTS

A. This Section specifies general requirements regarding products, product handling, product compliance, and substitutions, including submittal procedures.

1.03 DEFINITIONS

A. Definitions used in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents.

B. "Products" are items purchased for incorporation in the Work, whether specifically purchased for this project or taken from the Contractor's stock. The term "product" as used includes the terms "material", "equipment", "system" and other similar terms.

1. "Named Products" are products identified by use of the manufacturer's name for a product, including make or model designation, as published in product literature, current as of the date of the Contract Documents.

2. "Materials" are products that must be substantially cut, shaped, worked, mixed, finished, refined, fabricated or processed to form units of work.

3. "Equipment" includes products with operational parts, whether motorized or manually operated; products that require service connections such as wiring or piping; and other products identified as "equipment" by the Specifications.

C. Substitutions: Products and methods of construction differing from those required or identified as acceptable by the Contract Documents and requested by the Contractor to be deemed acceptable. The following are NOT subject to the substitutions requirements of this Section:

1. Revisions to the Contract Documents, where requested by the Owner or his representative; these are considered as "changes".

2. Pre-bid Substitutions requested during the bidding period and accepted prior to the Contract Date; these are included in the Contract Documents.

3. Contractor options on products and construction methods included in the Contract Documents.

4. The Contractor's determination of and compliance with governing regulations and orders as issued by governing authorities; these do not constitute "substitutions" and do not constitute a basis for Change Orders.

D. Pre-Bid Substitutions: Products and systems that are:

1. Identified as a product or system subject to the requirements of pre-bid substitution procedures; and,

2. Different from those required or identified as acceptable by the Contract Documents; and,

3. Submitted by a Bidder for the Architect's consideration in accordance with the Article, Pre-Bid Substitutions, of the Instructions to Bidders, Document 00101.

1.04 REQUIREMENTS

A. Comply with the requirements of this Section relative to the selection, coordination, handling and installation of products, except where more stringent or more specific requirements are specified in Division 02 through 16.

B. Comply with the requirements of this Section relative to requests for substitutions.

1.05 SUBMITTAL OF SUBSTITUTION REQUEST

A. Make request for pre-bid substitution by the submittals procedure specified in the Article, Pre-Bid Substitutions, in this Section.

B. Make request for substitution only as specified. Do NOT request substitutions by the submittals procedure specified in Section 01340: Submittals.

C. Requests for Substitutions:

1. Submit 3 copies of each request for substitution.

2. Identify the product or fabrication or installation method to be replaced by the substitution, including related Specification Section and Drawing numbers.

3. Include the following information, as appropriate, with each request:

a. Reason for proposed substitution.

b. Complete product data, drawings and descriptions of products, and fabrication and installation procedures.

c. Samples where applicable or requested.

d. A detailed comparison of the proposed substitution with the work specified. Include significant qualities such as size, weight, performance characteristics, compliance with requirements and standards, and visual characteristics. Submit in same terms and same order as specified work, to facilitate comparison.

e. Complete coordination information. Identify changes required in other elements of the work to accommodate the substitution, including work performed by other Contractors.

1) Include one of the following:

a) A statement by the Contractor proposing the substitution that he will pay for any additional costs to other Contractors.

b) A statement by each Contractor affected, that identifies changes to the costs, time, arrangement or performance characteristics of his work, and a statement by all other Contractors that the proposed substitution will require no change to the cost, time, arrangement or performance characteristics of their work.

f. A statement that the Contractor agrees to pay design costs or other costs incurred by the Owner in connection with the substitution including the cost of the Architect's review of the request for substitution.

g. A statement indicating the effect the substitution would have on the work schedule including total Contract Time, in comparison to the schedule without the proposed substitution.

h. Complete cost information, including a proposal of the net change in the Contract Sum.

i. Certification by the Contractor to the effect that, in the Contractor's opinion, the proposed substitution shall result in work that in every significant respect is equal to or better than the work required by the Contract Documents, and that it shall perform adequately in the application indicated. Include in this certification the Contractor's waiver of rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.

D. Architect Action:

1. Within one week of receipt of the Contractor's request for substitution, the Architect will advise the Contractor of additional information or documentation needed for evaluation of the request, and an estimate of design costs, administrative costs, or other costs to be incurred by Owner.

2. Within 3 weeks of receipt of the request, or within 2 weeks of receipt of the requested additional information or documentation, whichever is later, the Architect will notify the Contractor of either the acceptance or rejection of the proposed substitution.

a. Acceptance will be in the form of a letter, including a statement that a Change Order will or will not be required, and, if required, the changes in cost and time to be included in that Change Order. The Change Order, if required, will be issued within a reasonable time.

b. Rejection will include a statement giving reason for the rejection.

1.06 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same generic kind from a single source.

B. Compatibility of Options: Compatibility of products is a basic requirement of product selection. Select products to be compatible with other products previously selected. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract Documents, but must be provided by the Contractor.

1.07 REFERENCED STANDARDS

A. Comply with the applicable provisions of codes, standards and specifications referenced in the Section specifying each product.

1. Where products are shown on Drawings but not described in these Specifications, comply with industry standards and regulations applicable to such products.

1.08 PRODUCT HANDLING

A. Deliver, store, and handle products in accordance with manufacturer's recommendations, and to prevent damage, deterioration, loss, or theft. Control delivery schedules to minimize long-term exposed storage at the site. Minimize storage times for items which are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other loss.

1. Comply with product-specific requirements specified in Divisions 02 through 16.

2. The Contractor shall have and retain full responsibility for damage, deterioration or loss of materials, equipment, tools and supplies while being transported, handled, or stored.

B. Deliver products, except bulk materials, to the site in the manufacturer's sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

1. Products whose containers are broken, opened, watermarked, or otherwise damaged, or which contain caked, lumpy or otherwise damaged materials, are unacceptable and shall be immediately removed from the premises.

C. Storage:

1. Store products in a manner that will facilitate inspection and measurement of quantity or counting of units.

2. Store products in a manner that will not endanger the safety of personnel or the structure, or finishes of the Work.

3. Store products so that they do not interfere with operations of other Contractors, or with public use of streets, walks, or other public areas.

4. Store no combustible materials, nor any tools containing combustible fuels, in any mechanical or electrical spaces. Do not store such materials or tools in any enclosed spaces of the Work, except in tightly sealed metal containers, in well ventilated spaces, and in a quantity limited to one day's need.

5. Store cement, lime, plaster, aggregates, and similar items at least 6 inches above ground and protect from dampness, weather, and other damage.

D. Openings: Arrange and make provisions for handling large items of equipment by leaving temporary openings, as required. Fill openings when no longer required.

E. Small Components: Retain loose and small detachable parts, tools and spare parts until Substantial Completion. Turn same over to the Owner and obtain an itemized receipt in triplicate; retain one copy of receipt and include the other two with request for Final Payment.

PART 2 - PRODUCTS

2.01 GENERAL PRODUCT COMPLIANCE

A. Procedures for Selecting Products: The Contractor's options in selecting products are limited by requirements of the Contract Documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include:

1. Specifications including Named Products:

a. Where only a single product or manufacturer is named, provide the product named, unless the Specifications, by use of the term "Reference Product", "Design Product", or otherwise, indicate possible consideration of other products.

1) Comply with the "substitutions" procedures of this Section if proposing unnamed product.

b. Where two or more products or manufacturers are named, provide one of the products named, at the Contractor's option. Do not provide or offer to provide an unnamed product, except as follows:

1) Where the Specifications name products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to the use of these products only nor require pre-bid substitution, the Contractor may, at his option, propose an unnamed product that complies with Contract requirements in accordance with the "Substitutions" procedures of this Section.

2. Specifications which do not name products:

a. Where the Specifications describe a product or assembly by listing characteristics required, but without use of a brand or trade name, provide product or assembly that provides the specified characteristics and otherwise complies with Contract requirements.

b. Where the Specifications do not name products, but require compliance with specific performance requirements, provide products that comply with those requirements, and that are recommended by the manufacturer for each specific application. The manufacturer's recommendations may be contained in published product literature, or by the manufacturer's project-specific certification of performance.

c. Where the Specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specified requirements, including the standards, codes and regulations.

3. Specifications requiring matching an established sample: The final judgement of whether a product proposed by the Contractor matches the sample satisfactorily will be determined by the Architect.

B. Accommodation of Selected Products: Where the Contract Documents indicate details or other requirements based on a specified product, and the Specifications name two or more products or manufacturers for the Contractor's selection, the Contractor shall be responsible for adjustment in details and other requirements to accommodate the product of his selection, at no change to the Contract Sum or Contract Time.

2.02 GENERAL PRODUCT REQUIREMENTS

A. General: Provide products that comply with the requirements of the Contract Documents and that are undamaged. Unless specifically required by the Contract Documents to be salvaged, re-used or otherwise restored, provide products that are unused at the time of installation. Provide products that are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

B. Standard Products: To comply with the requirements of the Contract Documents, provide standard products of types that have been produced and used successfully in similar applications on other projects.

C. Continued Availability: Where, because of the nature of its application, the Owner is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard, domestically produced product for which the manufacturer has published assurances that the product and its parts shall be available to the Owner at a later date. A reasonable doubt regarding such future availability will be grounds for rejection of products other than named products.

D. Nameplates: Except for required labels and operating data, do not permanently attach or imprint manufacturers' or producers' nameplates or trademarks on exposed surfaces to view in occupied spaces or on the exterior of the completed project.

1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate the nameplate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain product identification and essential operating data, including information specified for particular nameplates in Divisions 02 through 16.

2.03 SUBSTITUTIONS

A. General: A request for a substitution will be received and considered when extensive revisions to the Contract Documents are not required, when the proposed changes are in keeping with the general intent of the Contract Documents, when the requests are timely, fully documented and properly submitted, and when one or more of the following conditions is

satisfied, as judged by the Architect; otherwise the requests will be returned without action except to record non-compliance with these requirements.

B. Conditions:

1. The request is for the use of a product not named in the Specifications, and where product selection is not limited to named products.

2. The specified product or method cannot be provided in time to comply with the Contract Schedule. The request shall not be considered if the effect on the schedule is a result of the Contractor's failure to place an order within 30 days of award of Contract, to pursue the work expeditiously, or to properly coordinate the work.

3. A substantial net advantage, as determined by the Architect, is offered the Owner, in terms of cost, time, operating efficiency or other factors, after deducting negative factors such as additional compensation to the Architect for redesign and evaluation services, increased costs of other work by other Contractors, or adverse effects on maintenance.

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Except where project-specific or more stringent requirements are set forth in the Contract Documents, comply with the manufacturer's instructions and recommendations for installation of products in each application.

B. Anchor each product securely in place, accurately located and aligned with other work.

C. Clean exposed surfaces and protect surfaces as necessary to ensure freedom from damage and deterioration at time of acceptance.

END OF SECTION

SECTION 01700

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Perform closeout work and submit closeout documents required to establish Substantial Completion.

2. Perform closeout work and submit closeout documents required to establish Final Completion.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions, and Division 1, General Requirements, apply to work of this section.

2. Section 01027, Applications for Payment.

3. Section 01029, Schedule of Values.

4. Section 01500, Temporary Facilities, Single Prime Contracts.

5. Section 01710, Final Cleaning.

6. Section 01720, Record Documents.

7. Detailed requirements for final completion of work prior to closeout are specified in Divisions 2 through 16, as work of each section.

1.02 SUBSTANTIAL COMPLETION REQUIREMENTS

A. Notification: In sufficient time to permit scheduling of inspection, but not less than two weeks in advance of such inspection, submit written notice requesting establishment of Substantial Completion, including:

1. Statement establishing date that the Work will be substantially complete.

2. Evidence of compliance with requirements of governing authorities:

a. Certificate of Occupancy.

b. Certificates of Inspection:

1) Plumbing.

2) Heating, Ventilating, and Air Conditioning, including control systems.

3) Electrical.

4) Elevator. ____

3. Prepare a list identifying items of work that will not be completed by date of Substantial Completion with justification on Architect provided form, show dates for completion of such work.

4. Statement of pending insurance change-over requirements.

5. Certification that specified performance criteria has been met by all equipment and systems specified in Division 12, 15, and 16 sections. In addition, provide certifications required by respective Division 12, 15, and 16 sections.

6. Specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents, except those which require a date of Substantial Completion.

7. Supporting documentation for completion required by the Contract Documents.

B. Prior to inspection establishing Substantial Completion, complete the following:

1. Obtain and submit release enabling the Owner's full, unrestricted use of the Work and access to services and utilities.

2. Deliver tools, spare parts, extra stock of material and similar physical items to the Owner.

3. Complete start-up testing and balancing of systems, and instructions of the Owner's operating and maintenance personnel, as specified in this section.

   a. Start-Up Reports: Submit copies of start-up reports to the Architect for review.

   b. Operating Instruction Statements: Submit to the Owner with a copy to the Architect prior to submitting request for final payment.

4. Discontinue or change over and remove from the Project site temporary facilities and services, construction tools and facilities, mock-ups, and similar elements, excepting those items and elements which the Owner may at his sole discretion, permit to remain in interest of achieving final completion.

5. Installation of all required material, equipment and systems documented in the Contract Documents.

6. Completion of cutting, patching and finishing of surfaces requiring such treatments.

7. Complete final cleaning requirements.

8. Make final change-over of locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.

C. Inspection Procedures:

1. The Architect will either proceed with observation or advise the Contractor of prerequisites to observation.

2. Following initial observation, the Architect will either prepare a Certificate of Substantial Completion, or will advise the Contractor of work which must be performed before the Certificate will be issued. List of work requiring completion will be Contractor's list, amended as necessary.

3. The Architect will perform a re-inspection when requested and when assured that the work has been substantially completed.

4. When Architect concurs that the Work is substantially complete, he will prepare a Certificate of Substantial Completion, accompanied by list of items to be completed or corrected prior to Final Completion, and submit the Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate.

5. Results of completed inspection will form the initial "punch-list" for final completion.

1.03 FINAL COMPLETION REQUIREMENTS

A. General: Complete the following submittals as soon as possible after Substantial Completion and before requesting final inspection and acceptance:

1. Release of Liens and Encumbrances (or alternate evidences): As required by the General Conditions and Supplementary General Conditions.

2. Certificates of Insurance: For products and completed operations, if such coverage is required to continue beyond final completion, complying with insurance requirements of the General Conditions and Supplementary General Conditions.

3. Final Punch List: Certified copy of Architect's list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by the Architect.

4. Final meter readings for utilities, a measured record of stored fuel, and similar data either as of the date of Substantial Completion, or of date when the Owner took possession of and responsibility for corresponding elements of the Work.

5. Consent of Surety.

6. Guaranties, Warranties and Bonds:

   a. Ensure guaranties, warranties, and bonds required by Contract Documents are properly executed and contain specific provisions specified.

   b. Specifically ensure manufacturers are properly notified in advance of Work to avoid negating provisions of required guaranties, warranties, and bonds.

7. Operations and Maintenance Manuals.

8. Project Record Documents. Accompany submittal with transmittal letter, in duplicate, containing:

   a. Date,

   b. Project title and number,

c. Contractor's name and address,

d. Title and number of each Record Document,

e. Certification that each document as submitted is complete and accurate,

f. Signature of Contractor, or his authorized representative.

9. Final project photographs, damage or settlement survey, property survey, and other final record information required by the Contract Documents.

10. Owner's receipts for delivery of small and loose components, maintenance stocks, and salvaged items required to be delivered to Owner.

11. Complete other work, deliveries and document submittals accepted as exceptions to requirements for Substantial Completion.

B. Final Statement of Accounting:

1. Prepare and submit a statement reflecting adjustments to the Contract sum, including:

a. Original Contract Sum.

b. Additions and deductions resulting from:

1) Previous Change Orders and Construction Change Directives.

2) Cost changes resulting from application of unit prices.

3) Deductions for uncorrected work.

4) Allocated utilities cost.

5) Other adjustments as applicable.

c. Total Adjusted Contract Sum.

d. Previous payments.

e. Sum remaining due.

2. The Architect will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders or Construction Change Directives.

C. Final Inspection:

1. The Architect will inspect the Work upon receipt of the Contractor's notice that Work, including punch-list items from earlier inspections, has been completed.

2. Upon completion of observation, the Architect will either prepare final Certificate for Payment, or will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled, but are required for final acceptance.

D. Final Closeout:

1. Upon completion of work, as evidenced by inspection of facilities and receipt of required closeout documents in acceptable form, a final Certificate for Payment will be issued and final payment made, in accordance with the Conditions of the Contract.

2. Contractor's obligations thereafter shall be limited to correction or replacement of defective work in accordance with terms of the general warranty, special warranties, and Conditions of the Contract.

1.04 OPERATING AND MAINTENANCE MANUALS

A. Prepare and furnish (3) three copies of Operating and Maintenance Manuals for each item of equipment or system installed in the project.

1. Include listed data for products and systems which require operation, adjustment or maintenance. Provide specific data for each of the following items:

a. Site and building utilities.

b. Moisture protection materials, including caulking, dampproofing, waterproofing, roofing, etc.

c. Visible finishes, interior and exterior, including paints, special coatings, resilient flooring, acoustical ceiling systems, etc.

d. Mechanical equipment and systems including heating and cooling apparatus, hot water heaters, drinking fountains, toilet and bath fixtures, etc.

e. Electrical equipment and light fixtures.

2. Each prime Contractor is responsible for preparation of operating and maintenance manuals for their respective work, except as follows:

a. Information relative to work of the Contractor for General Construction and another prime Contractor(s): Contractor for General Construction shall coordinate preparation of manuals, including collection from other prime Contractor(s), collation, binding and submittal of manuals.

b. Information relative to the work of more than one prime Contractor, other than the Contractor for General Construction: The Contractor designated by the Architect as principal source of information shall receive information from other prime Contractors, coordinate, collate, bind and submit manuals.

B. Form:

1. Organize data in order of the Project Manual Table of Contents. Include a Table of Contents in each volume or binder.

2. Bind data in heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Identify on both front and spine of each binder the name of the project and title "Operations and Maintenance Manual". If multiple binders, identify each volume by number.

3. Where it is necessary to use more than one binder, arrange data in each binder by Division of the Project Manual. Cross-reference other binders where necessary to provide essential information for operation and maintenance.

4. Provide heavy paper dividers with celluloid covered labeled tabs for each separate section. Mark each tab to indicate section contents.

C. Include the following typewritten information for each item:

1. Brief description of system or equipment, including location and function.

2. Copies of applicable shop drawings and product data submittals.

3. System equipment identification, with full nameplate data, including name of manufacturer, model number and serial number of each component. Identify equipment by designation shown in Contract Documents.

4. Operating instructions.

5. Emergency instructions.

6. Wiring and control diagrams.

7. Inspection and test procedures.

8. Maintenance instructions, procedures and schedules.

9. Precautions against improper use and maintenance.

10. Copies of Warranties.

11. ASTM Form U-1 for all pressure vessels, tanks, cylinders and drums.

12. Instructions for repairs within capability of Owner's staff.

13. List of spare parts furnished as part of contract.

14. Parts list for each piece of equipment with identifying drawings.

15. Name, address and telephone number (24 hours per day, 7 days per week availability) of nearest two (2) servicing agencies.

16. Name, address and telephone number of nearest manufacturer's representative.

17. Material safety data sheets.

18. Testing and balancing reports.

D. Review with Owner's operating and maintenance personnel.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 INSPECTING, ADJUSTING, TESTING AND CLEANING

A. At substantial completion of the project, thoroughly inspect and perform tests in compliance with each equipment manufacturer's standard test procedures or as specified in Division 11, 15, and 16 sections. Instruments, meters, wiring, electric power, fuel, water and other utilities necessary for operation of equipment and systems and personnel required for testing shall be included under this contract.

B. Motors shall be inspected and connected for proper rotation prior to operating any equipment.

C. Install, set, adjust and test electrical equipment overload and protective devices. Devices shall be of the proper rating and adjusted to suit load conditions for the correct equipment protection.

D. Test system and equipment grounding, document test results and submit for Architect's review.

E. Suspend testing when defects or malfunctions appear, make repairs or corrections to ensure proper system performance and operation.

1. Immediately inform the Architect of delays resulting from testing of systems or equipment.

2. Furnish the Architect a time duration estimate in writing for each delay, the reason for delay, and effect on the Construction Progress Schedule.

3. Execute additional work necessary for completion of tests and inform the Architect in writing that testing has been completed.

4. Additional testing required shall be rescheduled at the Architect's convenience.

5. Testing and retesting work shall be at the Contractor's expense.

F. Set adjustable lighting fixtures in operating position as directed by the Architect. Fixtures installed primarily for night use shall be aimed and adjusted at night.

G. After adjustments and tests have been completed, clean, dust, wash and vacuum electrical work, include interiors of boxes, cabinets, and equipment enclosures. Clean lighting fixture lens and reflectors, with anti-static detergent to ensure rated output.

H. At Final Completion, systems shall be complete and ready for the use intended.

3.02 SYSTEM START UP

A. After completion of testing in accordance with the Contract Documents, start each system and make final adjustments for proper flow, temperature and quietness of operation.

B. Where indicated in individual specification sections, provide start-up by the manufacturer's representative.

3.03 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Provide instructions and demonstrations by factory engineers for complete operation and maintenance of systems and equipment to designated Owner's Personnel. Use only instructors

who are thoroughly trained and experienced in the operation and maintenance of the building equipment or system involved.

B. Request a date from the Owner in writing with a copy to the Architect, when the instruction period shall begin.

1. Instruction period duration:

a. Mechanical: Minimum of 24 hours.

b. Plumbing and Fire Protection: Minimum of 24 hours.

2. Testing, Balancing and Adjusting shall be complete and acceptable to the Architect prior to instruction of the Owner's personnel. Time required for testing, balancing and adjusting shall not be included as final instruction time.

3. The Owner may request interim instruction prior to the final instruction period in order to operate systems prior to completion of the project.

4. The interim instruction period shall be in addition to final instructions and not reduce the length of instruction during the final instruction period.

C. The Owner's personnel shall sign a statement, prepared by the Contractor, showing their names, length of time and date of instruction, degree of comprehension, include a description of each system or item of equipment covered.

D. Review, as part of instruction:

1. Identification systems.

2. Equipment location and function.

3. Control sequences.

4. Hazards.

5. Cleaning.

6. Maintenance service agreements and contractors.

7. Spare parts and materials.

8. Tools.

9. Lubricants.

10. Fuels.

E. Review at time of instruction:

1. Operating and maintenance manuals.

2. Record documents.

F. Demonstrate, as part of instruction:

1. Start-up.

2. Shut-down.

3. Emergency operations.

4. Noise and vibration adjustments.

5. Safety procedures.

6. Economy and efficiency adjustments.

7. Effective energy utilization.

8. Other items required in individual specification sections.

G. Deliver Operating and Maintenance Manuals to Owner's personnel, at time of instruction.

H. Separate Prime Contracts: Where instruction in operating and maintenance procedures involves participation by more than one prime Contractor, the Contractor who is the principal source of instruction, as designated by the Architect, shall coordinate with the other prime Contractors involved, and shall make arrangements for a mutually agreeable time for instruction.

END OF SECTION

SECTION 01710

FINAL CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Final cleaning of work immediately prior to substantial completion, leaving project ready for use of which it is intended.

2. Removal of temporary protection.

3. Disposal of remaining debris, and of materials not incorporated in the work.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions, and remaining sections of Division 1, General Requirements, apply to work of this section.

2. Section 01040, Coordination-Single Prime Contracts.

3. Section 01500, Temporary Facilities, Single Prime Contracts.

4. Section 01700, Project Closeout.

5. Technical sections of Divisions 2 through 16 for special cleaning and disposal requirements for specific units of work.

6. Section 16501, Lamps.

1.02 QUALITY ASSURANCE

A. Environmental Requirements: Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with all applicable safety, environmental and anti-pollution regulations. Remove waste materials from the site and dispose of in a lawful manner.

1. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

2. Burning or burying of debris, rubbish or other waste material on the premises shall not be permitted.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces.

PART 3 - EXECUTION

3.01 CLEANING

A. General: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the standards and condition expected from a commercial building cleaning and maintenance program. Comply with printed cleaning instructions of both cleaning materials manufacturers and manufacturers of materials to be cleaned.

B. Scheduling: Provide final cleaning immediately prior to delivery of Work or portions of Work for Owner's occupancy.

1. If work or correction of work is performed after Owner's occupancy begins, clean areas in which such work is performed.

C. Detailed Requirements:

1. Remove labels which are not required as permanent labels.

2. Clean and polish mirrors, glass, and other transparent materials. Remove noticeable vision-obscuring substances. Replace chipped or broken glass and other damaged transparent materials. Take care not to scratch surfaces.

3. Clean exposed exterior and interior hard-surfaced finishes to a condition free of dust, stains, films and other noticeable distracting substances. Avoid disturbing the natural weathering of exterior surfaces. Restore reflective surfaces to their original reflective condition.

4. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces which cannot be satisfactorily repaired or restored, or which show visible evidence of repair or restoration. Do not paint over UL and similar labels, including mechanical and electrical label plates.

5. Remove debris and surface dust from roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and other limited access spaces.

6. Broom clean floors in unoccupied spaces.

7. Vacuum clean carpet, fabric and other soft surfaces, removing debris and excess nap. Shampoo carpet if necessary to remove spots and stains.

8. Wipe surfaces of mechanical, electrical, elevator and other equipment clean. Remove excess lubrication, paint and mortar droppings and other foreign substances.

9. Clean plumbing fixtures to a sanitary condition, free of stains.

10. Clean light fixtures and lamps so as to function with full efficiency.

11. Clean the Project site, yard and grounds, in areas disturbed by construction activities and landscape work, of litter and foreign substances. Clean any mud from paved areas, and sweep or blow to a broom-clean condition. Remove stains, petro-chemical spills and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.

3.02 REMOVALS

A. Removal of Protection: Except as otherwise directed, remove temporary protection devices and facilities installed to protect completed work during the construction period.

B. Remove waste materials, rubbish, tools, construction equipment, machinery and surplus material from the site.

C. Remove snow and ice to provide safe access to the building.

D. Arrange for disposition of extra materials of value remaining after completion of the Work which have become the Owner's property, as directed.

END OF SECTION

SECTION 01720

RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Record documents are defined to include those documents or copies relating directly to performance of the work, which Contractor is required to prepare or maintain for Owner's records, recording work as actually performed. In particular, record documents show changes in work from original Contract Documents and additional information not included in original Contract Documents.

2. Maintain, at the project site, as a basis for record documents to be delivered to Owner, and in addition to documents required for performance of the Work:

a. Complete set of Contract Drawings,

b. Complete Project Manual, including addenda,

c. Change Orders and Construction Change Directives,

d. Instructions, sketches and drawings for changes in the work, issued by Architect and Owner's Representative,

e. Finally reviewed submittals,

f. Field records of tests, measurements, and conditions concealed in the finished Work,

g. Special drawings and other descriptions prepared by Contractor, Subcontractors or suppliers.

3. Record, by markup of documents, information specified in this section.

4. Prepare a record documents set and deliver to Owner.

B. Related Documents and Sections:

1. General Conditions, Supplementary Conditions, and Division 1, General Requirements, apply to work of this section.

2. Section 01040, Coordination-Single Prime Contracts.

3. Section 01050, Field Engineering.

4. Section 01340, Shop Drawings, Product Data and Samples.

5. Section 01700, Project Closeout.

6. Technical sections of Division 2 through 16 may include specific record document requirements which extend the requirements of this section.

1.02 RECORD DOCUMENT MAINTENANCE

A. Store documents in Contractor's field office apart from documents used for construction. Do not use record documents for construction purposes.

B. File documents in same order as Table of Contents of the Project Manual.

C. Maintain documents in a clean, dry, legible and orderly condition.

D. Make documents available during project for inspection by the Owner's Representative and Architect.

1.03 RECORD DOCUMENT PROCEDURES

A. Record Drawings:

1. Markup Procedure: Maintain a blue-line or black-line set of Contract Drawings and shop drawings. Markup, clearly and legibly, substantial variations from work as originally shown. Mark drawings which best show each condition. Cross-reference to correlate details with small-scale drawings. Where shop drawings are marked up, mark cross-reference on Contract Drawings at corresponding location. Mark with erasable colored pencil, using separate colors where desirable to distinguish different categories of work at same general location.

a. Markup important additional information which was either shown schematically or omitted from Contract Drawings.

b. Give particular attention to information on concealed work, which would be difficult to identify or measure and record at a later date.

c. Note field order numbers, alternate numbers, Change Order numbers and similar identification.

d. Require each person preparing markup to initial and date markup and indicate name of responsible firm.

2. Indicate by mark-up not less than the following:

a. Depths of foundations in relation to finish first floor datum.

b. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

c. Locations of concealed utilities and appurtenances, referenced to visible and accessible features.

d. Field changes of dimension and detail.

e. Changes made by Change Order, Construction Change Directive, drawings, sketches, or other instruction.

f. Details and changes not on original Contract Drawings.

3. Markup information on work to be concealed prior to concealment; markup other information not less frequently than weekly.

4. Prior to final completion, review completed markup of record drawings with Architect. When authorized, transfer markups to a set of reproducible of Contract Drawings. Identify and date each updated reproducible.

   a. Purchase set of reproducible of Contract Drawings from Architect, at cost of reproduction and handling.

   b. Arrange and pay for printing.

5. Review: Prior to final printing and distributing, submit one (1) set of prints of corrected reproducible and marked-up prints to Architect for review of general scope, changes, information recorded, and quality of draftsmanship.

   a. If prints indicate that reproducible markup work is incomplete or otherwise unacceptable, Architect and Owners Representative will so advise Contractor.

   b. When prints of corrected reproducible are acceptable, Architect and Owners Representative will so notify Contractor. Contractor shall make prints to be included in Operating and Maintenance Manual, and shall then deliver, to Architect through Owners Representative:

      1) Corrected reproducible for delivery to Owner.

      2) One set of prints for Architect's records.

B. Record Project Manual:

1. Maintain one copy of Project Manual, including addenda, Change Orders and other modifications issued in printed form, and note thereon any significant variations in actual work in comparison with Documents as issued. Give particular attention to substitutions, field orders, selection of options, and other information on work which is concealed or cannot otherwise be readily observed in the completed Work. Note related record drawing information and product data, where applicable. Upon completion of markup, submit to Architect and Owners Representative for Owner's records.

   a. In each section mark record copy with manufacturer's name, model number, and other significant identification, of products actually provided.

C. Record Product Data:

1. Maintain one copy of each finally reviewed product data submittal, and mark up significant variations in actual work in comparison with submitted information. Include variations in product as delivered, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of work which cannot be readily observed in the finished Work. Note related Change Orders and markup of record drawings and Project Manual. Submit complete set to Architect and Owners Representative for Owner's records, except exclude from this set product data included in Operating and Maintenance Manual.

D. Record Sample Submittal: Immediately prior to date of Substantial Completion, Owner's Representative and Architect will meet with Contractor at site, and will determine which samples maintained by Contractor during the work are to be transmitted to Owner for record purposes. Package, identify, and deliver those samples to Owner's sample storage space. Dispose of other samples as specified for disposal of surplus and waste materials.

E. Miscellaneous Record Submittals: Complete miscellaneous records and place in good order, properly identified and bound for continued use and reference. Submit for Owner's records. Miscellaneous records include, but are not limited to:

1. Surveys establishing lines and levels of the structure in relation to established benchmarks.
2. Field records on depths of excavations, foundations, underground construction, wells and similar work in relation to first floor elevation.
3. Horizontal and vertical location of underground utilities and appurtenance referenced to permanent surface improvements.
4. Measurements to establish quantities for unit prices.
5. Plant treatment records.
6. Tests of substrates and records of ambient conditions.
7. Certifications received instead of labels on bulk products.
8. Batch mixing and bulk delivery records.
9. Load/performance testing.
10. Inspections and certifications by governing authorities.
11. Mock-up test records.
12. Leakage and water-penetration tests.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION

SECTION 01731

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

a. Some requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.

5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's or Construction Manager's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

1. Primary operational systems and equipment.
2. Fire-protection systems.
3. Control systems.
4. Communication systems.
5. Electrical wiring systems.
6. Operating systems of special construction in Division 13 Sections.
7. Fire rated barriers.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION

DIVISION 2 - SITE WORK

ALL INQUIRIES REGARDING SITE WORK,
INCLUDING RELATED SITE FEATURES, SHALL BE DIRECTED TO:

MENLO ENGINEERING ASSOCIATES, INC.
CIVIL ENGINEERING CONSULTANTS
261 CLEVELAND AVENUE
HIGHLAND PARK, NJ 08904
(732) 846-8585

ALL SHOP DRAWINGS AND SUBMITTAL DATA RELATED
TO THE SITE WORK SHALL BE SENT DIRECTLY TO:

MENLO ENGINEERING ASSOCIATES, INC.
CIVIL ENGINEERING CONSULTANTS
261 CLEVELAND AVENUE
HIGHLAND PARK, NJ 08904
(732) 846-8585

SECTION 02201

EARTHWORK - SITE

1. GENERAL

1.01 DESCRIPTION OF WORK

A. This Section and related drawings describe requirements pertaining to earthwork.

B. Soils and Foundation Investigation Report, dated December 11, 2001 prepared by Mellick-Tully and Associates, P.C. is available "for reference only".

C. The work includes, but is not limited to:

1. Site clearing and removal of all existing construction.

2. Earth moving and excavation for all earthwork located 5 (five) feet beyond the perimeter of the building including:

a. Excavation and haul off site of all unsatisfactory materials including weathered rock, saturated soils and spoil materials. Excavation of weathered rock shall be considered earthwork.
b. All stockpiling, placement, removal, re-stocking, etc. of all soil materials.
c. Excavation and undercut to produce designated lines and grades and reuse on site of suitable materials.
d. Import and place fill materials as may be required to produce designated lines and grades of fills, backfills and rough grades.
e. Dewatering all trenches and excavations.
f. Proofrolling and compacting subgrade soils and fill.
g. All utility trenching work.
h. Sheeting, shoring and other protection, as required, to complete the work of this section.
i. Protection of existing site features and adjacent properties during the course of the work.

D. Related work specified elsewhere:

1. *Section 01000 - Special Conditions*
2. *Section 02300 – Earthwork – Building Pad*

E. Unit Prices: See Bid Proposal Form for required unit price breakdown.

1.02 SITE INFORMATION

A. The soils report on indicated subsurface conditions is not intended as a representation or warranty of the continuity of such conditions. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. The data is included as an appendix to these Specifications for the convenience of the Contractor.

B. Additional soil investigations may be made by the Contractor at no cost to the Owner, provided such operations are acceptable and approved in writing by the Architect of Record.

1.03 SOIL TESTING AND INSPECTION SERVICES

A. Laboratory control and Geotechnical inspection is employed by owner to assist the Contractor in producing the specified results, but in no way relieves the Contractor of his obligation to produce the specified results.

B. All fill or backfill operations shall be executed under the direct supervision of the licensed Geotechnical Engineer.

C. The Geotechnical Engineer shall verify all design parameters indicated in the soils reports or elsewhere on the contract documents including allowable soil bearing pressure, all soil lateral active and passive pressures, subgrade modules, plasticity index, "wet season" water level, etc. If any actual conditions are found to be at variance with the design parameters, the Architect of Record shall be immediately notified of all variance conditions in writing and no further work except for required safety precautions shall be executed in the affected portion of the site until a resolution is obtained.

D. Layout of work: Contractor to provide all surveying and layout services. All work shall be carefully laid out and under the supervision of a state registered land surveyor.

1.04 SUBMITTALS

A. A testing laboratory, as specified above, shall be employed by the Owner to check the suitability of materials selected for controlled fills, to test and determine if the required density is being obtained, and to test compaction of exposed subgrades. Laboratory reports on tests performed shall include coordinates and elevations of field tests.

B. Testing service shall inspect and verify in writing all subgrades and fill layers before further construction work is performed thereon. All compacted fills shall consist of laboratory approved materials placed in horizontal layers in accordance with recommendations of the soils report and the requirements of the Geotechnical Engineer.

C. When tests indicate compaction does not meet requirements, fill and backfill shall be dried out or moistened as necessary, scarified, and recompacted, or removed and replaced with acceptable fill material. Recompacted areas shall be retested. This procedure shall be repeated until tests indicate compliance with specified requirements. Reworking and retesting shall be provided at no cost to the Owner. Cost of retesting shall be withheld from Contractor's retainage.

D. Contractor shall submit to the Architect of Record a letter from a Registered Surveyor certifying the foundation location and bottom of footing elevations.

1.05 TESTS FOR PROPOSED SOIL MATERIALS

A. Test soil materials proposed for use in the work and submit test reports, on the same day tests are conducted for tests herein specified and for additional tests as may be required.

B. Provide moisture density relation testing for each type of soil encountered in subgrade and fills in accordance with the recommendations of the soils report and the requirements of the Geotechnical Engineer.

C. The Geotechnical Engineer will determine the suitability and ascertain compliance with specification requirements of all materials to be used as fills.

D. For on and off site borrow materials, perform an analysis as determined by the soils testing laboratory. Tests shall include a moisture-density relation in accordance with recommendations of the soils report and the requirements of the Geotechnical Engineer.

E. All subgrade, fills, and backfills required to be compacted to a specified density by the Geotechnical Report shall be tested immediately prior to covering of such compacted areas.

1.06 GENERAL EARTHWORK REQUIREMENTS

A. All work shall be executed in accordance with the contract documents. Any conflict shall be brought to the attention of the Architect of Record, who shall decide the controlling specification.

1.07 COMPACTION EQUIPMENT

A. The contractor shall use whatever equipment is capable and required to attain the desired results in an acceptable manner and time frame.

1.08 FOUNDATION INSPECTION

A. After excavations for footings are completed to required depths, a testing laboratory shall verify the bearing capacity. The footing evaluations shall be made by a Registered Professional Geotechnical Engineer or his representatives in accordance with these specifications and the soils report.

B. Contractor shall make arrangements for and provide required temporary access routes to locations to be inspected, and shall fill test holes with cement and sand grout at no expense to Owner when required.

1.09 SITE CONDITIONS

A. Existing Utilities: The Contractor shall verify the location of any existing underground utilities in the areas of work. If utilities are to remain in-place, provided adequate means of support and protection during earthwork operations.

F. The building pad shall be constructed in such a manner as o provide positive drainage of surface water off the pad and to protect the pad surface and subgrade. Temporary ditches shall be constructed to carry any surface run off away from the pad area, as directed by the Geotechnical Engineer. At start of building construction, the pad shall be prepared for foundations and all temporary ditches properly backfilled.

G. The Contractor shall install all subsurface drainage dewatering measures as indicated on the construction documents and as directed by the Geotechnical Engineer.

3.03 EXCAVATION

A. General: Earth Excavation consists of removal and disposal of pavements and other obstructions visible on the ground surface, material of any classification indicated in the data on subsurface conditions and all material encountered when establishing required finished grade elevations as shown on the design plans.

B. Excavate cut areas within confines of site to required grades, levels, contours, and to sufficient depth necessary to obtain specified density when rolled and, in any case, to depth required to allow for materials that are to be placed. When cut is complete, before placing of cover materials, compact in accordance with the soils report and the requirements of the Geotechnical Engineer.

C. Unauthorized Excavation: Consists of removal of materials beyond indicated subgrade elevation not required by the Contract Documents. Unauthorized excavation , as well as remedial work directed by Owner, shall be at the Contractor's expense.

1. Under footings, foundations, retaining walls, etc., fill unauthorized excavation by extending indicated bottom elevation of footing, etc. to the excavation, without altering the required top elevation. Lean concrete fill shall be used to bring elevation to proper level as deemed acceptable by the Geotechnical Engineer.

2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavation of same classification, unless otherwise directed by Owner

D. If ground water is discovered to exist within 12" below the bottom of the lowest floor slab, the Contractor shall notify the Architect of Record who will determine if the underground structure and drainage as designed are adequate.

3.04 REMOVAL OF UNSUITABLE SOIL MATERIALS AND MEASUREMENT OF IMPORT

A. Additional Excavation: When excavation has reached required elevations, notify Geotechnical Engineer who will observe subgrade condition. If unsuitable materials are encountered at required elevations, excavation shall proceed until suitable materials are encountered, and excavation shall be backfilled with soils of same classification, as directed by Geotechnical Engineer.

B. Where the removal of unsuitable soil materials is due to the fault or negligence of the Contractor in his performance of earthwork and site grading operations, excavate the resulting unsatisfactory soil material and replace with compacted satisfactory soil material as required, and as determined by the Geotechnical Engineer at no additional cost to the owner.

C. Method of measurement for all unsuitable materials including materials over and above the base bid quantity; Calculate cubic yard volume of unsuitable soil materials excavated by the cross section method unless otherwise directed or permitted by Owner. Take sections at closely-spaced intervals. Over excavation below required elevations and corrective fill materials shall be at the contractor's expense. All measurements before and after unsuitable soil material removal shall be verified by the Owner/Geotechnical Engineer.

D. Method of payment for materials over and above the base bid quantity: Removal of unsatisfactory soils materials and replacement with off site fill will be paid for by the Contract Unit Price per cubic yard of material removed.

3.05 FILL AND BACKFILL

A. Notification of Geotechnical Engineer: The Geotechnical Engineer shall be notified 48 hours prior to any fill, backfill, or compaction operations.

1. Permit Geotechnical Engineer to observe all subgrades for each layer of fill or backfill. Additional fill or backfill should not be placed unless Geotechnical Engineer has approved the subgrade and/or previous layer of fill.

2. When required by the Geotechnical Engineer, the Contractor shall certify the field elevations of the compacted subgrade or fill layer.

3. If based on the Geotechnical Engineer's reports and inspections, subgrade or fill which has been placed is below specified density for respective construction areas, provide additional compaction at no additional expense to Owner.

B. Provide the required minimum density and moisture content of compacted fill in accordance with the soils report and the requirements of the Geotechnical Engineer.

C. When temporary sheeting, shoring or bracing is removed, fill remaining voids with backfill material and compact to required density.

D. Fill shall be placed in lifts in accordance with the soils report. Fill settlement shall be monitored with settlement plates to be installed with new fill, in accordance with the recommendations of the soils report and the requirements of the Geotechnical Engineer. Settlement plates shall be located in accordance with the soils report. Construction of building, site utilities, pavement and other site amenities may proceed once settlements have been essentially completed. Geotechnical Engineer shall determine when satisfactory settlements have occurred.

E. Redress and recompact any areas that settle below required grades before execution of other work required and leave solid and secure against future settlement.

C231-90 Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method
C260-86 Specification for Air-Entraining Admixture for Concrete
C309-89 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
C330 Standard Specifications for light weight aggregate for Structural l Concrete
C494-90 Specification for Chemical Admixtures for Concrete

1.04 SUBMITTALS

A. Samples of all products used in the work of this section. If units are of such size to make submission impractical, adequate examples of finish and material shall be provided.

B. Latest edition of manufacturer's specifications for proposed materials, and method of installation and list of materials proposed for use.

C. Four copies of shop drawings for all walls showing overall dimensions, reinforcing, foundations, soil reinforcement, drainage systems, backfill, appurtenances to be provided and coordination with items not provided as part of the wall system.

D. Submit required materials and drawings directly to the Owners Consulting Civil Engineer, within fifteen (15) days of the Contract Date, with a coy of the transmittal to the Owner's Construction department. Prior to submittal, the design shall be certified by a professional engineer registered in the state where the project is located.

E. The design shall include calculations for global stability and incorporate factors of safety for Sliding, Bearing, Overturning, Slope Stability and Design Uncertainties as recommended in the Geotechnical investigation unless specifically waived or modified in writing by Owner's Construction Department and the Owner's Consulting Civil Engineer.

1. The wall design should incorporate soils available on-site for use within the retained and reinforced soil zones, unless specifically excluded by the Owner's Geotechnical Engineer.

2. The wall design should include provisions to control hydrostatic pressure and/or saturation of the retained and reinforced soil zones. These may include the use of drainage stone behind the wall facing, horizontal blanket drains through the reinforced soil zone, vertical chimney drains to intercept seepage from the retained soil, and surface grading and drainage structures behind the wall to control surface runoff.

1.05 QUALITY ASSURANCE

A. Soil testing and associated testing for quality control during earthwork operations will be supplied by the Owner (see Section 02200). Any specific testing or inspection services required by the retaining wall design shall be clearly delineated in the submission.

B. Owner's Testing Lab will provide soil testing and documentation on behalf of the owner, and will provide this documentation to the Contractor in a timely manner for his information only. However, it will be the responsibility of the Contractor and the designer of the wall system to ensure that the wall is constructed properly and that the intentions of the design are being met. The Owner and its Testing Lab will not be responsible for the performance of the wall system.

C. Construction of a mockup of adequate size to illustrate the finish and construction techniques may be required, at a location acceptable to the Owner, for any wall system with which the Owner is not familiar or for which unique design modifications are proposed.

2 PRODUCTS

2.01 MANUFACTURED UNITS

A. Retaining wall units, reinforcing and accessories shall be supplied as specified in the manufacturer's submissions. Units produced under a license from an approved proprietary system shall be manufactured in a facility meeting all requirements of the licensing system with adequate capacity to supply the product to the site in a timely manner. Materials shall be stored as required to prevent damage and staining.

B. Acceptable retainage system, which will be allowed based on shop drawings and calculations.

1. "Keystone" Retaining Wall System (BASE BID) as manufactured by a licensed distributor for Keystone Retaining Wall Systems, Inc., Minneapolis, MN.

   a. Geogrids (lengths and elevations) for use with Keystone system shall be designed by the engineer and further specified in the approved shop drawings. Material shall be stored as required to protect from damage until used.

2. Approved alternate: Contractor may submit an alternate manufacturer/wall system, subject to Owner's approval.

2.02 LEVELING PAD

A. Leveling pad material shall consist of compacted sand, gravel, crushed rock or leveling concrete as shown on the construction drawings and/or shop drawings.

2.03 FILL AND BACKFILL

A. Unit fill (if required) and backfill materials, shall be as specified and shown on the construction drawings and/or shop drawings.

3. EXECUTION

3.01 EXCAVATION

A. The contractor shall excavate to the lines and grades required. Over-excavation and/or recompaction shall be performed as required to produce the specified bearing conditions.

3.02 LEVELING PADS

A. Leveling pads and foundations, unit installation, cap installation, installation of geogrid and/or other anchor materials and installation of accessories and appurtenances shall be carried out according to the manufacturer's recommendations and the approved drawings.

3.03 FIELD QUALITY CONTROL

A. Testing for compaction of subgrade and fill materials shall be performed by an Independent Testing Laboratory selection and paid by Owner.

B. If compaction requirements, embedment of reinforcing or other conditions are not met at any time during the construction process, Contractor shall remove and reconstruct deficient areas to obtain proper conditions at not additional cost to Owner.

C. Independent Testing Laboratory shall promptly prepare test reports and distribute to Owner, Owner's Consulting Civil Engineer and Contractor for all testing required by the certified and approved design documents. In the event any test performed fails to meet these requirements, Owner and Contractor shall be notified immediately by Independent Testing Laboratory.

All costs related to retesting due to failures shall be paid for by the Contractor at no additional expense to Owner. Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that is deemed necessary. Contractor shall provide free access to site for testing activities.

END OF SECTION

SECTION 02300

EARTHWORK-BUILDING PAD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

B. Soils and Foundation Investigation Report, dated December 11, 2001 prepared by Mellick-Tully and Associates, P.C. is available "for reference only".

1.2 SUMMARY

A. This Section includes the following:

1. Earthwork and preparing subgrades for foundations, slabs-on-grade, and other structures in an area bounded by a perimeter of five feet outside of and parallel to the exterior walls including canopies and other structures attached to the building.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for slabs-on-grade.
4. Subsurface drainage backfill for walls and trenches.
5. Excavating and backfilling trenches within building lines.

B. Related Sections include the following:

1. Division 2 Section "Earthwork-Site" for earthwork located 5 feet beyond the perimeter of the building.
2. Division 2 Section "Foundation Drainage Systems" for underslab and perimeter drainage systems.
3. Division 3 Section "Cast-in-Place Concrete" for granular course over vapor retarder.
4. Division 15 and 16 Sections for excavating and backfilling buried mechanical and electrical utilities and buried utility structures.

1.3 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

C. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations.

1. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. (0.57 cu. m) or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches (97 blows/50 mm).

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

J. Utilities include underground services within buildings.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.

B. Field Quality Control Test Reports: Submit test and inspection reports prepared by a qualified geotechnical engineer.

C. Certification that borrow fill is virgin material from a commercial or non-commercial source.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Engage an independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548 and to inspect foundation subgrade and perform

field quality control inspections and tests. Inspection and testing shall be supervised by a professional geotechnical engineer.

1. Professional Geotechnical Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing geotechnical engineering services.

B. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.
3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil and controlled fill materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 4 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Backfill and Fill: Satisfactory soil materials.

E. Controlled Fill: Uncontaminated, well-graded Satisfactory Soils with at least 90 percent passing a 1-1/2-inch (38-mm) sieve and not more than 15 percent passing a No. 200 (0.075-mm) sieve.

F. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

G. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Where rock is encountered, remove to a depth 10" inches below proposed subgrade or bottom of footing, replace with satisfactory soil material.

3.5 BUILDING PAD PREPARATION

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from subgrade surface. Excavate and remove existing fill materials within five foot perimeter of building to subgrade of natural, virgin soils.

B. Notify Architect and Geotechnical Testing Agency when excavations have reached required subgrade.

C. After excavation, proofroll existing subgrade with a minimum of eight passes of a heavy, smooth drum vibratory compactor to identify soft pockets and areas of excess yielding.

1. Make one-half of the passes perpendicular to the other passes and at a speed of 2 to 3 miles/hour.
2. Perform proofrolling in the presence of the Geotechnical Testing Agency.
3. Perform proofrolling only when weather conditions permit. Do not proofroll wet or saturated sugrades.
4. Disengage vibrator within ten feet at existing building.

D. If Architect and Geotechnical Testing Agency determines that unsatisfactory or unstable subgrade soil is present, continue excavation and replace with compacted fill material as directed by Geotechnical Testing Agency and Architect.

1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect and Geotechnical Testing Agency.

F. Place and compact fill material in layers to required elevations as follows:

1. Under building slabs, steps and ramps, use controlled fill.
2. Under footings and foundations, use controlled fill.

G. Place fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

H. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and ramps, compact each layer of fill material at 95 percent.

3.6 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended for bearing surface.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: 12 inches (300 mm) on each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches (100 mm) deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.

1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill using Satisfactory Soil Materials in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Inspecting and testing underground utilities.
3. Removing concrete formwork.

4. Removing trash and debris.
5. Removing temporary shoring and bracing, and sheeting.

B. Place backfill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

C. Place backfill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

D. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and ramps, compact each layer of backfill material at 95 percent.

3.11 UTILITY TRENCH BACKFILL

A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings; fill with concrete to elevation of bottom of footings.

C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.

1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

D. Coordinate backfilling with utilities testing.

E. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

F. Place and compact final backfill of satisfactory soil material to final subgrade.

3.12 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.14 DRAINAGE COURSE

A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:

1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
2. When compacted thickness of drainage course is 6 inches (150 mm) or less, place materials in a single layer.
3. When compacted thickness of drainage course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing and inspection.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet (30 m) or less of wall length, but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet (46 m) or less of trench length, but no fewer than two tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

SECTION 02513

ASPHALT CONCRETE PAVING

1. GENERAL

1.01 DESCRIPTION

A. Work included: Asphalt paving of drives and parking areas as indicated on the drawings and as specified herein.

B. Related work specified elsewhere:

Section 02200-Earthwork
Section 02528-Concrete Curbs and Sidewalk
Section 02580-Pavement Marking

1.02 REFERENCE STANDARDS

A. Reference is to "Standard Specifications for Construction of Roads and Bridges", Department of Transportation, State of New Jersey, the latest edition and amendments.

B. Owner's Soils Report

2. PRODUCTS

2.01 PAVING

A. Paving shall consist of the following:

1. Standard duty (auto driveways and parking) pavement shall be as indicated on drawings.

2. Road widening and resurfacing: Pavement shall be as indicated on the drawings.

2.02 ASPHALT

A. Asphaltic Concrete: Hot, plant-mixed bituminous material in accordance with the Reference Standards.

B. Prime shall be a bituminous material conforming to the Reference Standards.

C. Asphaltic Paving (Topping) Material-Plant Mix: The above "Aggregate for Asphaltic Pavement" must be heated in a continuous kiln until all moisture in the aggregate has been driven off. Then while aggregate is absolutely dry and hot, 5.8% - 6.0% of AC20 asphalt cement by weight must be thoroughly mixed with it so that all particles are completely covered. Material should be delivered to the job as it is mixed.

2.03 BASE

A. The graded aggregate base shall conform with the Reference Specifications. The base shall have the following gradation:

Sieve Size	1-1/2"	3/4"	No. 10	No. 50	No. 200
Percent Passing	100%	60-90%	25-45%	5-30%	0-8%

3. EXECUTION

3.01 REPARATORY WORK

A. Before commencing of asphalt paving, all concrete walks, strips and concrete paint adjoining the paving shall be installed. Prior to placing of base, the construction of all utility lines which are to be placed under the pavement shall have been completed.

3.02 REPARATION OF SUBGRADE

A. The area to receive base course and pavement shall be excavated to proper depth to obtain the finish contours and elevations shown on drawings. After grading, the entire surface shall be checked for unstable soil areas which are not suitable for subgrades by the Soil Engineer. These areas must be excavated to reach stable soil and then be backfilled with suitable materials. The entire area then shall be rolled to required compaction as per Section 02200 - EARTHWORK.

3.03 APPLICATION OF BASE

A. The base course shall be constructed in accordance with the Reference Standards. All base shall have minimum compaction of 95% of the maximum density obtained by the test procedure presented to ASTM D-698- 70 Method D (Standard Proctor). Maximum permissible lift thickness shall be 6" (compacted). A soils engineer selected and paid for by the Owner shall make soil and compaction tests on the subgrade and base courses. Results of such tests will be given to the Architect of Record. Cost of all tests made that show compaction not meeting the specifications shall be paid for by the Contractor. All costs of reworking the subgrade and base courses to specified compaction and retesting shall be paid for by the Contractor.

3.04 APPLICATION OF BINDER AND ASPHALT PAVING

A. When the base stabilization has been completed and when material is dry with a temperature above 60 degrees, it must be prime-coated with one coat of AE-P cut-back asphalt heated. Fill all voids in the base stabilization course and adhere the topping immediately following application of prime-coat.

B. The asphaltic paving material specified shall be placed at a temperature of 275°F. to 350°F. at the time of application, then the material must be mechanically rolled to compact topping to depths herein specified, after compaction which must not further settle or compact under the weight of a ten ton loaded truck when outside temperature is 90°F. The surface must be smooth, true to contours and elevations shown on the drawings and impervious to water.

END OF SECTION

SECTION 02528

CONCRETE CURBS & SIDEWALKS

1. GENERAL

1.01 SCOPE

A. Provide the following as required for the Work:
   1. Concrete Walks
   2. Concrete Curbs

1.02 REQUIREMENTS

A. All materials and workmanship shall be in accordance with the plan details and as specified in the State of New Jersey, Department of Transportation Standard Specifications for Road and Bridge Construction", the latest edition and amendments.

1.03 SUBMITTALS

A. Provide samples, manufacturer's data, test reports and materials certifications as required in the Reference Specifications.

1.04 INSPECTION

A. Examine the areas and conditions under which concrete curbs and sidewalks are to be installed. Notify the Architect of Record in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

2. PRODUCTS

2.01 MATERIALS

A. Metal Forms: In approved shape and section, in depth equal to required edge thickness of paving, fabricated in sections not less than 10 ft. long, designed to be positioned with not less than 3 pins or stakes and of adequate strength to withstand machine loads without visible springing or settlement.

B. Wood Forms: Southern Yellow Pine No. 1 SR grade or Douglas Fir Construction Grade or better, S4S.

3. EXECUTION

3.01 CONCRETE FINISHING AND CURING

A. Refer to Section 03300 - CAST IN PLACE CONCRETE.

3.02 CONCRETE SIDEWALK

A. Preparation: Over compacted subbase as recommended by soils engineer.

B. Construction Joints: Whenever placing concrete is suspended for 30 minutes or more, provide a construction joint located at the nearest control joint or expansion joint.

C. Concrete Strength: See Section 03300 – Cast in Place Concrete.

D. Placing: Thoroughly compact concrete during and after pouring so as to eliminate honeycombing and voids.

3.03 CONCRETE CURBS (FORMED)

A. Forming: Form straight sides against wood or metal. Form tapered sides and integral gutters with a metal mule constructed to required section profile.

B. Mixing and Placing Concrete: Conform to the requirements for mixing and placing concrete.

END OF SECTION

SECTION 02550

SITE UTILITIES

1. GENERAL

1.01 DESCRIPTION

A. This Section includes, but is not limited to water distribution, and sanitary sewer systems.

B. The extent of utility work is shown on the drawings. Systems shall start at a point approximately 5'-0" beyond the exterior wall of the building and extend to termination unless otherwise indicated on the drawings.

1.02 DELIVERY AND STORAGE

A. Unload materials so as to avoid shock or damage. Handle and store all pipe in such a manner as to avoid deterioration or other injury thereto. Place no pipe within pipe of a larger size. Store pipe and fittings on sills above storm drainage level and delivery for lying after the trenches are excavated. Valves and hydrants shall be drained and stored to protect them from damage.

1.03 APPLICABLE STANDARDS

A. **All water main materials and workmanship shall be in accordance with applicable city or county Standard Specifications and Details.**

B. **All sanitary sewer materials and workmanship shall be in accordance with applicable city or county Standard Specifications and *Details***

2. PRODUCTS

2.01 MATERIALS

A. **Ductile Iron Pipe (DIP):**

1. **Pipe shall conform to AWWA C151 Class 51, cement-lined in accordance with ANSI A21.4, except Class 52 minimum when threaded. Pipe ends shall be bell and spigot with mechanical joints that conform with ANSI A21.11 or with ends joined by a method that employs a single circular rubber gasket.**

2. **Fittings 12 inch and smaller shall conform to ANSI A21.10, cement-lined in accordance with ANSI A21.4. Mechanical joint, spigot, or modified bell ends may be submitted in lieu of bell ends. Flanged ends are not acceptable.**

B. **Poly Vinyl Chloride (PVC):**

1. **Water Lines: Pipe sizes 3 inch and larger which are installed below grade outside the building shall complying with AWWA C-900 Class 200 minimum and ASTM D-2241**

rated SDR 21 Class 150. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM D-3034 Table 2 with factory supplied elastomeric gaskets and lubricant.

2. **Sewer Lines: Pipe and fittings shall comply with ASTM D-3034 rated SDR 35. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM D-3034 Table 2 with factory supplied elastomeric gaskets and lubricant.**

3. **Fittings shall conform to ANSI A21.10 gray-iron or ductile iron for use with PVC pipe and with mechanical joint ends. Couplings shall be Certainteed Corp. Fluid-Tite, Johns-Manville Ring-Tite, or approved equivalent.**

C. **Chlorinated Poly Vinyl Chloride (CPVC) Sewer Lines:** Pipe and fittings shall comply with ASTM F-949. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM Table 2 with factory supplied elastomeric gaskets and lubricant. Pipe shall be installed in accordance with manufacturer's recommendations. Pipe shall be Contech or approved equivalent.

D. **High Density Polyethylene Pipe (HDPE) Smooth Interior:** only permitted when specifically indicated on drawings, conforming to AASHTO M294 and M252. Install pipe in accordance with manufacturer's guidelines for culvert and other heavy-duty drainage applications. Pipe shall be Advanced Drainage Systems N-12 and Hancor Hi-Q smooth interior.

2.02 VALVE AND ACCESSORIES

A. Gate valves shall be all-iron, bronze-mounted, double disc, parallel seats, non-rising stem with square operating nut turned counter clockwise to open in accordance with AWWA C500 gate valve with non-rising stem, O-ring seals and 2 inch square operating nut; fire line underground gate valves shall be AWWA C509 with resilient gaskets.

B. Check valves shall be swing check type, mounted horizontally, and shall have rubber or composition discs.

2.03 THRUST BLOCKS

A. Blocks shall be concrete of a mix not leaner than 1:2-1/2:5 cement:sand:stone and shall have a compressive strength of not less than 2,000 psi at 28 days. Concrete for thrust blocks shall be placed against undisturbed earth.

3. EXECUTION

3.01 EXISTING IMPROVEMENTS

A. Maintain in operating condition all active utilities that serve areas adjacent to this project. Repair to the approval of the utility or authority having jurisdiction any surface or subsurface improvement damaged during the course of the Work, unless such improvement is shown to be abandoned or removed.

3.02 CONNECTIONS TO BUILDING PIPING

A. **The ends of sanitary sewers and water service lines shall be tightly plugged or capped 5'-0" outside of building walls,** pending the connecting thereto of the building systems as specified in the plumbing section. Ends of lines shall be marked so they can be readily located.

3.03 TRENCHING AND BACKFILLING

A. Provide trenching and backfilling for water service and sewerage pipes. **Water and sewerage lines separation shall be minimum 10 feet horizontally and 18 inches vertically.** Lay all piping in open trench except where Architect of Record gives written permission for tunneling. Maintain access to fire hydrants by fire-fighting equipment.

B. Excavate trenches of sufficient width for proper installation of the work. When the depth of backfill over sewer pipe exceeds 10 feet, keep the trench below the level of the top of the pipe as narrow as practicable.

C. Sheet and brace trenches and remove water as necessary to fully protect workmen and adjacent facilities, in keeping with local regulations or, in the absence thereof, with the provisions of the "Manual of Accident Prevention in Construction", of the Associated General Contractors of America, Inc. Under no circumstances lay pipe or install appurtenances in water. Keep the trench free from water until pipe joint material has hardened. Sheeting left in place shall be cut off not less than 2 feet below finished grade. Sheeting shall not be removed until the trench is substantially backfilled.

D. It shall be noted that excavation under this contract shall be unclassified.

E. Grade the bottom of the trenches evenly to insure uniform bearing for full length of all pipes. Excavate all rock, cemented gravel, old masonry, or other hard material to at least 4 inches below the pipe at all points. Refill such space and all other cuts below grade with sand or fine gravel firmly compacted.

F. Should soil conditions necessitate special supports for piping and/or appurtenances, including the removal of unsuitable material and refilling with gravel or other material such work shall be performed as necessary.

G. Backfill trenches only after piping has been inspected, tested and the locations of pipe and appurtenances have been recorded. Backfill by hand around pipe and for a depth of 1 foot above the pipe. Use earth without rock fragments or large stones and tamps as specified in layers not exceeding 6 inches in thickness, taking care not to disturb the pipe or injure the pipe coating. Compact the remainder of the backfill as specified with a rammer of suitable weight or with an approved mechanical tamper, provided that under pavements, walks and other surfacing, the backfill shall be tamped as specified. Exclude all cinders, rubbish and scrap metal from trenches in which metal pipes are laid. Special care shall be used to properly tamp backfill under lower half of sewer pipe.

3.04 SEWER CONSTRUCTION

A. Make all required connections to existing sewers. Carry out such work in accordance with local standards. Observe care to prevent debris from entering sewers. Check the invert elevations of existing sewers to which connections are to be made, and if appreciable difference from elevations noted on the drawings, or if they involve any difficulty in obtaining necessary drainage, notify the Architect of Record immediately so that appropriate corrective action may be taken.

B. Commence at the lowest point in the system and lay the pipe with the bell-end upgrade. Test pipe for soundness and clean interior and joint surfaces before lowering the pipe into the trench. Lay pipe in straight lines and on uniform grades between points where changes in alignment or grade are shown. Bed the pipe barrel uniformly.

C. Comply fully with manufacturer's instructions for sewer pipe jointing, using sealing or lubricating compound as supplied by the manufacturer, and apply proper pressure to seal the spigot in the bell.

D. As soon as the joint material has set, pack fine earth carefully around the joints, and around and over the pipe. Carry this backfill operation to a depth of at least 12 inches above the top of the pipe. Care shall be used in tamping backfill under lower parts of the pipe to give proper support, especially in shallow trenches.

E. Flush all sanitary sewers, including building connections, with water in sufficient volume to obtain free flow through each line. Remove any obstructions and correct any defects discovered.

3.05 WATER DISTRIBUTION SYSTEM INSTALLATION

A. Service line from existing main shall be furnished and installed to serve the project. The project contract work shall begin at indicated public water supply line and shall include all water lines, valves, fire hydrant and appurtenances as shown on the drawings, except as indicated otherwise.

B. Pipe-Laying - General:

1. The interior of all pipe shall be clean and joint surfaces wiped clean and dry before the pipe is lowered into trench. Lower each pipe, fitting and valve into the trench carefully and lay true to line and without objectionable breaks in grade. **The depth of cover below finished grade shall be not less than 5'-0" and the standard cover shall be 6'-0".**

2. Provide uniform bearing for all pipe in trenches. Do not allow trench water or dirt to enter the pipe after laying. Insert a watertight plug in the open end of the piping while pipe laying is not in progress.

3. Do not lay pipe closer than 10 feet to a sewer. At cross overs with sewers, no joint in the water line shall be closer than 6 feet from the cross- over point. A minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer shall be maintained when the water main is either above or below the sewer. Provide valves, plugs or caps, as required, where pipe ends are left for future connections.

C. All pipe shall be laid with standard provisions for expansion and contraction and in accordance with manufacturer's recommendations. All pipe with slip type joints shall be restrained at elbows and tees by thrust blocks or rods and clamps.

D. Install suitable fittings at all changes in direction, dead ends and branch connections, provided that double strap saddles, in lieu of tees, may be used for service taps.

E. **Copper pipe** shall be joined by means of wrought copper, solder-joint fittings. Ends of pipe to be cut evenly, reamed, and sanded sufficiently at ends for solder to make required contact. Insulated unions shall be installed in service lines at main.

F. Before setting each valve make sure the interior is clean and test opening and closing. Set valves and stops with stems plumb and at the exact location shown. Provide brick laid flat or other similar foot-pieces under each curb box. Valve and service boxes shall be plumb, with tops at finished grade.

3.06 CLEAN UP

A. Remove all scrap and debris leaving all areas clean for other trades.

END OF SECTION

SECTION 02580

PAVEMENT MARKINGS

1. GENERAL

1.01 DESCRIPTION OF WORK

A. The extent of pavement marking is shown on the drawings.

B. Work includes, but is not limited to the following:

1. Parking stall divider lines.

2. Wheelchair legends.

3. "Stop" legends.

4. "No Parking" legends.

5. Diagonal striping.

6. Center line striping.

1.02 RELATED DOCUMENTS

A. The General and Supplementary Conditions and General Requirements (Division 1) apply to work specified in this section.

B. State Standard Specification for Road Construction, latest edition.

C. Division 9 section Painting for general execution requirements.

1.03 QUALITY ASSURANCE

A. Provide pavement marking complete in every respect.

B. Reference Standards: Comply with the current edition of applicable provisions of published codes and standards unless noted otherwise.

1. ASTM D 93, D 562, D 711, D 821, D 1210, D 1475, D 1640, D 2243, D 2369, D 2486, D 3723, D 3960, E 70, and G 53.

2. DOT Code of Federal Regulations, Hazardous Materials and Regulations Board, Reference 49CFR, ICC Regulations.

3. State Standard Specification for Road Construction, latest edition.

4. Federal Specification TT-P-115E, Type III (Type I if V.O.C. compliance required), colors 33538 and 37038.

1.04 SUBMITTALS

A. Shop Drawings: Indicate sizes, shapes, patterns, and colors of marking, and manufacturers and types of paints.

1.05 DELIVERY, STORAGE AND HOLDING

A. Deliver all materials to the job site with all labels intact and legible at time of installation.

B. Store materials off ground under cover. Protect from damage or deterioration.

C. Handle materials to prevent damage to surface, edges, ends and factory applied finishes of items. Damaged material shall be rejected and replaced.

1.06 GUARANTEE

A. Contractor shall guarantee entire installation for one (1) year from Grand Opening.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide ready-mixed one component water borne traffic line paint. Materials shall be listed on the Department of General Services Office of Procurement Qualified Products List.

B. Paints shall contain all necessary co-solvents, dispersants, wetting agents, preservatives and all other additives, so that paint shall retain viscosity. Halogenated solvents and glass beads shall not be permitted.

C. Volatile Organic Compound (VOC) content shall not exceed 250 grams maximum per liter of paint as determined in accordance with ASTM D 3960 test, excluding water and exempt solvents.

D. Yellow color shall match Federal 595a Color 33538. Black color shall match Federal 595a Color 37038.

E. Traffic paint for parking strips to be nonvolatile. Oil modified alkyd of chlorinated rubber (verify V.O.C. compliance) non-bleed, rapid drying material, especially manufactured for zone marking. Color to be white conforming to FS TT-P-115E, Type III (Type I required for V.O.C compliance). See plans for location.

3. EXECUTION

3.01 INSPECTION

A. Installer shall examine the substrates and conditions under which materials are to be installed, and notify the Architect of Record in writing of conditions detrimental to the completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Coordinate provisions for installation with work of other trades.

C. All parking area marking and painting to be protected by appropriate traffic barriers, lighted if necessary, so located as to prohibit parking and traffic until traffic lines are completed and properly dry.

3.02 INSTALLATION

A. Install pavement marking in accordance with approved shop drawings and applicable codes and standards.

B. Traffic paint shall be installed in two coats. First Coat shall be installed at ½ the recommended coverage rate after paving is in place with the second coat installed at full recommended rate 30 days later.

3.03 PAINTING

A. Parking stall, division and limit lines shall be 4" in width, true and straight. Color: White.

B. Pavement lettering "NO PARKING" shall be 2'-0" in height. Color: Red.

C. Stop legends shall be as detailed on Drawing. Color: White.

D. Wheelchair legends shall be as detailed on Drawing. Color: Blue background with white symbols. Parking stall striping shall be Blue at Handicapped stalls only.

E. Diagonal striping Handicapped. Color: Blue.

F. Diagonal striping Loading Zone. Color: Yellow.

G. Directional signage shall be as detailed on Drawing. Color: White.

H. Center line striping shall be 4" in width as detailed on Drawings. Color: White.

3.04 COMPLETION

A. During the progress of the work, the premises shall be kept free of debris and waste resulting from the work in this section. Upon completion, all surplus material and debris shall be removed from the site.

B. At completion of work, touch up minor damage to prefinished surfaces to the satisfaction of the Architect of Record. Replace materials damaged or stained during installation.

END OF SECTION

SECTION 02721

STORM DRAINAGE SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of storm drainage system work is shown on drawings.

B. Storm drainage system work includes, but is not limited to, the following:

1. Storm drainage conduits

2. Manholes, frames and covers

3. Catch basins, frames and gratings.

C. Comply with the requirements of Section 02200 for excavation and backfilling required in connection with storm drainage system work.

D. Comply with requirements of Section 03300 for concrete work required in connection with storm drainage work.

1.02 QUALITY ASSURANCE

A. Installer: A firm specializing and experienced in storm drainage work for not less than two years.

B. Comply with standards and requirements of the State Department of Transportation and other agencies having jurisdiction.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each product specified for storm drainage system.

PART 2 - PRODUCTS

2.01 CONDUIT MATERIALS

A. General: Furnish ells, tees, reducing tees, wyes, couplings, increasers, crosses, transitions and end caps of same type and class of material as conduit, or of material having equal or superior physical and chemical properties as acceptable to the Architect of Record.

B. Reinforced Concrete Pipe: ANSI/ASTM C 76, Class as indicated, with modified tongue-and-groove compression gasket joints complying with ANSI/ASTM C443.

C. Concrete Pipe: ANSI/ASTM C 14, Class 2, unless otherwise indicated.

D. High Density Polyethylene Pipe (HDPE): Pipe complying with AASHTO M252, M294, MP7 and ASTM D3350. Interior of pipes shall be smooth and shall have an "n value" of not less than 0.010. Pipes shall be joined with gasketed bell and spigot joints complying with AASHTO M252 and M294. Gaskets shall comply with ASTM F477 and ASTM D1149. Provide minimum coverage per manufacturer's specifications.

1. Acceptable corrugated Polyethylene Pipe Manufacturer:

a. Hancor "Sure Lok" or equal.

2.02 CONCRETE STRUCTURES

A. Concrete Base: Precast or cast-in-place, at Contractor's option. Use concrete, which will attain a 28-day compressive strength of not less than 3000 psi.

B. Precast Concrete Manholes: ANSI/ASTM C 478, sized as indicated, eccentric cone precast top.

2.03 MASONRY MATERIALS

A. Concrete Masonry Units: ANSI/ASTM C 139.

B. Manhole Brick: ANSI/ASTM C 32, Grade MS.

C. Sewer Brick: ANSI/ASTM C 32, Grade SS.

D. Masonry Mortar: ANSI/ASTM C 270, Type M.

2.04 METAL ACCESSORIES

A. Manhole Frames and Covers: Grey cast iron, ANSI/ASTM A 48, Class 30 B.

1. Comply with requirements of FS RR-F-621 for type and style indicated.

2. Furnish covers with cast-in legend on roadway face as indicated.

B. Manhole Steps: Grey cast iron, ANSI/ASTM A 48, Class 30B, integrally cast into manhole sidewalls, unless otherwise indicated.

C. Cast Basin Frames and Gratings: Grey cast iron, ANSI/ASTM A 48, Class 30 B.

1. Comply with requirements of FS RR-F-621, for type and style required.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Installer must examine the areas and conditions under which storm drainage system work is to be installed and notify the General Contractor in writing of conditions detrimental to the proper

and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION OF CONDUIT

A. Install conduit in accordance with governing authorities having jurisdiction, except where more stringent requirements are indicated.

B. Inspect conduit before installation to detect apparent defects. Mark defective materials with white paint and promptly remove from site.

C. Lay conduit beginning at low point of a system, true to grades and alignment indicated with unbroken continuity of invert.

D. Place bell ends of clay conduit or groove end of concrete conduit facing upstream.

E. Install gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements.

F. Concrete Pipe: Install in accordance with applicable provisions of American Concrete Pipe Association "Concrete Pipe Field Manual", unless otherwise indicated.

G. Cleaning Conduit: Clear interior of conduit of dirt and other superfluous material as work progresses. Maintain swab or drag on line and pull past each joint as it is completed.

1. Place plugs in ends of uncompleted conduit at end of day or whenever work stops.

2. Flush lines between manholes if required to remove collected debris.

I. Interior Inspection: Inspect conduit to determine whether line displacement or other damage has occurred.

1. Make inspections after lines between manholes, or manhole locations, have been installed and approximately two feet of backfill is in place and at completion of project.

2. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects, correct such defects to satisfaction of the Architect of Record.

3.03 UNDERGROUND STRUCTURES

A. Precast Concrete Manholes: Place precast concrete sections as shown on drawings. Where manholes occur in pavement, set tops of frames and covers flush with finish surface. Elsewhere, set tops 3" above finish surface, unless otherwise indicated.

1. Use epoxy-bonding compound where manhole steps are mortared into manhole walls.

2. Provide rubber joint gasket complying with ASTM C 443.

B. Catch Basins: Construct catch basins to the sizes and shapes indicated.

1. Use concrete which will attain a 28-day compressive strength of not less than 3000 psi.

2. Set cast-iron frames and gratings to elevations indicated.

3.04 TAP CONNECTIONS

A. Make connections to existing conduits and underground structures, so that finished work will conform as nearly as practicable to requirements specified for new work.

B. Take care while making tap connections to prevent concrete or debris from entering existing conduit or structure. Remove debris, concrete or other extraneous material which may accumulate.

3.05 BACKFILLING

A. General: Conduct backfill operations of open-cut trenches closely following laying, jointing and bedding of pipe, and after initial inspection and testing are completed.

3.06 TESTING

A. Perform testing of completed conduit lines in accordance with local authorities having jurisdiction.

END OF SECTION

SECTION 02810

FINE GRADING, TEMPORARY GRASSING & EROSION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section of the Specifications and related drawings describes requirements pertaining to finish grading and temporary grassing work.

B. Related work specified elsewhere:

Section 02000 Special Conditions
Section 02200-Earthwork
Section 02920-Soil Preparation
Section 02930-Lawns and Sod
Section 02940-Landscape Planting
Section 02950-Trees, Shrubs, Vines and Groundcovers
Section 02960-Landscape Irrigation

1.02 STANDARDS

A. Grass seed shall conform to tolerances for germination and purity in accordance with applicable standards of U.S. Department of Agriculture.

B. Availability of various elements contained in all fertilizers shall conform to standards of the Association of Official Agricultural Chemists.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. All topsoil necessary to complete the work shall be obtained from topsoil stockpiles from grading and excavating operations and from approved topsoil sources on the site. In the event additional topsoil is required, it shall be obtained from approved sources off the site. Topsoil shall be natural, friable, topsoil characteristic of representative soils in the vicinity that produce heavy growths of crops, grass, or other vegetation. Topsoil shall be free from tree roots, stones, and other materials that hinder grading, planting, and maintenance operations, and free from noxious and other objectionable weed seeds and toxic substances.

B. Topsoil borrow areas used on the site shall be neatly trimmed, drained and grassed after borrow excavations are completed.

C. At Contractor's expense, topsoil shall be analyzed by a reputable laboratory with reference to grass species specified and the report shall contain fertilization and soil amendment recommendations. Furnish laboratory reports to the Architect of Record. The Architect of Record will accept or reject the topsoil based on the laboratory report prior to use.

2.02 FERTILIZER

A. Provide a commercial grade fertilizer manufactured in accordance with the recommendations of the State Agricultural Board.

B. Fertilizer shall be a grade containing the appropriate plant food elements as determined by the soil test.

C. Deliver the acceptable fertilizer in standard size bags, showing weight, analysis and manufacturer's name. Store in weatherproof storage place in such manner that its effectiveness will not be impaired.

2.03 GROUND LIMESTONE

A. Ground limestone (calcium carbonate) shall have the following analysis: at least 95% to pass 20 mesh sieve; at least 55% to pass 60 mesh sieve; and at least 40% to pass 100 mesh sieve.

B. Total carbonates shall be not less than 80% of 44.8% calcium oxide equivalent; for purpose of calculation total carbonates are considered as calcium carbonate.

2.04 MULCH

A. Mulch shall be baled wheat, oat, rye, or hay or other grasses as acceptable to the Architect of Record and shall be applied on all areas to be seeded unless they are hydroseeded. Mulch shall be applied at a rate of 1½ to 2 tons per acre and shall be anchored to the soil to prevent it from being blown around on the site during periods of high winds. Asphalt emulsion application will not be acceptable. At any time the mulch becomes bunched it shall be respread and reanchored.

2.05 HYDROMULCH

A. Hydromulch shall be composed of wood cellulose fiber and contain no germination or growth-inhibiting factors. It shall be colored green to allow visual metering in its application and have the property of being evenly dispersed and suspended when agitated in water.

PART 3 - EXECUTION

3.01 DEPOSITING, SPREADING AND PREPARATION OF TOPSOIL AREAS

A. Contractor shall review Section 02000 Special Conditions regarding the site potential for highly acidic soil conditions. All mitigation methods outlined within Section 02000 shall be implemented prior to redistribution of topsoil.

B. Do not start work until after construction work on structures, walks, curbs, walls and paved areas has been substantially completed, and rough grading has been completed, inspected and accepted. The grassing work shall be accomplished only when satisfactory results can be expected. When conditions such as drought, excessive moisture, high winds, or other factors prevail to such an extent that satisfactory results are not likely to be obtained the work shall be stopped. The work shall be resumed only when the desired results are likely to be obtained. All grassing operations shall be conducted across the slope. Establishment of grass shall be as specified.

C. Prior to spreading topsoil the subgrade shall be pulverized to a minimum depth of 2" with equipment capable of obtaining proper pulverization of the soil.

D. Topsoil shall be uniformly distributed and evenly spread to a minimum thickness of 6". Topsoil shall be spread so that planting can proceed with little additional soil preparation or tillage.

E. Any finished grade that is not free from lumps and foreign material as described in Paragraph 2.01 will not be acceptable.

F. After placement, finish grade topsoil to levels, grades and contours as shown. Maintain surfaces to indicated finished grades. Deposit whatever additional topsoil may be required to take care of any settlement or erosion up to date of final acceptance. Rake surfaces upon which additional topsoil is to be deposited or otherwise prepare to insure proper bond.

G. Till in order to provide a good seed bed. Hand tools such as a lawn rake, grading rake, steel tined speed rake, potato hook or spiker aerator or mechanical equipment such as a verticutter, disc harrow, scarifier-rake, tine harrow, etc., shall be used during cultivation operations.

H. These tools and equipment plus any other that the Contractor desires to use shall be employed during spreading of all topsoil to insure smooth draining grades and a fine graded surface upon which to receive seed.

3.02 AREAS OF GRASSING

A. All areas disturbed by construction and grading operations shall be hydroseeded with temporary lawn grasses.

3.03 SLOPE AND DITCH TREATMENT

A. Any slopes in excess of one vertical on four horizontal or any swales shall be solid sodded, or be hydromulched at a rate of 2,000 pounds of fiberous mulch per acre. The swales shall receive this treatment over an area 5' on either side of the centerline and for the entire length of the swale.

3.04 LIMESTONE APPLICATION

A. Apply ground limestone (at a rate as determined by the soil test) and thoroughly incorporate into the top 4" of soil.

3.05 FERTILIZER APPLICATION

A. Apply fertilizer at a rate as determined by the soil test.

B. Rework soil to remove all foreign matter and lumps as specified in preparation of topsoil areas.

3.06 HYDROSEEDING

A. Hydroseed shall be applied with hydraulic equipment at the rate of 1,000 lbs. to 1,500 lbs. of hydromulch per acre with the exception of any slopes in excess of 4:1 or any swales. Hydromulch shall be added to the water slurry in the hydraulic seeder after the proportionate quantities of seed, fertilizer and other accepted materials have been added.

B. The slurry shall be sprayed uniformly on the surface of the soil.

3.07 TEMPORARY LAWNS

A. Annual ryegrass (Lolium Multiflorum) at 250 lb./acre shall be added to water slurry.

B. The temporary lawns shall be maintained by the Contractor until the preparation for permanent lawn is started.

3.08 SMOOTHING ALL LAWNS

A. If the lawn surface has become bumpy and uneven during planting or because of washing during a heavy rain, begin smoothing operations at the time of first mowing. Apply topsoil to low spots in the lawn in light applications (up to ½" deep) to produce a smooth surface.

3.09 MAINTENANCE

A. Provide maintenance from start of work until final acceptance. Maintenance includes watering of lawns, refertilization, weeding, mowing, cleaning up and edging, repairs of all washouts and gullies, repairs or protection, and other necessary work of maintenance. Maintain slopes against erosion.

3.10 EROSION

A. Contractor shall anticipate a certain amount of erosion after completion of grassing and he shall continue to re-prepare, add topsoil, re-fertilize, and re-plant eroded areas using sod, or hydromulch in areas where erosion persists, until the grass is acceptable in all respects.

3.11 MOWING

A. Mowing shall be accomplished with acceptable mowing machines as often as necessary in accordance with good turf establishment practices.

3.12 WATERING

A. During establishment, grassed areas shall be moist through the upper 4" of soil.

3.13 CLEANUP

A. Before inspection of work, and before acceptance, paved areas that are soiled or stained by operations of work of this Section shall be cleaned. Clean by sweeping or washing and remove all defacements or stains.

B. Remove construction equipment, excess materials and tools. Cart away from site any debris resultant from work of this Section and dispose as directed.

3.14 INSPECTION AND ACCEPTANCE

A. The Contractor shall, after his personal inspection, request an acceptance inspection by the Architect of Record.

B. After acceptance, maintenance will be assumed by the Owner or his designated representative.

3.15 CONDITION UPON ACCEPTANCE

A. No erosion shall exist.

B. Bare or thin spots in excess of 5% of any area will not be acceptable.

END OF SECTION

SECTION 02920

SOIL PREPARATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. General: Provide soil preparation in accordance with the contract documents.

B. Related Work Specified Elsewhere:

1. Finish Grading.
2. Lawns.
3. Trees, Shrubs, Vines, and Groundcovers.

1.02 PROJECT/SITE CONDITIONS

A. Review the Owner's existing soils analysis and soils boring data.

B. Existing conditions: For protection of existing plants to remain, refer to spec. Section-Trees, Shrubs, Vines and Groundcover.

1.03 EXAMINATION OF SITE AND DOCUMENTS

A. By submitting a bid, the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.

B. Plans, specifications, surveys, measurements, other documents and dimensions under which the work is to be performed are believed to be correct; but the Contractor shall have examined them for himself during the Bidding period, as no additional compensation will be made for errors or inaccuracies that may be found therein.

1.04 SOIL FERTILITY AND AGRICULTURAL SUITABILITY ANALYSIS

A. Submittal:

1. After completion of rough grading and prior to soil preparation, the contractor shall obtain agronomic soils tests for planting areas. A minimum of one sample per two acres of planting and lawn areas shall be required and shall include a fertility and suitability analysis, PH and written recommendations for soil amendment, fertilizer, and chemical conditioner, application rates for soil preparation, auger hole requirements, and post-maintenance fertilization program.

2. The Soils Report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified on the plan only when they exceed the specified minimums. Additional materials required by the Soils Report shall be paid for by Change Order.

3. Submit the name, address, and phone number of the consulting soil testing laboratory for approval to the Architect of Record prior to obtaining services.

1.05 SEQUENCING AND SCHEDULING

A. Do not install on-structure drainage materials or soil mix prior to acceptance of waterproofing and sprinkler irrigation in other sections.

1.06 SUBMITTALS

A. Product Data: Manufacturer's current catalog cuts and specifications of the following:

1. Fertilizer.
2. Approved organic amendment.
3. Peat moss.
4. Potting soil.

B. Quality Control Submittals:

1. Soils Test Lab:
   a. Soils Testing Laboratories:
      1. To be approved by the Owner.
      2. Lab must be capable of providing field observation and testing services as well as experience in landscape soils.
2. Test Reports:
   a. Organic Amendments: Test for physical and chemical properties.
   b. Imported Topsoil: Agricultural suitability tests.
   c. Stockpiled on Site Natural Topsoil.
      1. Agricultural suitability tests.
   d. Off-Site Imported Topsoil.
      1. Agricultural suitability tests.
   e. On-Site Earth Subsoil in Planted Areas.
      1. Agricultural suitability tests.
      2. Certificates: Contractor certifying strict compliance with accepted soil mixes and amendments including rate of application.

1.07 FIELD QUALITY CONTROL

A. Tests: Right is reserved to take soil mixes and prepared soil for testing for conformity to Specifications.

B. Rejected Materials: The contractor shall pay cost of testing of materials not meeting specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Stockpiled On-Site Native Topsoil:

1. Quantity: The approximate quantity of on-site stockpiled native soil will not be known until demolition and excavation for parking lots and building pads have been completed.

2. Topsoil shall have been stockpiled on the site under Site Earthwork section. Provide agricultural suitability test.

3. Amend topsoil per recommendation of soil test for the trees, shrubs, groundcover and perennials as noted on the drawings and for the lawns.

B. Off-Site Imported Topsoil:

1. Composition: Fertile, friable, well-drained soil, of uniform quality, free of stones over 1 in. diameter, sticks, oils, chemicals, plaster, concrete and other deleterious materials.

2. Analysis: Obtain an agricultural suitability analysis of the proposed topsoil from an approved Soils Testing Laboratory.

3. Test Results: Request soils laboratory to send one (1) copy of test results direct to the Landscape Architect and one (1) copy to the owner.

a. Imported topsoil shall be amended per soils test report for the trees, shrubs, groundcovers, and perennials, as noted on the drawings and for the lawns.

4. Samples: The Landscape Architect and owner reserves the right to take samples of the imported topsoil delivered to the site for conformance to the Specifications.

5. Rejected Topsoil: Immediately remove rejected topsoil off the site at Contractor's expense.

2.02 AMENDED TOPSOIL

A. Soil Amendments: incorporate thoroughly with top six (6) in. of lawn and planting areas per 1,000 square feet:

6 cu. yd. Approved Organic Amendment
30 lbs. 6-20-20 Commercial Fertilizer
50 lbs. Dololite Lime
10 lbs. Iron Sulfate

Intent: The above amendments and quantities are approximate and are for bidding purposes only Following an on-site topsoil analysis by Soils and Plant Laboratory, composition of amendments may change. Contract price will be adjusted accordingly.

B. ORGANIC AMENDMENT:

1. Type: As recommended by the soils laboratory.

2.03 BACKFILL MIX

A. Backfill mix shall be composed of approved topsoils amended and fertilized per the recommendations of the soils laboratory.

2.04 COMMERCIAL FERTILIZERS

A. Controlled Release Fertilizer:

1. Type: Osmocote 17-6-12 plus minors.

2.05 SUPPLEMENTAL CHEMICAL COMPONENTS

A. The following but not limited to chemical components may or may not be used depending on the outcome

of the soil agricultural suitability test.

B. Dolomite Lime: Agricultural grade mineral soil conditioner containing 35% minimum magnesium carb and 49% minimum calcium carbonate, 100% passing #65 sieve. "Kaiser Dolomite 65 AG" as manufactur by Kaiser, Inc. Mineral Products Department, or equal.

C. Iron Sulfate (Ferric or Ferrous): Supplied by a commercial fertilizer supplier, containing 20% Fe as ferro sulfate.

D. Single Superphosphate: Commercial product containing 20% to 25% available phosphoric acid.

E. Potassium Nitrate: Commercial product: 13-0-44.

F. Calcium Nitrate: Agricultural grade containing 15-1/2% nitrogen.

2.06 WATER

A. Water: Clean, fresh and potable. Furnished and paid for by Contractor. Transport as required.

2.07 POTTING SOIL

A. Well Drained: High organic soil approved by landscape architects.

PART 3 - EXECUTION

3.01 PREPARATION

A. Soil Moisture Content: Do not work soil when moisture content is so great that excessive compaction w occur, nor when it is so dry that dust will form in air or that clods will not break readily. Apply wat necessary, to bring soil to optimum moisture content for tilling and planting. Maintain within 2% abo below optimum moisture content at all times during the work.

B. Clearing of Debris: Clear all planting areas of stones 2 in. diameter and larger, weeds, debris and extraneous materials prior to amending existing soil and prior to spreading topsoil.

C. Preparation of Areas to Receive Topsoil:

1. Verifications: Verify that subgrades for installation of topsoil have been established.
2. Depth: Verify that subgrades are 6 in. minimum below finished grades, +/- 1 in., allowing for topso soil amendments.

3. Cultivation: Cross rip to 8" depth subgrade in planting areas prior to spreading topsoil.

3.02 INSTALLATION OF AMENDED TOPSOIL

A. Installation of Amended Topsoil:

1. Spreading of Topsoil:

a. Preparation: Do not commence spreading of topsoil prior to acceptance of soil preparation. Do place topsoil under muddy or frozen conditions. Do not spread topsoil until mitigation mea outlined in Section 02000 have been implemented as required.

b. Topsoil Depth: Minimum depth of 6 in. after natural settlement and light rolling conforming to finished grades shown on Drawings.
c. Installation of Topsoil:
   1. Install where shown on the Drawings.
   2. Place in 2 lifts of 3" per lift.
   3. First lift to be thoroughly mixed with subsoil by rototil, disc, or crossripping.
   4. Second lift to be placed on first and rototilled with amendments required by soils lab.

3.03 PREPARATION OF BACKFILL MIX

A. Backfill mix shall be composed of approved topsoils amended and fertilized per the recommendations of the Soils Report.

3.04 PREPARATION OF AMENDED TOPSOIL

A. Amend the topsoil as specified Part 2.02A materials-amended topsoil preparation.

3.05 APPLICATION OF PRE-EMERGENT HERBICIDE

A. Apply pre-emergent weed control to all areas to receive woody, non-lawn ornamental planting after incorporating soil amendments.

B. Apply strictly according to manufacturer's current printed specifications.

3.06 INSTALLATION OF BACKFILL MIX

A. Install where shown on the drawings and details and as specified under the Trees, Shrubs, Vines and Groundcover Section.

END OF SECTION

SECTION 02930

LAWNS AND SOD

PART 1 - GENERAL

1.01 DESCRIPTION

A. General: Provide lawns and sod in accordance with the contract documents.

B. Related Work Specified Elsewhere:

1. Section 02000-Special Conditions
2. Section 02810-Temporary Grassing & Erosion Control
3. Section 02920-Soil Preparation
4. Section 02930-Lawns and Sod
5. Section 02940-Landscape Planting
6. Section 02950-Trees, Shrubs, Vines & Groundcovers
7. Section 02960-Landscape Irrigation

1.02 REFERENCES

A. Hortus III - 1976 Edition, Bailey Horatorium, Cornell University.

B. Technical Association of the Pulp and Paper Industry for Wood Cellulose.

1.03 EXAMINATION OF SITE AND DOCUMENTS

A. By submitting a bid the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.

B. Plans, specifications, surveys, measurements, other documents and dimensions under which the work is to be performed are believed to be correct; but the Contractor shall have examined them for himself during the Bidding period, as no additional compensation will be made for errors for inaccuracies that may be found therein.

1.04 SUBMITTALS

A. Product Data: Manufacturer's current catalog cuts and specifications of the following:

1. Fertilizer
2. Mulch

B. Samples:

1. Mulch: Half a pound.
2. Soil Stabilizer: Half a pound.
3. Seed

4. Sod: Identify the improved cultivar proposed; submit descriptive literature for approval.

C. Certificates:

1. Certificates of inspection as required by law for transportation of each shipment of seed and sod along with invoice.

2. Seed mix certificate including fertilizer and rate of application.

1.05 FIELD QUALITY CONTROL

A. Tests: Samples of materials may be taken and tested for conformity to Specifications at any time.

B. Rejected Materials: Remove rejected materials immediately from the site at contractor's expense. Pay cost of testing of materials not meeting Specifications.

1.06 DELIVERY, STORAGE AND HANDLING

A. Seed:

1. Delivery: Furnish standard seed in unopened manufacturer's standard containers bearing quantity, analysis and name of manufacturer.

2. Storage: Store seed with protection from weather or other conditions, which would damage or impair the effectiveness of the product.

B. Sod:

1. Harvest and Delivery: Harvest from the source and deliver to project site within 24 hours. Deliver only as much sod as can be installed in 1 day's work.

2. Review: Sod not transplanted within this time period shall be reviewed prior to installation.

C. Mulch:

1. Labeling: Each package of the cellulose fiber shall be marked by the manufacturer to show the air-dry weight content.

2. Storage: Store seed with protection from weather or other conditions, which would damage or impair the effectiveness of the product.

1.07 PROJECT/SITE CONDITIONS

A. Existing Conditions: For protection of existing plants to remain, refer to Spec. Section-Trees, Shrubs, Vines and Groundcover.

1.08 SOIL FERTILITY AND AGRICULTURAL SUITABILITY ANALYSIS

A. Submittal:

1. After completion of rough grading and prior to soil preparation, the contractor shall obtain agronomic soils tests for planting areas. A minimum of one sample per two acres of planting and lawn areas shall be required and shall include a fertility and suitability analysis, PH and written recommendations for soil amendment, fertilizer, and chemical conditioner, application rates for soil preparation, auger hole requirements, and post-maintenance fertilization program.

2. The Soils Report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified on the plan only when they exceed the specified minimums. Additional materials required by the Soils Report shall be paid for by Change Order.

3. Submit the name, address, and phone number of the consulting soil testing laboratory for approval to the Architect of Record prior to obtaining services.

1.09 SEQUENCING AND SCHEDULING

A. Areas to Receive Hydroseeding: All graded, irrigation areas as delineated on the Drawings.

B. Period of Application of Hydroseeding:

1. Irrigated Areas: Within fourteen (14) calendar days after the completion of finish grading in any area.

C. Scheduling:

1. Hydroseeding: Perform on a section-by-section basis, upon approval of Landscape Architect, owner and immediately after finish grading and irrigation installation except for seasonal limitations.

a. Season: Plant in Fall or Spring.

1) Allow sufficient time for full germination and 2 mowings before preliminary acceptance.

2. Embankment and Slopes: Complete in a continuous manner.

1.10 WARRANTY

A. Time Period: Warrant that lawns and sod shall be in a healthy and flourishing condition of active growth one (1) year from Grand Opening.

B. Appearance During Warranty: Lawns and sod shall be free of dead or dying patches, and all areas shall show foliage of a normal density, size and color.

C. Delays: Delays caused by the Contractor in completing planting operations which extend the planting into more than one planting season shall extend the Warranty Period correspondingly.

D. Coverage: Warrant growth and coverage of hydroseeded planting to the effect that a minimum of 95% of the area planted shall be covered with specified planting after one growing season with no bare spots.

E. Exceptions: Contractor shall not be held responsible for failures due to neglect by owner, vandalism, etc., during Warranty Period. Report such conditions in writing.

PART 2 - PRODUCTS

2.01 MANUFACTURERS/GROWERS

A. Lawn Sod: Grower is contractor's option. Sod shall be a Bluegrass blend unless otherwise noted.

B. Mulch and Soil Stabilizer:

Supplier is Contractor's option.

C. Fertilizer:

1. Regular Type: Nitrogen content derived from organic sources; bearing manufacturer's statement of analysis. Minimum requirements: 12% nitrogen, 4% phosphoric acid, and 8% potash.

2. Slow-release Type: 50% of nitrogen is in slow-release form. Content derived from organic or inorganic sources; bearing manufacturer's statement of analysis. Minimum requirements: 12% nitrogen, 4% phosphoric acid, and 8% potash.

3. Commercial Mixed Type: Nitrogen content derived from organic or inorganic sources, bearing manufacturer's statement of analysis. Minimum requirements: 10% nitrogen, 10% phosphoric acid, 10% potash.

D. Lime: Ground limestone containing not less than 85% carbonates; 50% passing 100 mesh sieve and 90% passing 20 mesh sieve.

E. Annual Rye (Lolium Multiflorum) Seed: Fresh, clean seed testing 90% for purity and 70% for germination, 0.5 maximum weed content.

F. Kentucky Blue Grass Seed: Fresh, clean seed testing 85% for purity and 90% for germination, 0.25% maximum weed content.

G. Rebel II Fescue Seed: Fresh, Clean hulled, new seed crop; 85% minimum purity, 90% minimum germination, 0.25% maximum weed content.

H. Rebel Jr. Fescue Seed: Fresh, clean new seed crop, 85% minimum purity, 90% minimum germination, 0.25% weed seed.

1. Mowing Height: ¾" maximum

2. Thatch: ½" uncompressed

3. Inspected and free of diseases, nematodes, pests and pest larvae by an entomologist of the State Department of Agriculture.

4. Free of common Bermuda grass, quack grass, Johnson grass, poison ivy, nutsedge, nimblewill, Canadian thistle, bindweed, bent grass, wild garlic, ground ivy, perennial sorrel and broom grass.

5. Having not more than five jimsonweed, mustard, lambs' quarter, chickweed, cress or crabgrass per 100 sq. ft.

I. Red Fescue (Festuca Rubra Var.) Seed: Fresh, clean, new seed testing 90% for purity and 70% for germination.

J. Straw Bales: Clean bales of straw of hay, wheat, rye, oats or barley.

K. Hydromulch: Wood cellulose fiber containing no germination inhibiting or growth inhibiting agents. Characteristics shall be as follows:

1. Percent moisture content: 9.0% (+3.0%).

2. Percent organic matter: 99.2% (+0.8).

3. Percent ash content: 0.8% (+0.2%).

4. pH: 4.8 (+0.5).

5. Water Holding Capacity: 1,150 grams water/100 grams fiber, minimum.

L. Mulch: Clean, seed free stray of hay, wheat, rye, oats or barley.

M. Staking Pegs: 3/4" diameter by 8" long softwood.

N. Water: Clean, potable.

2.03 ACCESSORIES

A. Mulch: Shall be Product: "Silva Fiber", "X-100 Spra-mulch", or "Conwed".

1. Composition: Green-colored, fibrous, 100% virgin wood fiber mulch containing no growth or germination-inhibiting factors.

2. Weight: Weight specifications of this material from suppliers, and for all applications, shall refer only to air-dry weight of the fiber material. Absolute air-dry weight is based on the normal standards for wood cellulose and is considered equivalent to 10% moisture.

3. Dispersion in Slurry: Mulch shall be manufactured in such manner that after addition to and agitation in slurry tanks with fertilizer, seed, water and other approved additives, fibers in the material will become uniformly suspended to form a homogeneous slurry.

4. Absorption Capacity: When hydraulically sprayed on the ground, the material will form a blotter-like groundcover impregnated uniformly with seed, which will allow absorption of moisture and allow rainfall to percolate to the underlying soil.

2.04 HYDROSEED EQUIPMENT (if required)

A. Type: Commercial type hydro-seeder for the application of slurry. Equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend and homogeneously mix slurry.

B. Distribution Lines: Large enough to prevent stoppage and to provide even distribution of the slurry over the ground.

C. Pump Capacity: 150 psi at the nozzle.

D. Slurry-Tank: Minimum capacity of 1,000 gallons and shall be mounted on a traveling unit which will place the slurry tank and spray nozzles within sufficient proximity to the areas to be seeded.

2.05 MIXES

A. Hydroseeding Mix per (1,000 Sq. Ft.)

1. Lawn Areas:

30 lbs.-Mulch
7 lbs.-Lawn Seed
10 lbs.-Fertilizer

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Stones, Weeds, Debris: Verify that all areas to receive hydroseeding and sodding are clear of stones larger than ½" diameter, weeds, debris and other extraneous materials.

2. Grades: Verify that grades are within 1" plus or minus of the required finished grades. Verify that fertilization have been installed in another section. Report all variations in writing.

3.02 PREPARATION

A. Soil Moisture:

1. Excessive Moisture: Do not commence work of this section when soil moisture content is so great that excessive compaction will occur nor when it is so dry that dust will form in air or that clods will not break readily.

2. Inadequate Moisture: Apply water, as necessary, to bring soil moisture content to an acceptable level.

3.03 HYDROSEEDED LAWN

A. Preparation: Do all slurry preparation at the job site.

1. Water: Add water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, establish good re-circulation and add seed.

2. Seed: Do not allow seed to remain more than 30 min. in slurry.

3. Fertilizer: Add fertilizer, followed by the mulch. The mulch shall only be added to the mixture after the seed, and when the tank is at least 1/3 filled with water.

4. Mixing: Open the engine throttle to full speed when the tank is half-filled with water. Add all the mulch by the time the tank is 2/3 to 3/4 full. Commence spraying immediately when the tank is full.

B. Seed Bed Preparation:

1. Rolling: Roll amended soil with 200-pound water ballast roller and bring to finish grade.

2. Raking: Lightly rake seedbed surface to ¼" depth. Seed immediately thereafter, provided the seedbed has remained in friable condition.

C. Application

1. General: Apply specified slurry mix in a sweeping motion to form a uniform mat at the specified rate. Keep hydroseeding within designated areas and keep from contact with other plant materials.

2. Unused Mix: Do not use a slurry mixture, which has not been applied within 4 hours of mixing. Promptly remove from the site.

3. Protection: After application, do not operate any equipment over the hydroseeded areas.

4. Reseeding: Reseed all areas and parts of areas, which fail to show a uniform stand of lawn until all areas are covered with strands of lawn.

3.04 SODDED LAWN INSTALLATION

A. Sod Bed Preparation:

1. Rolling: Roll amended soil with 200-pound water ballast roller.

2. Moistening: After all unevenness in the soil surface has been corrected, lightly moisten the soil immediately prior to laying the sod.

3. Timing: Sod immediately thereafter, provided the sod bed has remained in friable condition.

B. Sodding Operations:

1. Starter Strip: Lay the first row of sod in a straight line, with subsequent rows parallel to and tightly against each other, with no spaces between strips. Stagger lateral joints. Do not stretch or overlap sod. Butt all joints tightly to eliminate all voids.

2. Cutting: Use a sharp knife to cut sod to fit curves and paving.

3. Tamping and Rolling: Thoroughly tamp and roll sod to make contact with sod bed. Roll each entire section of completed sod.

4. Watering: Thoroughly water sod immediately after installation to wet the underside of the new sod pad and the soil immediately below to a depth of 6".

5. Top-Dress Fertilizer: Apply at the rate of six (6) pounds per 1,000 sq. ft. at 25 days and at 50 days after sodding.

3.05 CLEANING

A. Hydroseed Overspray: Immediately after application, thoroughly wash off any plant materials, planting areas, or paved areas not intended to receive slurry mix.

B. Erosion: Immediately restore eroded areas. Keep all adjacent paved surfaces cleaned of dirt, mud or stains and organic debris.

END OF SECTION

SECTION 02940

LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 SCOPE

A. Work included: Labor, materials, tools, equipment, facilities, transportation and services necessary for and incidental to performing operations of work of this section, complete as shown on the drawings and specified herein. Work includes, but is not limited, to the following:

1. Finish grading of planting areas.
2. Providing and preparing soil and soil mixes per agronomic soil test recommendations.
3. Planting, including ground cover, trees, shrubs, seeded and sodded lawns.
4. Staking and guying.

B. Related work specified elsewhere includes but may not be limited to:

1. Section 02000-Special Conditions
2. Section 02810-Temporary Grassing and Erosion Control
3. Section 02920-Soil Preparation
4. Section 02930-Lawns and Sod
5. Section 02940-Landscape Planting
6. Section 02950-Trees, Shrubs, Vines and Groundcovers
7. Section 02960-Landscape Irrigation

1.02 QUALITY ASSURANCE AND REQUIREMENTS

A. Standards:

1. Provide plants and planting material meeting or exceeding specifications of Federal, State and County and municipal laws requiring inspection for plant disease and insect control.

2. Provide quality and size conforming with current edition of "Horticultural Standards" for nursery stock as adopted by the American Association of Nurserymen.

3. Provide plants, which are true to name. Tag one of each bundle or lot with the name and size of plants in accordance with standards of practice of the American Association of Nurserymen.

4. In all cases, botanical names shall take precedence over common names.

B. Workmanship: Perform work in accordance with the best standards of practice for landscape work and under the continual supervision of a competent foreman capable of interpreting the drawings and specifications.

C. Quantities and types: Furnish plants in the quantities and/or spacing as shown or noted for each location, and of the species kinds and sizes described in the "List of Plant Materials", or as indicated on the drawings.

D. Verification of dimensions and quantities: Scaled dimensions are approximate. Before proceeding with any work, carefully check and verify dimensions and quantities and immediately inform the Architect of Record of any discrepancy between the drawings and/or specifications and actual conditions. No work shall be done in any area where there is any such discrepancy until approval has been given by the Architect of Record.

E. Submit documentation to Architect of Record within 25 days after award of contract that plant material is available. Any and all substitutions due to unavailability must be requested in writing prior to confirmation of ordering.

F. Plants shall be subject to review and approval of Architect of Record at place of growth or upon delivery for conformity to specifications. Such approval shall not impair the right of review and rejections during progress of the work. Submit written request for review of plant material at place of growth to Architect of Record. Written request shall state the place of growth and quantify of plants to be reviewed. Architect of Record reserves the right to refuse review at this time if, in his judgment, sufficient quantity of plants is not available for review. Review shall be for character and form.

G. The Contractor shall submit specifications of any item being used on-site upon the request of the Architect of Record.

1.03 SOIL FERTILITY AND AGRICULTURAL SUITABILITY ANALYSIS

A. Submittal:

1. After completion of rough grading and prior to soil preparation, the contractor shall obtain agronomic soils tests for planting areas. A minimum of one sample per two acres of planting and lawn areas shall be required and shall include a fertility and suitability analysis with, PH and written recommendations for soil amendment, fertilizer, and chemical conditioner, application rates for soil preparation, auger hole requirements, and post-maintenance fertilization program.

2. The Soils Report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified on the plans only when they exceed the specified minimums. Additional materials required by the Soils Report shall be paid for by Change Order.

3. Submit the name, address, and phone number of the consulting soil testing laboratory for approval to the Architect of Record prior to obtaining services.

B. Certification: Provide a certificate with each delivery of bulk material, stating the source, quantity, and type of material, and stating that the material conforms with the specified requirements:

1. For bulk delivered organic fertilizer, show on the certificate the volume, net weight, and percentages of nitrogen, phosphorus and potassium.

2. For other fertilizers and soil conditions in containers, show on the certificate the total quantities by weight and volume for each material. The Architect of Record reserves the right to take and analyze samples of materials for conformity to specifications. Furnish samples upon request of the Architect of Record.

3. Samples: In addition to other Samples which may be required by the Architect of Record, submit samples of each of the specified fertilizers, mulch and soil conditioners.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Deliver plants with legible identification labels.

2. Protect plants and/or sod from drying out and from contamination.

3. Deliver fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trademark, and conformance to state law.

B. Storage:

1. Maintain and protect plants yet to be planted in a healthy vigorous condition.

2. Heel-in bare root and balled plant material with damp soil to protect from sun and wind.

C. Handling:

1. Do not drop plant materials.

2. Do not pick up container plant material by stems or trunks.

1.05 WARRANTY AND REPLACEMENT

A. General:

1. Warrant shrubs and ground cover to grow and be healthy for a period of one year after final acceptance.

2. Warrant trees to live and grow in an acceptable uprights position for a period of 1 year after final acceptance.

B. Replacements: Any materials found to be dead, missing, or in poor condition during the maintenance period shall be replaced immediately. The Owner shall be the sole judge as to the condition of material. Material to be replaced within the guarantee period shall be replaced by the contractor within 15 days after written notification by the Owner may at his discretion extend the warranty period if he determines the above as a detrimental effect on the project.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Existing soil on the site may be used as topsoil for planting purposes insofar as possible, but shall be free of debris, oil, weeds or other foreign matter and amended in accordance with our agricultural suitability test. Contaminated soil shall be removed and replaced with acceptable existing soil or imported soil.

B. Imported topsoil, if indicated on plans, shall be sandy textured. Silt plus clay content of this soil shall not be greater than 12% by weight. All topsoil shall meet the NJDOT Standard Specifications as outlined in Division 909.10 of the NJDOT Standard Specifications and shall not have a PH value less than 5.0. In order to insure conformance, samples of the imported soil shall be submitted to an approved soil testing lab, or the County Extension Office, for analysis prior to use. Results of testing shall be delivered to the Architect of Record and owner for approval.

C. Light Weight Soil: Soil Mix #76 in all on-structure planters, available from B.D. White, Inc.

2.02 FERTILIZERS AND SOIL CONDITIONERS

A. Organic Amendment: Nitrolized-mineralized redwood shaving (.5% actual nitrogen) or Nitrolized-mineralized fir shaving. (8% actual nitrogen) or Nitrolized-mineralized fir bark (1% actual nitrogen). It shall be fine textured, having actual minimum 80% passing #8 screen and minimum 95% passing #4 screen. Salinity shall not be higher than 3.5 millimeters per centimeter at 25° C as measured by saturation extract conductivity.

B. Commercial Fertilizer: An approved standard brand conforming with pertinent State fertilizer laws, uniform in composition, dry and free flowing. Provide the percentages by weight as noted in 3.04 of these specifications.

1. Agricultural gypsum: Containing 98% minimum calcium sulphate, expressed as elemental.

2. Soil Sulfur: Agricultural grade containing a minimum of 99% sulfur.

3. Iron Sulfate: 20% iron derived from ferric and ferrous sulfate, 10% sulfur, expressed as elemental.

4. Calcium Carbonate: 95% lime as derived from oyster shells.

C. Planting Tablets: 12-month release, 20-10-5 Booster Packs as manufactured by RTI, (800) 784-4769. Apply per manufacturer's instructions.

D. Planting mix additive: "Mycor Tree Saver", Mycorrhizal Fungal Transplant inoculant: Packs as manufactured by Plant Health Care,Inc. (800) 421-9051.

E. Planting Mix Additive: Terra-Sorb Hydrogel. Packs as manufactured by Plant Health Care, Inc. (800) 421-9051. Apply only when "Mycor Tree Saver" not utilized.

2.03 PLANT MATERIALS

A. Plants shall be vigorous, of normal growth, free from disease, insects, insect eggs and larvae. Plants shall equal or exceed the measurements specified in plant list. The Architect of Record is the sole judge as to acceptability.

B. No container plants that have cracked or broken root balls when taken from containers will be accepted.

C. Plants shall have been grown under climatic conditions comparable to those of the project site, unless otherwise specifically approved by the Architect of Record.

D. Nomenclature conforms to customary nursery usage; for clarification, the term "multi-trunk" defines a plant having three or more trunks of nearly equal diameter.

E. Seeds are to be fresh, clean, new crop seed composed of the varieties, mixed in proportions and testing minimum percentage of purity and germination as indicated herein.

F. Sod is to be machine cut at a uniform thickness of 3/4" within a tolerance of 1/4", excluding top and growth and thatch. Each individual sod piece shall be strong enough to support its own weight when lifted by the ends. Broken pads, irregularly shaped pieces, and torn or uneven ends will be rejected.

G. Substitute plant material will not be permitted unless specifically approved in writing by the Architect of Record.

2.04 INERT GROUNDCOVER MATERIALS

A. Shredded bark mulch.

1. Shall be doubled shredded wood and bark residual from natural resources.

2. Grading:

Sieve Size	Percent Passing
1"	95%
3/8"	50%
6 mesh	25%

3. Shall be acid in relation with PH percent based on dry weight.

4. Ash content shall not exceed 7% based on dry weight.

5. Moisture shall vary from 12% to 35% based on fresh material.

6. Shall be free of soluble salts such that the saturation extract conductivity shall not exceed 1.5.

7. Shall be free of leaves, young green growth branches, twigs greater in diameter of ½" Ø, weeds, shaving or foreign material such as stones.

2.05 GUYING AND STAKING MATERIALS

A. Wood Tree Stakes: Pressure-treated pine, 2" x 2" diameter, and 6' long for deciduous and 2" x 3" x 30" for evergreens.

B. Ties: "Wonder-Tree Ties" or ½" new rubber wire hose with 10 gauge or approved equal.

C. Steel Guy Anchor: 3/4" diameter x 36" steel vane.

D. Guying Hardware:

1. Wire: Pliable 3/32" galvanized braided cable.

2. Wire Guard: 3/8" diameter white PVC tubing, full length of wire.

3. Turnbuckles: Galvanized, or dip-painted, ½" x 6" long.

4. Cable Clamps: Galvanized, size as required.

2.06 DRAINAGE MATERIAL (CRUSHED ROCK)

A. 3/8" crushed rock – 95-100% passing through a 3/8" screen; 0-5% passing through No. 8 mesh; 80-100% per cubic yard.

2.07 OTHER MATERIALS

A. Materials not specifically described but required for a complete and proper installation shall be as selected by the Contractor subject to the approval of the Architect of Record.

PART 3 - EXECUTION

3.01 SUBSURFACE CONDITIONS AND PROTECTION OF PROPERTY

A. Prior to excavation for planting or placing of stakes, locate electrical cables, conduits and utility lines so that proper precautions may be taken not to damage such improvements. In the event of a conflict between such lines and plant location, promptly notify the Architect of Record, who shall arrange for relocation of one or other. Failure to follow this procedure places upon the Contractor the responsibility to repair damages at his own expense, which result from such work.

B. Prior to planting, remove weeds, rocks, and debris.

C. If the contractor is unable to dig plant pits to a depth that will provide 24" of soil beneath rootball, contact Architect of Record and Civil Engineer immediately.

3.02 SOIL PREPARATION

A. Soil Tilling: Cross rip planting areas to a depth of 9" to 12".

B. Uniformly broadcast and thoroughly incorporate the soil preparation mix as indicated below or on the plans to a depth of 6" by mechanical tiller or similar means.

C. Soil Prep Mix: Per 1,000 sq. ft. (or as per soil suitability test)

1. Nitrogen stabilized organic amendment: 4 cu. yd.

2. Planting fertilizer: 150 lbs. 5-3-1 Gro-Power.

3. Agricultural Gypsum: 25 lbs./cu. yd.

4. Soil Sulphur: 25 lbs.

5. "Mycor Tree & Plant Saver" as per manufacturer

D. Pre-Plant Weed Control:

1. If live perennial weeds exist on-site at the beginning of work, spray with a non-selective systemic contact herbicide, as recommended and applied by an approved licensed landscape pest control advisor and applicator. Leave sprayed plants intact for at least 15 days to allow systemic kill or as directed by advisor.

2. Maintain site weed free until final acceptance by Owner utilizing mechanical, manual and/or chemical treatment.

3.03 GRADING

A. Where any portion of the irrigation system is installed after grading and the fertilizing has been performed, refill and re-fertilize the upper portion of the backfill in accordance with the provisions of this section.

B. Fine grading: Upon completion of rough and finish grading, perform required fine grading of planting areas.

1. Do not work the soil when moisture content is so great that excessive compaction will occur, nor when soil is so dry that clods will not break readily.

2. Apply water, if necessary, to provide ideal content for tilling and for planting.

3. Grade so as to anticipate the finished grade:

   a. Remove or redistribute excess soil before the application of fertilizer and mulch.
   b. Where soil is to be replaced by plants and mulch, make allowance to prevent deficiency in the depth of mulch when final grading is completed.

4. Before and during preliminary fine grading, dig out and remove weeds and grasses. Dispose of off-site.

C. Grades and elevations: When fine grading is completed including weeding and fertilizing, and the soil has dried sufficiently to be readily worked, grade the lawn and planting areas to the elevations shown on the drawing:

1. Where grades are not otherwise indicated, provide uniform levels or slopes between points where elevations are given.

2. Make minor adjustments of grade where so directed by the Architect of Record.

3. Provide finished grades which are even, uniform and without abrupt change of surface.

4. Slope soil away from structures to allow natural runoff of water, remodeling surfaces as required to do so. Grade low spots and pockets when soil is at optimum moisture content for working, provide for positive drainage.

5. Provide final finished grades in planting areas 1-1/2" below paving and curbs or as shown on the drawing.

6. Remove soil generated by excavations to an approved off-site location, unless utilized to obtain desired grade.

3.04 PLANT PIT AND BACKFILL SOIL

A. Excavate plant pits for container plants with vertical sides and roughened surfaces, and shall be the size noted on drawings.

B. Backfill soil mix per cubic yard of soil:

1. 6 parts on-site soil.

2. 4 parts nitrogen stabilized organic amendment.

3. 15 lbs. "Gro-Power".

4. 2 lbs. iron sulfate; 10 lbs. agricultural Gypsum.

5. Terra-Sorb Hydrogel or "Mycor Tree & Plant Saver" as per manufacturer's specifications.

C. Thoroughly mix materials to the bottom of the pit so that they are evenly distributed and without clods or lumps. Compact to 90%.

D. Position the plant in the hole and backfill no higher than halfway up the root ball. Place the recommended number of plant tablets evenly around the perimeter of, and immediately adjacent to the root ball at a depth, which is between the middle and the bottom of the root ball. Complete the backfilling, tamp and water.

3.05 PLANTING TREES, SHRUBS, GROUNDCOVER, AND VINES

A. General:

1. Prior to planting, provide one percolation test per 6,000 sq. ft. Fill a 24" ∅ size hole with water. If it does not completely drain within 24 hours, notify Architect of Record. The test shall be done with the supervision of the site superintendent.

2. Plant nursery stock immediately upon delivery to the site and approval by the Architect of Record.

3. Do not plant until irrigation system installation is complete and until final grades are established and approved.

4. Plant locations shown on the drawings are tentative and subject to minor modification in the field as directed by the Architect of Record. Make such modifications at no additional cost to Owner.

5. Set plants so that when settled they will bear the same relation to the natural grade in the container.

B. Planting Trees:

1. Dig tree holes with vertical walls and level bottoms, making the hole twice the diameter of the root ball and 1-1/2 times the depth of the root ball for trees up to and including 24" ball. For trees with a 36" ∅ root ball and larger dig holes twice the diameter of the root ball and 12" deeper than the root ball depth. Loosen the soil at side and bottoms.

2. Backfill the hole with the specified mix, compacting as required, to the bottom of the boxed soil; insert the tree to the required grade; and backfill around sides with the specified mix.

C. Planting Shrubs and Groundcover:

1. Plant shrubs in pits at least twice the diameter of the root ball and at least twice the depth of the root ball.

2. Loosen the compacted soil at bottom pits, and fill with the specified mix, to the bottom of the ball and compact.

3. Set the plant and backfill to the required grade with the specified mix, thoroughly tamping and watering.

4. Prepare depressed water basin as wide as plant root balls at each plant. Water thoroughly, backfilling voids with the prepared mix.

5. Plant groundcover in pits at least 4" x 4" x 4". Moisten the areas prior to planting, and do not plant in dry soil. Set plants in center of pits so that crown of plant will be level with finished grade after settling of soil, then backfill and water. Groundcover shall be planted in straight rows and evenly spaced. Plant at intervals noted on drawings. Triangular spacing shall be used unless noted otherwise on drawings.

6. Mulch Cover: All groundcover, perennial and annual beds shall be top dressed with 3" layer of mulch.

D. Watering basin: Construct a mound of soil around each tree and plant to form a watering basin, placed at the edge and following the shape of the root ball:

1. Make basin berms for trees, shrubs and vines from 5 gal. and larger containers at least 4" high. Unless otherwise directed, make other mounds at least 2" high.

2. On slopes, construct half-mounds on the lower side if full mounds are not practical.

3. After watering, refill settlement within the basins to the required grade, using the specified mix and recovering the surface with the specified mulch.

4. Watering basins in shrub areas shall be planted with groundcover in normal pattern.

5. If soil settling occurs, bring plants back up to grade of adjacent planting areas.

3.06 PLANTING LAWNS

A. General:

1. Prepare the areas as previously specified, then rake and roll to a smooth, form surface with uniform grade.

2. Secure the Project Manager approval of prepared areas prior to planting. Plant sod as indicated on drawings.

B. Placing Sod:

1. Place sod a maximum of 36 hours after initial harvesting. Thoroughly moisten areas to be sodded immediately prior to placing sod.

2. Start watering immediately after completing each day's sodding. Apply water at a rate sufficient to ensure thorough wetting of soil to a minimum depth of 4".

3.07 WATERING

A. Immediately after planting, apply water to each tree, vine and shrub by means of a hose in the planting basins until the material above the roots is completely saturated from the bottom to the top.

B. Provide thorough watering of ground cover by means of the irrigation system within one hour after ground cover planting.

C. Apply water in such quantities, and at such intervals, as required to keep the ground moist at all times will below the root system of grass and other planting.

D. Provide hose watering for plants, which cannot be efficiently watered with the irrigation system.

3.08 STAKING TREES

A. Remove nursery stakes and stake immediately after planting.

B. Where trees are not to be guyed at time of planting, stake such trees by placing stake in the prepared hole and driving minimum 2" x 2" pressure-treated wood stake 24" into solid ground.

C. Place the stake as close to the tree as possible without crowding or injuring the roots.

D. The trunk shall be secured to stakes with ties just below the head of the tree. "Wonder Tree-Ties" shall be secured in accordance with manufacturer's specifications.

E. All stakes and guying shall be removed one year after installation.

3.09 GUYING TREES

A. Remove nursery stakes or bracing and guy immediately after planting.

B. Set three wire guys, equally spaced, around the tree and attach to the tree trunk or main branching using 3/32" braided cable and ½" X 36" long PVC tubing.

C. Anchor guys to 2" X 3" X 30" pressure-treated stakes driven a minimum of 24" into solid ground.

D. All guys shall be removed one year after installation.

3.10 PRUNING

A. At no time shall trees or plant materials be pruned, trimmed or topped prior to delivery, and any alteration of their shape shall be conducted only with approval and when in the presence of the Architect of Record.

3.11 CLEANUP

A. After planting operations have been completed, remove trash, excess soil, empty plant containers and rubbish from the property. Scars, ruts, or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site.

B. Leave the site broom-clean and wash down paved areas within the contract area, leaving the premises in a clean condition. Walks shall be left in a clean and safe condition.

3.12 OBSERVATION SCHEDULE

A. Notify the Landscape Architect seven (7) days in advance for the following site visits:

1. Pre-job conference.
2. Final grade review.
3. Plant material review.
4. Plant layout review.
5. Soil preparation and planting operations. One tree with each type of specified staking shall be approved prior to planting of trees.
6. Pre-maintenance.
7. Final walk-through.

B. When observations are conducted by someone other than the Architect of Record, the contractor shall show evidence in writing of when and by whom these inspections were made.

C. No site visits shall commence without items noted in previous observation reports either completed or remedied unless such compliance has been waived by the Owner. Failure to accomplish punch list tasks or prepare adequately for desired inspections shall make the contractor responsible for reimbursing the Architect of Record at the current billing rates per hour plus transportation costs. No further inspections shall be scheduled until this charge has been paid and received.

3.13 GUARANTEE

A. The Contractor, in protecting his own interests, is obligated to periodically check work areas during his guarantee period to insure proper maintenance procedures are being implemented.

B. In case of negligent or improper maintenance, the contractor shall state in writing within seven (7) days to the Owner his observations and recommendations. Any claims not in writing will not be considered.

C. All cuttings, seed, and container plants up to and including 15 gallon size shall be guaranteed by the contractor as to growth and health for a period of one year after final acceptance by Owner.

D. Guarantee all B&B materials including trees to "live and grow" in an "acceptable, upright position": for a period of 1 year after final acceptance by Owner without definition. Definition of "live and grow" and "acceptable, upright position" shall mean that the tree must, during the guarantee period, sustain a healthy, vigorous appearance. It shall not defoliate more than 30% nor shall 30% of the foliage be dried and unhealthy appearance. If the tree, during the guarantee period does not sustain this specified appearance, it shall be removed and replaced by the contractor without cost to the Owner. Any damage caused by the replacement operation such as, a contiguous planting, structure, lighting or sprinklers shall be repaired by the contractor without cost to the owner.

E. Within 15 days of written notification by Owner, remove and replace guaranteed plant materials, which for any reason fail to meet the requirements of the guarantee. Replacement shall be made with plant materials originally specified and shall meet original guarantees.

END OF SECTION

SECTION 02950

TREES, SHRUBS, VINES AND GROUNDCOVER

PART 1 - GENERAL

1.01 DESCRIPTION

A. General: Provide trees, shrubs, vines and groundcover in accordance with the contract documents.

1.02 REFERENCES

A. "American Standard for Nursery Stock", 1990 Edition, American Association of Nurserymen, Inc.

B. Hortus III-1976 Edition. Bailey Horatorium, Cornell University.

1.03 EXAMINATION OF SITE AND DOCUMENTS

A. By submitting a bid the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.

B. Plans, specifications, surveys, measurements, other documents and dimensions under which the work is to be performed are believed to be correct; but the Contractor shall have examined them for himself during the Bidding period, as no additional compensation will be made for errors or inaccuracies that may be found therein.

1.04 SUBMITTALS

A. Product Data: Manufacturer's current catalog cuts and specifications of the following:

1. Mulch and fertilizer tablets.

2. Anti-desiccant.

3. Hydrogel Polymer and Mycorrhizal Inoculant.

B. Drawings: Locations of fencing at drip lines of existing trees and plants to remain.

C. Samples:

1. Tree and Shrub Planting Fertilizer: Four (4) tablets each.

2. Mulch: One (1) pint.

3. Wrapping Material: Twelve (12) in. length.

4. Hydrogel Polymer & Mycorrhizal Inoculant.

D. Certificates of Inspection: As required by law for transportation of each shipment of plants along with invoice.

1.05 PLANT MATERIAL FIELD REVIEW PROCEDURE

A. Review: Submit a written request for review of plant materials and quantity at place of growth within
(30) days after award of contract). Right is reserved to refuse review at this time if, in the judgment of
landscape architect, an insufficient quantity of plants is available for review.

B. Transportation: Contractor shall accompany Landscape Architect to all review(s) of plant materials at
nursery. Landscape Architect will review and tag plants at place of growth and review them upon de
for conformity to specifications.

C. Distant Material: Submit photographs with a person adjacent to each plant type for preliminary rev
Such review shall not impair the right of a growing grounds review and rejection during progress
work.

D. Unavailable Material: If proof is submitted that a specified plant is not obtainable, a proposal w
considered for use of the nearest equivalent size or variety with corresponding adjustment of Contract pri
Substantiate such proof in writing no later than 30 days after award of contract.

E. Special Conditions: The above provisions shall not relieve Contractor of the responsibility of obta
specified materials in advance if special growing conditions or other arrangements must be made in or
to supply specified materials.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Do not deliver to the site disease-infected plant materials.

B. Labeling: Furnish standard products in manufacturer's standard containers bearing original labels le
showing quantity, analysis, genus/species and name of manufacturer/grower.

C. Storage: Protect metal containers from sun during summer months with temperatures above 80° F.
plants that cannot be planted immediately upon delivery in the shade, well-protected and well-watered.
in and protect with burlap all B & B plant materials, which cannot immediately be planted upon delive

D. Handling: Do not lift or handle container and B & B plants by tops, stems, or trunks at any time. D
bind or handle plants with wire or rope at any time.

E. Anti-Desiccant: At Contractor's option, immediately before transporting, spay evergreen or deciduous
materials in full leaf with anti-desiccant. Apply an adequate film over trunks, branches, twigs and fo

F. Digging: Dig B & B plants with firm, natural balls of earth of diameter not less than that recommend
American Association of Nurserymens Standard for Nursery Stock, and of sufficient depth to include
fibrous and feeding roots.

1.07 PROJECT/SITE CONDITIONS

A. Protection of Existing Plants to Remain:

1. Operations: Do not store materials of equipment, permit burning, or operate or park equipment under the branches of all existing plants to remain.

2. Barriers: Provide temporary fences at the drip line to protect existing plants to remain from damage during construction.

3. Notification: Give immediate written notification if other construction activities threaten to damage existing plants to remain.

B. Replacement of Damaged Plants:

1. Replace existing plants to remain, which are damaged by Contractor during construction with accepted plants of the same species; replacement size to be determined by Landscape Architect; cost of replacement shall be at no additional cost to Owner.

2. Landscape Architect will determine extent of damage and value of damage plants.

1.08 PLANTING SEASON

A. Contractor to use discretion based on current weather conditions.

B. Deciduous Trees and Shrubs: In the fall after leaf drop occurs but before soil freezes, in the spring before growth begins.

C. Evergreen Trees, Shrubs and Vines: Early Fall or late spring.

1.09 SEQUENCING AND SCHEDULING

A. Acceptance: Do not install plant materials prior to acceptance of finish grades and/installation of irrigation system.

B. Coordination: Coordinate with work of other sections to insure the following sequence of events:

1. General: Sprinkler system to be installed and operable prior to installation of plant materials.

2. Trees in Paving: As necessary, install prior to pouring of paving under another section. See Drawings.

3. Pruning: Do not prune materials prior to installation and acceptance. Request review by Landscape Architect prior to pruning.

1.10 WARRANTY

A. Correct Species: Warrant that all plant materials are true to species and variety.

B. Vigor: Warrant that all trees, shrubs, vines and groundcover planted under this Contract will be healthy an in flourishing condition of active growth one (1) year from date of final acceptance.

C. Delays: Delays caused by the Contractor in completing planting into more than one planting season sha extend the Warranty Period correspondingly.

D. Conditions of Plants: Plants shall be free of dead or dying branches and branch tips, with foliage of norm density, size and color.

E. Replacements: As soon as weather conditions permit, replace, without cost to Owner all dead plants and a plants not in a vigorous, thriving condition, as determined by Landscape Architect during Warranty Perio

F. Exclusions: Contractor shall not be held responsible for failures due to neglect by Owner, vandalism, an acts of God, during Warranty Period. Report such conditions.

G. Dormancy Extension: Only the period of active growth shall be counted in measuring the duration of th Warranty Period. All plant materials installed just prior to or during their dormancy period shall have th Warranty Period extended accordingly. Time of onset of dormancy and resumption of active growth s be as set by the Landscape Architect in accordance with regional and species-specific requirements.

1.11 REPLACEMENTS

A. Failed Materials:

1. Plant materials exhibiting conditions, which are determined as unacceptable due to workmanship by Contractor shall be repaired and/or replaced at no additional cost to the Owner.

2. Replacements to be same species. Apply requirements of this Specification to replacements.

3. Contractor shall be held responsible for a maximum of two (2) replacements for each failed tree, sh and vine, and same area of groundcover planting after final acceptance during warranty period.

B. Incorrect Materials:

1. During Warranty Period. replace at no additional cost to Owner plants revealed as being untrue to nam and species.

2. Provide replacements of a size and quality to match the planted materials at the time the mistake discovered.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plant Materials: Verify that all container stock has been grown in the containers in which delivered for least 1 growing season, but not over two (2) years.

1. Growing Conditions: Plants shall be nursery-grown in accordance with good horticultural practices under climatic conditions similar to those of the project unless otherwise specifically authorized.

2. Appearance: Trees shall be exceptionally heavy, symmetrical, tightly knit and so trained or favored in development and appearance as to be superior in form for their species, with regard to number of branches, compactness and symmetry.

3. Vigor: Plants shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs, or larvae. They shall have healthy, well-developed root systems and shall be free from physical damage or adverse conditions, which would prevent thriving growth.

B. Condition of Root system: Samples must prove to be completely free of circling, kinked or girdling trunk surface and center roots and show no evidence of a pot-bound condition.

C. Measurements:

1. General: Measure plants when branches are in their normal upright position. Height and spread dimensions specified refer to main body of plant and not branch tip to tip. Take caliper measurement at a point on the trunk 6" above natural ground line for trees up to 4 in caliper (and at a point 12" above the natural ground line for trees over 4" in caliper).

Size Range: If a range of size is given, do not use plant materials less than the minimum size. Not less than 40% of the plants shall be as large as the minimum size acceptable and are the measurements after pruning, where pruning is required. Plants that meet the measurements specified, but do not possess a normal balance between height and spread shall be rejected.

3. Substitutions: Substituted plants shall be true to species and variety and shall conform to measurements specified except that plants larger may be used if accepted. Use of such plants shall not increase Contract price. If larger plants are accepted, increase the ball of earth in proportion to the size of the plant. Plants overgrown for their container size will be rejected.

D. Unacceptable Trees: Trees, which have damaged or crooked leaders, will be rejected. Trees having a main leader shall not have been headed back. Trees with abrasions of the bark, sunscalds, disfiguring knots, or fresh cuts of limbs over ¾" which have not completely callused, will be rejected.

E. Pruning: Do not prune plants before delivery. Consult Landscape Architect for pruning after installation.

F. Field Dug Stock: Prior to digging of field grown plant materials, insure that excess loose fill resulting from cultivation around stems and over roots be removed down to natural finish grade at crown of plant materials. During digging, verify that size of vernier shovel or other equipment is adequate to encompass the actively-growing root zone of all plants. Plants which, after digging show mostly large fleshy roots and few fibrous rots will be rejected.

2.02 FERTILIZERS & SOIL AMENDMENTS

A. Slow-Release Fertilizer Tablets for Plant Pits:

1. Slow-release Fertilizer Tablet: "Agriform" 21 gram tablets with 20-10-5 (N-P-K) by Sierra Chem Co.

B. Top-Dress Fertilizer for Groundcover Planting:

1. Top-dress Fertilizer: Osmocote as specified in soil preparation section.

C. "Mycor Tree & Plant Saver" by Plant Health Care, Inc.
3 ounces/1'-0" root ball diameter.

2.03 BACKFILL MIX

A. Backfill Mix:

1. Backfill mix shall be amended topsoil per recommendation of soil test report. See Section 02920 - So Preparation.

2. "Terra-Sorb" Hydrogel Polymer or "Mycor Tree and Plant Saver" as manufactured by Plant Health Car Inc.

2.04 ACCESSORIES

A. Tree Staking & Guying: As shown on drawings and as specified below.

1. Wood Ground Anchors: 2" X 3" X 30" pressure-treated wood detailed.

2. Wood Tree Stakes: Pressure treated wood as detailed. 2" x 2" x 72" or as required.

3. Guying Wire: 10 Gauge galvanizes steel cable, size as specified.

4. "Wonder-Tree Ties" – Spring action, self adjusting restraints.

5. Turnbuckles Hot Dipped Galvanized ½" x 6" long, self-adjusting tree tuys.

6. Guy Covers: 3/8" diameter x full length white PVC tubing. (Provide for all guyed installations

7. Rubberhose: Two ply fiber bearing garden hose. The hose color shall be black.

8. Cable Clamps: Galvanized, size as required.

B. Mulch:

1. Type: Doubled shredded composted pine, fir or hardwood bark free of stubs, dirt, dust and other debr

2. Size: The mulch shall be shredded fiberous material with no chips or pieces of mulch of a chun present.

3. Free of leaves, green growth and foreign materials (i.e. stones).

C. Water:

1. Clean, fresh and potable, furnished and paid for by Contractor.

2. Transport as required.

E. Anti-Desiccant:

1. Type: Sprayable, water soluble vinyl-vinyledine complex which will produce a moisture retarding barrier not removable by rain or snow.

2. Product: "Wilt-Pruf NCF" by Nursery Specialty Products, Inc.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
Soil Preparation: Do not commence planting work prior to completion and acceptance of soil preparation.

2. Finish Grades: Finish grades for planting areas shall have been established in another section. Verify that all grades are within 1" plus or minus of required finish grade and that all soil amendments have been installed as specified under Section on Soil Preparation.

3. Irrigation: Verify that irrigation system has been installed and accepted.

3.02 PREPARATION

A. Layout and Staking: Lay out plants at locations shown on Drawings. Use 3' lath, color-coded for each species of plant material. Stake each tree, and major shrub. Outline shrub and groundcover beds with lime.

B. Review: Locations of plants will be checked in the field and will be adjusted to exact position before planting begins. Right is reserved to refuse review at this time if, in the Landscape Architect's opinion, an insufficient quantity of plants is available.

C. Equipment for Digging Plant Pits: Use backhoe to dig plant pits. Scarify all sides of the tree pit after excavation- see below. Do not use an augur or vernier spade.

D. Plant Pits: Excavate square plant pits as follows:

	Width	Depth
Trees	Rootball + 24"	Rootball + 6"
Shrubs	Rootball + 12"	Rootball + 6"
Groundcover Beds	As Required	6"

3.03 DRAINAGE TEST OF PLANT FOR TREE AND SHRUB PITS/OBSTRUCTIONS

A. Testing: Immediately after completion of excavation, test drainage of all tree pits and 4 representative shrub pits plant pits by filling with water twice in succession. Give written notification of conditions permitting the retention of water in plant pits for more than twenty-four (24) hours.

B. Correction: Submit for acceptance a written proposal and cost estimate for the correction of poor drainage conditions before proceeding with planting.

C. Obstructions: If rock, underground construction work, tree roots or other obstructions are encountered the excavation of plant pits, acceptable alternate locations may be used at direction of Landscape Arch

D. For Trees and Shrub Plant Pit:

1. Location: At locations as determined by the Landscape Architect on site.

2. Restrictions: Do not perform test on a rainy day or during freezing weather. Repeat all tests interr by rain or cold.

3. Procedure:

Dig test pit of a size specified for the tree pits, a minimum of 24" deep for shrub pits and 4' deep for tr pits. Legibly calibrate a stake at 1" intervals and drive it firmly into the undisturbed soil at the bott of the pit.

b. Fill test pit with water to within 1' of the finish grade. Immediately record water level on the stak

c. After 3 hours, record water level again. Repeat recording of water level once each hour for t succeeding 5 hours.

4. Documentation: Submit written documentation of all test pit results, dated and signed by the test

5. Rates:

a. Acceptable Rate: 2"/hour or more

b. Marginal Rate: 1" to 2"/hour

c. Unacceptable Rate: 1"/hour or less

3.04 TREE, SHRUB AND VINE PLANTING

A. Handling and De-Potting of Plant Materials:

1. Damage: Avoid damage to containers and wrappings and rootballs. If rootball is cracked or brok during handling and de-potting, plant will be rejected.

2. Canned Trees and Shrubs: Metal Containers: Cut can on two sides with accepted cutting tool. Do n use spade. Plastic Containers: Tip container to horizontal orientation and shake carefully to re shrub. Support rootball during installation to prevent cracking or shredding of soil.

3. Boxed Trees: Lift from bottom with forklift or from sides with 2" x 4" rails nailed to each side box. Do not remove box prior to settling tree in plant pit. Remove sides of box after acceptan Landscape Architect and prior to backfilling. Bottom of box may be left in place.

4. Balled and Burlapped Plants: Lift and carry bottom of ball only. Do not remove wrapping until plant is set in plant pit. Cut and remove all wire and peel burlap away from upper 1/3 of rootball prior to backfilling.

   a. Remove any plastic or fiberglass or other non- decomposable wrapping material completely.

   b. All wire shall be cut and removed from sides.

B. Installation:

1. Plant Pit Side Scarification:

   a. Plant Rootball: After removing plant from container, scarify the sides of the rootball to a depth of 1" at 4 to 6 equally-spaced locations around the perimeter of the ball or at 12". intervals on sides of boxed materials. cut and remove circling roots over 3/8" diameter.

   b. Plant Pit: Scarify sides of all plant pits, thoroughly breaking up surfaces and eliminating "glazed" areas.

2. Positioning: Backfill plant pit with backfill mix as shown on the drawings to allow setting crown of tree 2" above new finish grade and crown of shrub 1" above finish grade. Thoroughly foot tamp all backfill. Position plant in planting pit, maintaining plumb condition. Maintain plants in a thriving healthy condition throughout all planting operations.

3. Backfilling:

   a. Use backfill mix to backfill on-grade plant pits as shown on Drawings. Brace each plant plumb and rigidly in position until planting soil has been tamped solidly around the ball and roots.

   b. When plants pits have been backfilled approximately 2/3 full, water thoroughly and saturate rootball, before installing remainder of the backfill mix to top of pit, eliminating all air pockets.

   c. Slow-Release Fertilizer Tablets: Place evenly distributed in plant pits when backfilled 2/3 according to the following schedule:

      1. Canned stock

      1 gallon can - 2 tablets 24" ball - 8 tablets
      5 gallon can - 4 tablets 36" ball - 10 tablets
      15 gallon can - 6 tablets 48" ball - 12 tablets

      2. B & B stock for larger than 48" ball
      One tablet for 1' of height

   d. Hydrogel Polyer/Mycorrhizal Inoculant.

      1. "Terra-Sorb" Hydrogel packs shall be incorporated into the planting backfill at a rate specified by manufacturer.

      2. "Mycor Tree and Plant Saver" shall be incorporated in backfill at 3 ounces per 1-foot root ball diameter as per manufacturer's specification. When "Mycor" is utilized, "Terra-Sorb" is not required.

4. Guying: When required guy as specified paragraph 3.05.

C. Tree Wrap:

1. Wrap trunks of deciduous trees of 1½" caliper or more with a spiral wrapping to height of the first branch.

2. Wrap from the bottom up and tie wrapping securely in place at the third tree branch.

3. Remove tree wrap when tree guys are removed.

D. Saucer: Form saucer with 4 high berm of backfill mix or soil mix as shown on the drawings centered around edge of each tree and shrub ball.

E. Watering: Immediately water all plants after completion of planting operations.

F. Settlement: Correct all settlement of materials immediately.

3.05 GUYING

A. General: Guy all trees unless noted otherwise on the drawings.

B. Guying:

1. Positioning: Guy trees at points of branching, with guys spaced equally around and outside perimeter of ball. Cover guys with rubber hose at points of contact with bark. Position guys at crotches and [redacted] to stakes.

2. Turnbuckle: Provide one (1) turnbuckle for each guy. Use two (2) cable clamps at each [redacted] connection. (Place white plastic guy covers on all guys).

3. Mock-up: Install mock-up of manufactured products at job site per manufacturer's instructions [redacted] review and acceptance by Landscape Architect.

3.06 MULCHING

A. Install a 3" deep layer of mulch over all tree pits. Mulch shall not be in contact with stem.

B. Install a 3" deep layer of mulch over all shrub areas including tree and shrub watering basins. Mulch shall not be in contact with stem.

C. Install a 3" deep layer of mulch over groundcover areas prior to planting groundcover.

3.07 GROUNDCOVER ANNUAL OR PERENNIAL PLANTING

A. Top-dress Fertilizer: Prior to mulching groundcover areas apply at the rate of 10 lbs. per 1,000 sq. immediately before planting.

B. Incorporate "Terra-Sorb" Hydrogel at manufacturer's recommended rate.

C Mulch groundcover areas immediately after fertilizing.

D. Plant groundcover through the mulch.

E. Water groundcover area immediately after planting.

END OF SECTION

SECTION 02960

LANDSCAPE IRRIGATION

PART 1 - GENERAL

1.01 WORK INCLUDES

A. The work covered by this Section includes furnishing all labor, equipment, and materials required to design, furnish and install an underground sprinkler system as specified herein.

B. The extent of the work is specified herein. Design, layout and documentation of the landscape irrigation shall be the responsibility of the Irrigation Contractor. The system shall be designed to provide full coverage to all grassed open areas and grassed parking islands as indicated on the Drawings.

C. In his bid, the Irrigation Contractor shall provide a written list of all material and product quantities.

B. The Irrigation Contractor shall completely familiarize himself with the site conditions and the requirements of the Contract prior to bidding the work in this Section.

C. All work specified in this Section shall be performed by a qualified Irrigation Contractor.

F. All work and materials shall be in accordance with applicable codes.

G. The Irrigation Contractor shall alert the Landscape Contractor of all line and head locations. The Landscape Contractor shall use due caution so the Irrigation System is not damaged during landscape installation operations. The Landscape Contractor shall be responsible for any damage incurred during landscape operations.

H. The entire irrigation system shall be fully operational prior to any planting.

1.02 RELATED WORK UNDER SEPARATE CONTRACT

A. Electrical stubout for irrigation controller.

B. Water tap and stubout for irrigation system.

C. Installation of water meter (by utility company).

D. Landscaping installation and maintenance.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Related Sections:
1. Section 02200-Earthwork
2. Section 02810-Fine Grading and Erosion Control
3. Section 02920-Soil Preparation
4. Section 02930-Lawns and Sod
5. Section 02940-Landscape Planting
6 Section 02950-Trees, Shrubs, Vines and Groundcovers
7. Section 02960-Landscape Irrigation

1.04 QUALITY ASSURANCE

F. Requirements of Regulatory Agencies:

1. All work and materials shall be in full accordance with the latest rules and regulations of the SBCCI and other applicable laws or regulations, including any local Plumbing Code.

2. Should the Contract Documents be at variance with the aforementioned rules and regulations, notify the owner's representative for instructions before proceeding with work affected.

B. Testing:

1. Preliminary review of completed installation will be made prior to backfilling of trenches and during hydrostatic testing.

2. Final review shall be made in conjunction with the final review of lawn, shrub, and tree planting.

C. Permits and Inspections:

1. Any permits for the installation or construction of any work included under this contract, which are required by any of the legally constituted authorities having jurisdiction, shall be obtained and paid for by the Contractor, each at the proper time.

2. The Contractor shall also arrange for and pay all costs in connection with any inspection and examination required by these authorities.

1.05 SUBMITTALS

A. Certificate of Qualification: Prior to bid acceptance, submit certification of installer's experience identifying a minimum of four (4) previous projects with names of Owners and Landscape Architects to Owner's representative for approval.

B. Contractor shall furnish one (1) Manufacturer's service manual each to the Owner and the Owner's Construction Representative. Manuals may be loose-leaf and shall contain complete exploded drawings of all equipment installed showing components and catalog numbers together with the manufacturer's name and address.

C. Record Drawings: The Contractor shall maintain one record set of blueline prints of the sprinkler system in good condition at the site and mark on them the exact "Record". The Contractor shall make a daily record of all work installed during each day. Plans shall indicate the location of check valves, gate valves, wire locations, head layout, automatic valves, quick couplers. All irrigation and drainage piping etc., shall be shown on the prints. Locations should be shown by the triangular system of measurements from easily identified permanent features, such as buildings, curbs, fences, walks, etc. Drawings shall show approved substitutions, if any, of material including Manufacture's name and catalog number. Upon completion all information noted on the prints shall be transferred to a reproducible mylar by the Contractor. Drawings shall be to scale and all information shall be recorded in a neat, orderly way.

1. At the time of the irrigation mainline test, the Contractor shall provide a preliminary set of "Record" drawings to the Owner's Construction Representative.

2. On or before the date of final inspection, the Contractor shall deliver one (1) reproducible mylar and two (2) sets of blueline prints of the "Record" drawings to the Owner and the Owner's Construction Representative. The delivery of the prints shall not relieve the Contractor of the responsibility of furnishing required information that may have been omitted.

D. Substitutions:

1. The Contractor shall use materials as specified on the Irrigation Plan. Material other than that specified will be permitted only after written application by Contractor and written approval by Owner's representative prior to bid opening.

2. Substitutions will only be allowed when in the best interest of the Owner.

3. The installation of any approved substitution is the Contractor's responsibility. Any changes required for installation of any approved substitution must be made to the satisfaction of the Owner's Construction Representative and without additional cost to Owner.

1.06 JOB CONDITIONS

A. Examination of the Site: The bidder acknowledges that he has examined the site, Construction Documents, and specifications, and the submission of a quotation shall be considered evidence that examinations have been made.

B. FIELD CONDITIONS:

1. The Contractor shall verify actual field conditions and inspect related work and adjacent surfaces. The Contractor shall report to the Owner's Construction Representative all conditions which prevent proper execution of his work.
2. The exact location of all existing utilities, structures, and underground utilities, which may not be indicated on the Construction Documents, shall be determined by the Contractor, and he shall conduct his work so as to prevent interruption of service or damage to them. The Contractor shall protect existing structures and utility services and be responsible for their replacement if damaged by him.

3. The Contractor shall verify the correctness of all finish grades within the work area to insure the proper soil coverage of the sprinkler system pipes.

C. Coordination:

1. The Irrigation Contractor shall coordinate the schedule of his activities with the Owner's Construction Representative prior to commencing operations.

2. The Irrigation Contractor shall familiarize himself with other work and shall coordinate his activities with those of other Contractors in or adjacent to landscape work areas.

3. The Irrigation Contractor shall give notice to and obtain approval from the Owner's Construction Representative prior to proceeding with any site work covered under this contract.

D. Discrepancies and Unsuitable Conditions:

1. Prior to the start date of any operations, the Irrigation Contractor shall inspect the site to determine its suitability for the work under this Contract. In addition, the Contractor shall verify that the work of other Contractors is sufficiently complete to permit the work under this Contract to be started properly.

2. The Irrigation Contractor shall notify the Owner's Construction Representative of any discrepancies or unsatisfactory conditions and shall not commence operations until they have been corrected.

1.07 MATERIALS STORAGE AND CLEAN-UP

A. The Contractor shall keep the premises free from rubbish and all debris at all times and shall arrange his material storage so as not to interfere with the operation of the project. All unused materials, rubbish, and debris shall be removed from the site.

1.08 COMPLETION AND ACCEPTANCE

A. The completion of the contract will be accepted and Notice of Completion recorded only when the entire contract is completed to the satisfaction of the Owner's Construction Representative.

B. Within ten (10) days of the Contractor's notification that the installation is complete, Owner's Construction Representative will inspect the installation and, if final acceptance is not given, will prepare a "punch list".

C. Final Acceptance: Work under this section will be accepted by Owner's Construction Representative upon satisfactory completion of all work including "punch list" items.

1.09 WARRANTY

A. The entire sprinkler system will be unconditionally guaranteed by the Contractor as to material and workmanship, including settling of backfilled areas below grade for a period of one (1) year following Grand Opening of work and he hereby agrees to repair or replace any such defect occurring within that year at his expense.

B. It shall be the Irrigation Contractor's responsibility to insure complete coverage as specified herein of the areas to be irrigated. During the warranty period the Irrigation Contractor shall make any adjustments as necessary to maintain proper coverage.

C. If, within one year from the date of completion, settlement occurs, and adjustments in pipes, valves, and sprinkler heads, lawn areas or paving are necessary to bring the system, grade, or paving to the proper level of the permanent grades, the Contractor, as part of the work under this Contract, shall make all adjustments without extra cost to the Owner, including restoration of all damaged planting, paving, or other improvements of any kind.

Should any operational difficulties in connection with the sprinkler system develop within the specified guarantee period, which, in the opinion of Owner may be due to inferior material and/or workmanship, said difficulties shall be immediately corrected by the Contractor to the satisfaction of the Owner at no additional cost to the Owner, including any and all other damages caused by such defects.

1.10 OPERATION AND MAINTENANCE - IRRIGATION SYSTEM

A. The entire irrigation system shall be fully operational at least three (3) days prior to any planting.

B. Operation of the irrigation system shall be confined to hours between 12 midnight and 7 a.m.

C. Important: It is the Landscape Contractor's responsibility to determine water application rates and timer cycling. The Irrigation Contractor will instruct the Landscape Contractor on the operation and programming of the controller and will assist the Landscape Contractor as necessary in such operations throughout the one year maintenance period. Any adjustments, repairs, etc., other than programming are the total responsibility of the Irrigation Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified and meeting the requirements of this system.

2.02 WATER METERS

A. Water meter shall be provided and installed by the local water district in accordance with their requirements. Cost will be paid by Owner.

2.03 BACKFLOW PREVENTER

A. Backflow PREVENTER to be provided by Irrigation Contractor.

B. Shall be manufactured by Watts Regulator Company, Model 909-3, or approved equal.

2.04 PIPE

A. All piping shall be from virgin parent material. The pipe shall be homogenous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious wrinkles, and dents. All pipe shall be National Sanitation Foundation (NSF) approved.

B. Piping on pressure side of irrigation control valves:

1. Shall be Polyvinyl Chloride (PVC) 1120 with a minimum class rating of 200, sized to maintain a flow velocity of less than five feet (5') per second (FPS).

2. Type I, Grade I, Pressure Rated Pipe.

3. Materials shall meet the requirements set forth in ASTM D-1784-60T.

4. Outside diameter of pipe shall be the same size as iron pipe.

5. Pipe shall be marked at intervals (not to exceed 5') with the following information: Manufacturer's name or trade mark, nominal pipe size, schedule, PVC type and grade (i.e. PVC 1120), SDR rating class, working pressure at 73□F and (NSF) approval.

6. PVC Type I shall not be threaded.

7. Caution should be utilized in handling Type I pipe due to the possibility of cracking or splitting when dropped or handled carelessly.

8. When connection is plastic to metal, male adaptor shall be used. The male adaptor shall be hand tightened, plus one turn with a strap wrench.

C. Piping on non-pressure side or irrigation control valves shall be: Polyvinyl Chloride (PVC): 1120 with a minimum class rating of 160 psi., NFS approved, sized to maintain a flow velocity of less than five feet (5') per second (EPS).

D. Pipe for sleeving: High impact pipe, polyvinyl chloride (PVC) 2110, minimum Schedule 40.

2.05 SOLVENT

A. Solvent for PVC Pipe: Shall be #705 Gray NSF approved as manufactured by Industrial Polychemical Service, Gardena, California, or approved equal.

2.06 FITTINGS

A. Fittings for Solvent-Weld PVC Pipe: Schedule 40 or 80, polyvinyl chloride (PVC), Type I, to meed ASTM D2466-73 and D-2467-73 NSF approved.

B. Threaded PVC nipples shall be Schedule 80.

2.07 SHUT OFF VALVES

A. Up to three inches (3") size": 125 pound bronze construction, non-rising stem type, sized to line. "Nibco" #T113 or approved equal.

2.08 QUICK COUPLING VALVES (If applicable)

A. Valve and key shall be "RainBird", #33D and #33DK.

B. Furnish two valve keys fitted with three-quarter inch (3/4") swivel hose ells.

C. All quick coupling valve keys and hose swivels shall be of the same manufacturer as the quick couplers.

2.09 VALVE BOXES

A. To be injection-molded of polyesters and fibrous inorganic temperature resistant, components. Box and lid to be green, manufactured by one of the following:

Ametek, Sheboygan, WI
Carson Industries, Inc., LaVerne, CA

B. For Remote Control Valve: Shall be rectangular or round in shape and sized to provide adequate clearance to operate and service valve.

C. For Shut-Off Valves and Quick Coupler Valves: Shall be round, approximately nine inches (9") inside diameter by ten inches (10").

2.10 MANUAL DRAIN VALVE

A. Manual drain valve to be provided by Irrigation Contractor and installed according to local codes and the manufacturer's latest printed instructions.

2.11 SPRINKLER HEADS

A. All sprinkler heads shall be pop-up type heads or acceptable alternates.

Acceptable manufacturers listed below:

Toro - Riverside, CA (714) 688-9221
RainBird - Glendora, CA (818) 963-9311

B. Spray nozzles for sprinkler heads, if required, shall be of the same manufacturer as the sprinkler head.

2.12 AUTOMATIC CONTROLLER

A. A fully automatic controller manufactured by either RainBird, Toro, or Weather Matic. Controller must have the following features:

1. Master on/off switch that permits system shutdown with programming maintained.
2. Independent station programming.
3. Independent station timing.
4. Manual operation option.
5. Variable day cycle.
6. Battery powered models not permitted.

B. Wall mounted installation, unless specified otherwise on the drawing.

2.13 RAIN SHUT-OFF DEVICES

A. Shall be provided on each project. Acceptable models and manufacturer's listed below:

RainBird, Rain-Check
WeatherMatic, Rain-Stat

2.14 ELECTRIC CONDUIT AND FITTINGS

A. Underground plastic conduit: Class III, FS W-C1094.

2.15 CONTROL WIRE

A. Wire: Solid copper wire, U.L. approved for direct burial in ground. Minimum gauge: #14 UF. Common ground wire shall be white.

2.16 SPLICING MATERIALS

A. Splicing materials: 3 M Direct Bury (DBY) splice kits by 3M Corporation, Austin, Texas or "Snip-Snap" connector by Imperial, Lenexa, KS

2.17 REMOTE CONTROL VALVES

A. Remote controlled valves shall be electrically operated, normally closed, 24 Volt AC, 1 Ampere, constructed of corrosion resistant cycolac and stainless steel, capable of manual operation, and shall be self-flushing. The valve shall have a throttling device for system balancing and shall comply with all code and permitting requirements.

PART 3 - EXECUTION

3.01 GENERAL

A. The Irrigation Contractor shall carefully schedule his work with the Landscape Contractor and all other site developments.

B. Sleeves are required wherever piping or electrical wires are placed under paved surfaces. Install sleeves prior to commencement of paving. Irrigation Contractor shall coordinate sleeve placement with General Contractor. See Civil Engineering Drawings for Sleeving Plan.

C. No consideration will be given to any design changes. Should any changes be deemed necessary after award of contract, for proper installation and operation of the system, such changes shall be negotiated by the Owner's Construction Representative.

D. Lay out work as accurately as possible to design drawings. As-built drawings may be diagrammatic to the extent that swing joints (QVC), offsets and all fittings are not shown.

E. Full and complete coverage is required. Contractor shall make any necessary minor adjustments to layout as required to achieve full coverage of irrigated areas at no additional cost to the Owner.

F. Where the piping is shown on Construction Documents to be under paved areas to the running parallel and adjacent to planted areas, the intent is to install piping in planted areas. Do not install directly over another line in same trench.

G. It shall be the Contractor's responsibility to establish the location of all sprinkler heads in order to assure proper coverage of all areas. All pipe damaged or rejected because of defects shall be removed from the site at the time of said rejection.

H. Install sprinkler system after completion of site grading; the irrigation system shall be installed and completely operational three days prior to installation of any planting operations.

3.02 TRENCHING

A. Perform all excavations as required for installation of work included under this Section, including shoring of earth banks, if necessary. Restore all surfaces, existing underground installation, etc., damaged or cut as a result of the excavations, to their original condition.

B. Should utilities not shown on the Construction Documents be found during excavations, Contractor shall promptly notify Owner's Construction Representative and the Architect of Record for instructions as to further action. Failure to do so will make Contractor liable for any and all damages thereto arising from his operations subsequent to discovery of such utilities. Indicate such utility crossings on the record drawings promptly.

C. Trenches shall be open, vertical sided construction wide enough to provide free working space around work installed and to provide ample space for backfilling and compacting.

D. When two (2) pipes are to be placed in the same trench, a six inch (6") space is to be maintained between the pipes. The Contractor shall not install two pipes with one directly above the other.

E. Trenches located under paving shall be backfilled with sand (a layer six inches (6") below the pipe and three inches (3") above the pipe) and compacted in layers of 95% compaction. Depth of trenches shall be sufficient to provide the minimum cover above the top of the pipe as follows:

* 12" over non-pressure lateral lines
* 18" over non-pressure lateral lines under paving
* 18" over control wires
* 18" over sprinkler main line
* 24" over sprinkler main line under paving

F. The Contractor shall cut trenches for pipe to required grade lines and compact trench bottom to prove accurate grade and uniform bearing for the full length of the line.

G. All laterals and mainline shall be sufficiently sloped to provide a positive drainage through drain valves.

H. The Contractor shall be held responsible for any damages caused by these operations and shall immediately repair or replace damaged parts.

3.03 BACKFLOW PREVENTION DEVICE

A. Backflow prevention device to be provided by Irrigation Contractor.

B. Backflow prevention device shall be installed in accordance with local codes and manufacturer's latest printed instructions.

3.04 PIPE LINE ASSEMBLY

A. General:

1. Install pipes and fittings in accordance with manufacturer's latest printed instructions.

2. Clean all pipes and fittings of dirt, scales and moisture before assembly.

3. All pipe, fittings, and valves, etc. shall be carefully placed in trenches. Interior of pipes shall be free from dirt and debris and when pipe laying is not in progress, open ends of pipe shall be closed by approved means.

4. All lateral connections to the mainline as well as other connections shall be made to the side of the mainline pipe. No connections to the top of the line shall be allowed.

B. Solvent-Weld Joints to PVC Pipes:

1. Use solvents and methods of pipe and solvent manufacturers.
2. Cure joint a minimum of one hour before applying any external stress on the piping and at least twenty four (24) hours before placing the joint under water pressure, unless otherwise specified by manufacturer.

C. Threaded Joints for PVC Pipes:

1. Use Teflon tape on all threaded PVC fittings.

2. Use strap-type friction wrench only. Do not use metal-jawed wrench.

3. When connection is plastic to metal, male adapters shall be used. The male adapter shall be hand tightened, plus one turn with a strap wrench.

D. Laying of Pipe:

1. Pipes shall be bedded in at least two (2") of finely divided material with no rocks or clods over one inch (1") diameter to provide a uniform bearing.

2. Pipe shall be snaked from side to side of trench bottom to allow for expansion and contraction. One additional foot per 200 feet of pipe is the minimum allowance for snaking.

3. Do not lay PVC pipe when there is water in the trench.

4. Plastic pipe shall be cut with PVC pipe cutters or hacksaw, or in a manner so as to ensure a square cut. Burrs at cut ends shall be removed prior to installation so that a smooth unobstructed flow will be obtained.

5. All plastic to plastic joints will be solvent-weld joints or slip seal joints. All plastic pipe and fittings shall be installed as outlined and instructed by the pipe manufacturer, and it shall be the Contractor's responsibility to make arrangements with the pipe manufacturer for any field assistance that may be necessary. The Contractor shall assume full responsibility for the correct installation.

E. PVC Sleeves and Electrical Conduit:

1. All PVC sleeves shall be a minimum of twice (2x) the diameter of the pipe to be sleeved.

2. All PVC control wire conduit shall be of sufficient size to hold the required quantity of control and common wires.

F. Thrust Blocks:

1. Concrete thrust blocks must be provided on the thrust side of the mainline pipe wherever the pipe line:

   a. Is larger than 2½" in diameter, and changes direction, as at tees or bends, or dead-ends.

3.05 IRRIGATION CONTROL VALVES

A. Install control valves in valve boxes grouping together where practical. Place no closer than twelve inches (12") to walk edges, buildings, and walls.

B. Pressure regulating remote control valves shall be adjusted so that most remote sprinkler heads operate at the pressure specified.

C. Valves shall be installed as shown in details and in accordance with manufacturer's instructions and the specifications.

3.06 QUICK COUPLING VALVES (Where applicable)

A. Shall be set a minimum of twelve inches (12") from walks, curbs, or paved areas where applicable or as otherwise noted. Quick coupling valves shall be housed in valve boxes.

B. Valves shall be installed on a three (3) elbow PVC Schedule 80 swing joint assembly.

3.07 VALVE BOXES

A. Valve boxes shall be set flush with finish grade in lawn areas and one half inch (½") above finish grade in ground cover and shrub bed areas.

3.08 SPRINKLER HEADS

A. All sprinkler heads within a zone shall have matched precipitation rates.

B. All heads operating on one valve (zone) shall do so at the same pressure.

C. Do not mix different types of heads within a zone.

D. Shrub beds and lawn areas are to be on separate valves (zones).

E. Place part-circle pop-up sprinkler heads six inches (6") from edge of adjacent walks, curbs, and mowing bands, or paved areas at time of installation.

F. All sprinkler nozzles shall be adjusted for the proper radius and direction of spray pattern. Make adjustments where possible to prevent overspraying onto walks, pavement, or buildings.

G. Sprinkler heads and quick coupling valves shall be set perpendicular to finished grade unless otherwise designated on the plans.

3.09 DRAIN VALVES

A. The mainline and laterals shall be drained with manual drain valves.

B. Drain valves are to be provided as sufficient intervals to provide complete drainage of all piping.

3.10 AUTOMATIC CONTROLLER

A. The location of the automatic controller shall be coordinated with the Owner by the General Contractor.

B. All local and other applicable codes shall take precedence in connecting the 110 volt electrical service to the Controller.

C. Install per local code, manufacturer's latest printed instructions, and as detailed.

D. Connect remote control valves to controller in sequence to correspond with station setting beginning with Stations 1, 2, 3, etc.

E. Affix controller name (i.e. "Controller A") on inside of controller cabinet door with letters minimum of one inch (1") high. Affix a non-fading copy of irrigation diagram to cabinet door below controller name. Irrigation diagram shall be a reduced copy of the as-built drawing and shall show clearly all valved operated by the Controller, showing station number, valve size, and type of planting irrigated.

3.11 CONTROL WIRING

A. All electrical equipment and wiring shall comply with local and state codes and be installed by those skilled and licensed in the trade.

B. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible, and shall have a minimum of eighteen inch (18") cover.

C. Control wire shall be installed to the side of the main line whenever, possible. Placement over pipes is not permitted.

D. When more than one (1) wire is placed in a trench, the wiring shall be taped together at intervals of ten feet (10').

E. An extension curl shall be provided within three feet (3') of each wire connection and at least every one hundred feet (100') of wire length on runs of more than one hundred feet (100') in length. Expansion curls shall be formed by wrapping at least five (5) turns of wire around a one inch (1") diameter pipe, then withdrawing pipe.

F. Control wire splices at remote control valves to be crimped and sealed with specified splicing materials. Line splices will be allowed only on runs of more than 500 feet (500') and they must be located in ten inch (10") round splice boxes which are green in color. The connector shall be 3MD by splice kit by 3M Corporation, or "Snip-Snap" connector by Imperial. Use one splice per connector sealing packs.

G. The main line shall have two (2) spare wires installed its entire length and to the automatic controller. Label each end "spare wire".

3.12 CLOSING OF PIPE AND FLUSHING OF LINES

A. All testing shall be done under the supervision of the Owner's Construction Representative. Submit written requests for inspections to the Owner's Construction Representative at least three (3) days prior to anticipated inspection date.

1. Thoroughly flush all water lines under a full head of water before installing heads, valves, quick coupler assemblies, etc. Maintain flushing for a minimum of three (3) minutes at the valve located farthest from water supply.

2. After flushing, cap or plug all openings to prevent entrance of materials that would obstruct the pipe or clog heads. Leave in place until removal is necessary for completion of installation.

3. Test as specified below.

4. Upon completion of testing, complete assembly and adjust sprinkler heads for proper distribution.

5. All sprinkler heads and quick coupling valves shall be set perpendicular to finished grades unless otherwise designated on the drawings, or otherwise specified. Sprinkler heads adjacent to existing walls, curbs, and other paved areas shall be set to grade. Sprinkler heads which are to be installed in lawn areas where the turf has not yet been established shall be set one inch (1") above the proposed finish grade. Heads installed in this manner will be lowered to grade when the turf is sufficiently established to allow walking on it without appreciable destruction. Such lowering of heads shall be done by this contractor as part of the original contract with no additional cost to the Owner.

3.13 TESTING

A. Making hydrostatic test when welded PVC joints have cured as per manufacturer's instructions.

1. Pressurized Mains:

a. Completely install water meter, mains, isolation valves and control valves. Do not install laterals.
b. Open all isolation valves.
c. Fill all lines with water and shut off at meter.
d. Pressurize the main with air to 70 psi. Monitor gauge for pressure loss for four (4) hours.
e. Leave lines and fittings exposed throughout testing period.
f. Leaks resulting from test shall be repaired and tests repeated until the system passes.
g. Test all isolation valves for leakage.

2. Non-Pressure Laterals: Testing piping after laterals and risers are installed and system is fully operational. Leave trenches open to detect possible leaks.

3.14 INSPECTION

A. The Contractor shall maintain proper facilities and provide safe access for inspection to all parts of the work.

B. Irrigation inspection shall consist of a minimum of:

1. Mainline Pressure Test.
2. Coverage Test.
3. Final Irrigation Inspection.

C. If the specifications, the Owner's Representative's instructions, laws, ordinances, or any public authority require work to be specifically tested or approved, the Contractor shall give the Owner's Representative three (3) days notice of its readiness for inspection.

D. The Contractor shall be solely responsible for notifying Owner's Construction Representative where and when such work is in readiness for testing.

E. If any work should be covered up without approval of Owner's Construction Representative, it must be uncovered, if required, for examination at Contractor's expense.

F. No inspection will commence without "Record" drawings and without completing previously noted corrections, or without preparing the system for inspection.

3.15 BACKFILL AND COMPACTING

A. After system is operating and required tests and inspections have been made, backfill excavations and trenches.

B. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 95% density under pavements, 85% under planted areas.

C. Backfill material shall be approved soil. Unsuitable materials, including clods and rocks over two inches (2") in size shall be removed from the site.

D. A fine granular material shall be placed initially on all lines with a minimum of three inches (3") cover. No foreign matter larger than one-halve inch (½") in size shall be permitted in the initial backfill.

E. Trenches located under paving shall be backfilled with sand (a layer six inches (6") below the pipe and three inches (3") above the pipe) and compacted in layers of 95% compaction.

F. Compact trenches in areas to be planted, by thoroughly flooding the backfill.

G. Within all planting and lawn areas the existing six inch (6") layer of topsoil shall be restored to its original condition and finish grade.

H. The Contractor shall dispose of surplus earth remaining after backfilling off-site.

PART 4 - CONCLUSION

It has been our purpose in preparing these specifications to provide the Irrigation Contractor with all information necessary to design and install a sprinkler system which is complete in every detail, meets the criteria of the Owner and local authorities; and is consistent with good irrigation design and installation practice.

Please call to our attention any discrepancies in the specifications as they relate to actual on-site conditions. Discrepancies of any sort shall not be taken advantage of and construction shall be pursued efficiently and rapidly in the letter and spirit of these specifications.

END OF SECTION

SECTION 02970

LANDSCAPE MAINTENANCE

PART 1 - GENERAL

1.01 DESCRIPTION

A. General: Provide landscape maintenance for a period of one year beginning with the first day the facility is open to the public.

B. The extent of landscaping and related work is shown on the Landscape Drawings or specified herein.

C. Related Work Specified Elsewhere:

Section 02200-Earthwork
Section 02810-Fine Grading and Erosion Control

1.02 REFERENCES

A. *Arboriculture: Care of Trees, Shrubs and Vines in the Landscape* by Richard W. Harris, Prentice-Hall, Inc., 1983.

1.03 SUBMITTALS

A. Quality Control Submittals:

1. Schedule of maintenance operations and monthly status report including list of equipment, materials proposed for the job and watering schedule.

2. Licenses, permits and insurance required by the City, County, State or Federal authority having jurisdiction over landscape maintenance work.

3. Monthly record of all herbicides, insecticides and disease control chemicals used for the project.

4. Documentation of existing planting and irrigation system.

5. Written application recommendation by a licensed agricultural pest control advisor for all weed, pest and disease controls restricted by the Director of Agriculture proposed for this work.

B. Close-out Submittal: Include in a single, 3-ring binder a landscape maintenance manual containing an indexed collection of all schedules, records and permits listed above, as well as a documentation of accepted condition of planting at end of the 1 year Maintenance Period.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Experience: The landscape maintenance firm shall have a full time foreman assigned to the job for the duration of the contract. He shall have a minimum of four years experience in landscape maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.

2. Labor Force: The landscape maintenance firm's labor force shall be thoroughly familiar with and trained in the work to be accomplished and shall perform the task in a competent, efficient manner acceptable to the Owner.

B. Requirements:

1. Supervision: The foreman shall directly employ and supervise the work force at all times. Notify Owner of all changes in supervision.

2. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and labor force. Be uniformly dressed in a manner satisfactory to the Owner.

1.05 PROJECT/SITE CONDITIONS

A. Site Visit: At beginning of maintenance period, maintenance personnel shall visit and walk the site with the Owner's representative to clarify scope of work and understand existing project/site conditions.

B. Documentation of Conditions: Maintenance Personnel shall document general condition of existing trees, shrubs, vines, groundcovers and lawn recording all plant materials which are healthy, thriving, damaged, dead or dying.

1.06 SEQUENCING AND SCHEDULING

A. Perform all maintenance during hours mutually agreed upon between Owner and Contractor.

B. Work force shall be present at the project site at least once a week and as often as necessary to perform specified maintenance in accordance with the approved maintenance schedule.

1.07 WARRANTY

A. Specific Requirements: Refer to the Landscape Drawings

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: All materials and equipment shall be provided by the Contractor, except as specified below.

B. Water: Clean, potable and fresh, furnished and paid for by the Contractor during construction.

C. Fertilizers:

1. Tightly-compressed, slow-release and long-lasting complete fertilizer tablets bearing manufacturer's label of guaranteed analysis of chemicals present.

2. Balanced, once-a-season application, controlled-release fertilizers with a blend of coated pellets, which supply controlled-release nitrogen, phosphorus and potassium, and uncoated, rapidly soluble pellets containing nitrogen and phosphorus.

D. Herbicides, Insecticides, and Fungicides:

1. Best quality materials with original manufacturers' containers, properly labeled with guaranteed analysis.

2. Use non-staining materials.

E. Lawn Sod for Resodding: Match existing sodded lawn.

F. Replacement Tree Guys, Stakes, Ties and Wires: Match existing materials on the site.

2.02 EQUIPMENT

A. General: Use only the proper tool for each job. Maintain all tools in sharp, properly-functioning condition. Clean and sterilize pruning tools prior to usage.

B. Insect/Disease Prevention: Take all measures to prevent introduction of insect or disease-laden materials onto the site. (See Landscape Drawings.)

PART 3 - EXECUTION

3.01 PREPARATION

A. Duration: Continuously maintain each plant and each portion of groundwater area after installation, during progress of work, and for a period of 1-year after completion of all planting work until the 1-year Maintenance Agreement.

B. Protection:

1. Protect all new planting areas from damage of all kinds from beginning of work until end of the 1-year Maintenance Agreement.

2. Provide temporary protection fences, barriers and signs as required for protection.

C. Replacements

1. Immediately or replace all plants which become damaged or injured as a result of Contractor's operations or negligence, as directed by Landscape Architect, at no additional cost to Owner.

2. Replacement plants shall be of acceptable size, condition and variety.

3.02 TREES, SHRUBS AND VINES

A. Saucers:

1. Maintain all saucers around plants so that enough water can be applied to establish moisture through major root zones.

2. For supplemental hand watering of saucers, use a water wand to break the water force. Do not permit use of "jet" type watering equipment. Do not permit crown roots to become exposed to air through dislodging of soil and mulch.

3. Maintain originally called for depth of mulch to reduce evaporation and frequency of watering.

4. In rainy season, open saucers to allow surface drainage away from the root crown where excess water may accumulate. Restore watering basins at end of rainy season.

B. Resetting: Reset plant to proper grades and upright positions.

C. Weed Control:

1. All areas between plants, including watering basins, shall be weed free.

2. Use only recommended and legally approved herbicides to control weed growth.

3. Avoid frequent soil cultivation that destroys shallow roots and breaks the seal of pre-emergent herbicides.

D. Pruning:

1. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, and which have vertical spacing of 18" to 48" and radial orientation so as not to overlay one another.

2. Prune trees to eliminate diseased or damaged growth, and narrow V-shaped branch forks that lack strength. Reduce toppling and wind damage by thinning out crowns.

3. Prune trees to maintain growth within space limitations, maintaining a natural appearance and balancing crown with roots.

4. No stripping lower branches ("raising up") of young trees will be permitted.

5. Retain lower branches in a "tipped back" or pinched condition to promote caliper trunk growth (tapered trunk). Do not cut back to fewer than six buds or leaves on such branches. Only cut lower branches flush with the trunk after the tree is able to stand erect without staking or other support.

6. Thin out and shape evergreen trees when necessary to prevent wind and storm damage. Do primary pruning of deciduous trees during the dormant season. Do not permit any pruning of trees prone to excessive "bleeding" during growth season.

7. Prune damaged trees or those that constitute health or safety hazards at any time of year as required.

8. Make all cuts clean and close to the trunk, without cutting into the branch collar. "Stubbing" will not be permitted. Cut smaller branches flush with trunk or lateral branch. Make larger cuts (1" in diameter or larger) parallel to shoulder rings, with the top edge of the cut at the trunk of lateral branch.

9. Branches too heavy to handle shall be precut in three stages to prevent splitting or peeling of bark. Make the first two cuts 18" or more from the trunk to remove the branch. Make the third cut at the trunk to remove the resulting stub.

10. Shrubs shall not be sheared or pruned into ball or boxed forms unless specifically called for by design.

11. Clip shrubs to be hedged when branches project 2" beyond limit of clipped hedge shown on the Drawings.

12. Take extreme care to avoid transmitting disease from one infected plant to another. Properly sterilize pruning tools before going from one infected plant to all other plants.

E. Guying of Trees/Removal of Stakes & Guys:

1. Inspect guys at least once a month to check for rubbing that causes bark wounds.
2. Remove all stakes, guy wires and supports one year after installation.

3.03 GROUNDCOVERS

A. Watering:

1. Check for moisture penetration throughout the root zone at least twice a month.

2. Water as frequently as necessary to maintain healthy growth of groundcovers.

B. Weed Control:

1. Control weeds, preferably with pre-emergent herbicides and with selective systemic herbicides.

2. Minimize hoeing of weeds in order to avoid plant damage.

3.04 LAWNS

A. Watering:

1. Water lawns at such frequency as weather conditions require, to replenish soil moisture to 6" below root zone.

2. Provide a total of 1½" of water weekly during hot summer weather, in three (3) applications per week.

3. Watering shall be done during early mornings.

B. Weed Control:

1. Control broadleaf weeds with selective herbicides.

2. In areas where crabgrass has infested the lawn, apply a selective post-emergent herbicide as soon as possible, and prior to flowering.

3. Apply pre-emergent herbicides such as Dacthal, Balan, or Betasan prior to crabgrass germination.

4. Do not irrigate for 48 hours after application of all herbicide sprays.

5. Coordinate application of herbicides with thatch control and reseeding schedule as described below.

C. Mowing and Edging:

1. Mow lawns when they reach 2½" high.

2. Trim edges at least twice a month or as needed for neat appearance. Vacuum clippings.

3.05 INSECTS, PESTS AND DISEASE CONTROL

A. Inspection: Inspect all plant materials for signs of stress, damage and potential trouble from the following:

1. Presence of insects, moles, gophers, ground squirrels, snails and slugs in planting areas.

2. Discolored or blotching leaves or needles.

3. Unusually light green or yellowish green color inconsistent with normal green color of leaves.

B. Personnel: Only licensed, qualified, trained personnel shall perform spraying for insect, pest and disease control.

C. Application: Spray with extreme care to avoid all hazards to any person or pet in the area or adjacent areas.

3.06 CLEANING

A. Dispose of all pruned materials, vacuum all lawn clippings and leaves, sweep all walkways and rake smooth all mulched areas.

B. Remove from the site all containers and evidence of maintenance activities.

3.07 ACCEPTANCE REQUIREMENTS

A. Preliminary Review:

1. *Preliminary Review: As soon as all plantings are completed per Contract Documents,* the contractor shall request in writing preliminary review to determine the condition of the work in the affected sections listed below.

a) The close out schedule applies to work in the following sections and as specified herein.

Lawns and Sod
Trees, Shrubs, Vines and Groundcover
Shrub and Tree Transplanting

b) Date of Review: Notify Landscape Architect at least five (5) working days prior to anticipated date of review.

c) Corrective Work:

1. Work requiring corrective action or replacement shall be performed within ten (10) calendar days of the review. Maintenance work will not be accepted until all corrective work has been accepted by Owner's representative.

2. Perform Corrective work and materials replacement in accordance with the Drawings and Specifications, and shall be made by the Contractor at no cost to the Owner.

3. After corrective work is completed, the Contractor shall again request a Review for Acceptance as outlined above.

4. Continue maintenance of all landscaped areas until such time as all corrective measures have been completed and accepted.

B. 1-Year Maintenance Period

1. Beginning of the 1-year Maintenance Period: The date on which the Landscape Architect issues a letter of Preliminary Acceptance to the Contractor shall be the beginning of the 1-year Maintenance Period as defined in Section 1.01.A.

2. Acceptance of the 1-year Maintenance Period:

a. Procedure:

1) Work will be accepted by the Landscape Architect upon satisfactory completion of all work, included in the 1-year maintenance period, but exclusive of replacement of materials under the Warranty Period.

2) Submit a written request to Landscape Architect for review for Acceptance of the 1-year maintenance at least five (5) working days prior to anticipated Review date, which is at the end of the 1-year Warranty Period.

b. Conditions for Acceptance of Work at End of the 1-year Maintenance Period:

1) Each plant shall be alive and thriving, showing signs of growth and no signs of stress, disease, or any other weaknesses.

a) All plants not meeting these conditions shall be replaced and a new 1-year Maintenance Period commenced for such plants.

c. 1-year Maintenance Period Acceptance Date and Beginning of the Owner's Maintenance: The Owner's maintenance shall begin the date the Landscape Architect issues a Letter of Acceptance. Upon Acceptance, the Owner will assume responsibility for maintenance of the work.

C. Warranty Period:

1. Warranty Period begins with the 1-year maintenance period.

a. Warranties

1. Laws and Sod: 1 year
2. Trees Shrubs, Vines & Groundcovers: 1 year.
3. Shrub and Tree Transplanting: 1 year

2. Condition for Acceptance: See respective sections.

3. Replacements: See respective sections.

D. Final Acceptance Review:

1. Contractor to request in writing Final Acceptance Review at the end of the warranty period.

    a. Within 10-days of receipt of the written request, Owner's representative, contractor Landscape Architect will review the work completed per contract documents.

2. Corrective work shall be completed immediately after Final Acceptance Review.

3. If terms of warranty (as outlined in respective sections) are complete and after all corrective work is completed and reviewed by the contractor, the Owner and the Landscape Architect. In the judgment of the landscape architect Final Acceptance will be granted in writing by the landscape architect.

4. Landscape Maintenance Manual: Submit binder to Owner with all documentation and records required and utilized during the maintenance period.

5. Keys and Identification: Return all keys and identification materials supplied by Owner for the purpose of site access

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

B. Related Sections include the following:

1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 2 Section "Earthwork" for drainage fill under slabs-on-grade and subgrade inspections.
3. Division 3 Section "Structural Precast Concrete" for precast concrete.
4. Division 3 Section "Concrete Sealers" for water-repellent coatings.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix indicated including alternate mix designs for cold and hot weather or when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mix water to be withheld for later addition at Project site.
2. The proposed mix designs shall be accompanied by complete standard deviation analysis or trial mixture test data.
3. Submit each proposed mix on the mix design submittal form included at the end of this section.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Identification: Each reinforcing bar shall have an embossed identifying symbol indicating that steel is of the grade specified. Steel without such a symbol will be rejected.

E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

1. Normal weight aggregates.

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures, including certification that chloride content complies with specification.
4. Curing materials.
5. Bonding agents.
6. Joint-filler strips.
7. Repair materials.
8. Certification of Ready Mixed Concrete Production Facility.
9. Certification of Field Testing Personnel within five (5) days of conference.
10. Adhesive Anchors.

G. Minutes of preinstallation conference within five (5) days of conference.

H. Quality Control Test and Inspection Reports: Submit field quality control test reports.

I. Ready-Mix Concrete Delivery Tickets: Duplicate delivery tickets for each batch discharged and used in the work, showing producer's name; delivery date; time dispatched; time delivered; project name and number; mix type including type and brand of cement, amount of admixture, class of concrete or cement content, and amount of water introduced.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

E. ACI Publications: Comply with the most recent version of the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
3. ACI 318, "Building Code Requirements for Reinforced Concrete."
4. ACI 211, "Standard Practice for Selecting Proportions for Normal, Heavyweight and mass concrete."
5. ACI 260, Standard Specification for Air-Entraining Admixtures for concrete.
6. ACI 302.1, "Guide for Concrete Floor and Slab Construction."
7. ACI 305, "Hot Weather Concreting."
8. ACI 306, "Cold Weather Concreting."
9. ACI 308, "Standard Practice for Curing Concrete."
10. ACI 347, "Recommended Practice For Concrete Formwork."
11. ASTM C 494, "Standard Specification for Chemical Admixtures for Concrete."

F. Preinstallation Conference: Before submitting design mixes, conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1. Review concrete mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixes.
   c. Ready-mix concrete producer.
   d. Concrete subcontractor.
   e. Independent testing agency responsible for field quality control.
   f. Independent testing agency responsible for floor flatness measurement.
   g. Geotechnical testing agency.

2. The Structural Engineer will be present at the conference. The Contractor shall notify the Structural Engineer at least 10 days prior to the scheduled date of the conference.
3. Minutes of the conference shall be recorded, typed and printed by the Contractor and distributed by him to all parties.
4. Agenda: Includes but is not limited to:

   a. Submittals.
   b. Coordination of work.
   c. Availability of material.
   d. Concrete mix design including admixtures.

e. Methods of placing, finishing, and curing.
f. Finish criteria required to obtain required flatness and levelness.
g. Materials inspection and testing.
h. Cold Weather and Hot Weather Procedures.
i. Field Quality Control Inspections and Testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Avoid damaging coatings on steel reinforcement.
2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.
2. Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60 (Grade 420), deformed.

B. Epoxy-Coated Reinforcing Bars: ASTM A 775, deformed.

1. Steel Reinforcement: ASTM A 651/A 615 M, Grade 60 (Grade 420), deformed.

C. Plain-Steel Wire: ASTM A 82, as drawn.

D. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets. Rolls not acceptable.

2.3 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use RSI Class 1 Plastic-protected or CRSI Class 2 stainless-steel bar supports.

2. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs. Support bottom bars on continuous slab bolsters with continuous sand plates (3 inch minimum width) at four feet o.c. maximum spacing. Support top bars on individual high chairs, with a one (1) piece 6 inch square sand plate, at a maximum spacing of four feet o.c. in each direction. Provide beam bolsters with continuous sand plates (3 inch minimum width) at four feet o.c. maximum.

1. For footings, use concrete masonry units made of stone concrete with f'c equal to 4,000 psi at 28 days.

B. Adhesive Anchors: Two component structural epoxy or polyester resin adhesive capable of developing yield strength of reinforcing bar.

1. Subject to compliance, provide one of the following:

   a. Hilti, Inc., "Hilti-HY-150" System.
   b. Rawl Plug Company, "Foil Fast" or "Chem Fast" System.
   c. Ackerman Johnson, "Poly-All" System.
   d. ITW Ramset/Redhead, "Epcon System".

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I/II.

1. Fly Ash: ASTM C 618, Class C or F.
2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Class: Severe weathering region, but not less than 3S.
2. Maximum size of coarse aggregates not more than one-fifth of narrowest dimension between sides of forms, one-third of depth of slabs, nor three-fourth of minimum clear spacing between reinforcing bars.

C. Water: Potable and complying with ASTM C 94.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.05 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Air-Mix" or "AEA 92", Euclid Chemicals Co.
b. "MB-VR" or "MB-AE", Master Builders.
c. "Sika Aer" Sika Corp.
d. "Darex AEA" or "Daravair", W. R. Grace.

C. Water-Reducing Admixture: ASTM C 494, Type A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Ecuon WR-75" or "WR-89", Euclid Chemical Co.
b. "Pozzolith 322", Master Builders.
c. "WRDA Hycol", W. R. Grace.
d. "Plastocrete 161", Sika Chemical Corp.

D. High-Range, Water-Reducing Admixture (HRWR): ASTM C 494, Type F.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Eucon 37", Euclid Chemical Co.
b. "Rheobuild 1000", Master Builders.
c. "WRDA 19" or "Daracem", W. R. Grace.
d. "Sikament 300", Sika Chemical Corp.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Accelguard 80", Euclid Chemical Co.
b. "Daraset", W. R. Grace.
c. "Pozzolith NC534", Master Builders.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Eucon Retarder 75", Euclid Chemical Co.
b. "Pozzolith Retarder", Master Builders.

c. "Daratard-17", W. R. Grace.
d. "Plastiment", Sika Chemical Co.

G. *Corrosion Inhibiting Admixture:* Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Products: Subject to compliance with requirements, provide one of the following:

a. DCI or DCI-S; W.R. Grace & Co,., Construction Products Div.
b. Rheocrete 222+; Master Builders, Inc.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A, 25% solids content minimum.

F. Products: Subject to compliance with requirements, provide one of the following:

1. Evaporation Retarder:

a. Eucobar; Euclid Chemical Co.
b. E-Con; L&M Construction Chemicals, Inc.
c. Confilm; Master Builders, Inc.

2. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:
a. Lumiseal WB Plus; L&M Construction Chemicals, Inc.
b. Vocomp-30; W. R. Meadows, Inc.
c. Super Aqua Cure, Euclid Chemical Co.
d. Super Diamond Clear Vox, Euclid Chemicals Co.
e. Masterkure 30W, Masterbuilders.

2.7 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. "Flex-Con", Euclid Chemical Co.
    b. "Daraweld C", W. R. Grace.
    c. "SBR Latex", Euclid Chemical Co.

C. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.8 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.
5. Products: Subject to compliance with requirements, provide the following:

    a. "Flo-Top", Euclid Chemical Co.
    b. "Ardes", Ardes Co.
    c. "Underlayment 110", Master Builders.

B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm).

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5700 psi (39 MPa) at 28 days when tested according to ASTM C 109/C 109M.
5. Products: Subject to compliance with requirements, provide the following:

    a. "Eucocrete", The Euclid Chemical Co.
    b. "Euco Speed MP" (Cold Weather), The Euclid Chemical Co.

C. Polymer Patching Mortar: Polymer and microsilica modified pumpable cementitious based compound.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Horizontal Surfaces

1) "Euco Thin Top Supreme Concrete Top Supreme", The Euclid Chemical Co.
2) "Sikatop 121 or 122", Sika Chemical Corp.

b. Vertical or Overhead

1) "Verticoat/Verticoat Supreme", Euclid Chemical Co.
2) "Sikatop 123", Sika Chemical Corp.

2.9 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, according to Section 5.3 of ACI 318.

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
2. If field experience data for previously used mixes are submitted, all materials shall be from the same sources and with the same brand names as the previously utilized mixes.
3. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve an average compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1400 psi when concrete strengths of 5000 or more are used.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

1. The testing agency shall not be the same as used for field quality control testing.

C. Do not begin concrete production until Architect has reviewed mix designs.

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

E. Normal Weight Concrete: Proportion normal-weight concrete mix as indicated on drawings.

F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 25 percent.
4. Combined Fly Ash and Ground Granulated Blast-Furnace Slag: 25 percent.

G. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as indicated within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:

1. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.

H. Limit water-soluble, chloride-ion content in hardened concrete to 0.10 percent by weight of cement.

I. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
2. Use high range water-reducing (HRWR) admixture in concrete with a water-cementitious materials ratio below 0.50.
3. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
4. Use non-corrosive, non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degree F. (10 degree C).

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
2. Provide delivery ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
3. No water shall be added after mixing to concrete containing HRWR. If loss of slump occurs, HRWR may be redosed at the site as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Architect and the manufacturer at the Pre-Installation Conference.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class B, 1/4 inch (6 mm).

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete except as indicated.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

M. Earthforms: Earth cuts maybe used as forms for footings only. Do not use earth cuts as forms for other vertical surfaces of pile caps, walls, or grade beams, except as reviewed by Architect. If earthforms are used, the dimensions of the concrete member shall be increased by 2 inches (1 inch each face) to meet the requirements of ACI 318 for minimum concrete cover over reinforcing.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevations required.
2. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:

1. Not less than 14 days and until concrete has attained 28-day design compressive strength.
2. Determine compressive strength of in-place concrete by testing representative field- or laboratory-cured test specimens according to ACI 301.
3. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
2. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations.
3. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.
4. Bending: Bend bars, cold, unless otherwise approved. Do not field bend bars partially embedded in concrete.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

G. Splicing: Splices of reinforcement made only as required or shown or specified. Accomplish splicing as follows:

1. Lap splices: Do not use lap splices for bars larger than #11. Minimum lengths of lap as shown.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect. Locate so that slabs can be placed in strips.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with "Soff-Cut" early entry, dry-cut power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks, but not later than 12 hours after placement.
3. Leave joints in an acceptable condition for installation of joint sealant.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement. Use HRWR admixture to adjust slump for workability.

1. Do not add water to concrete after adding high-range water-reducing admixture to mix.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
4. Use only a non-corrosive, non-chloride accelerator. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are NOT permitted.

G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
4. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm) in height.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use still brushes, brooms, or rakes.

1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.10 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive *concrete sealers.*
   b. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect reinforcing, observe placement, sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

1. Provide a technician at site of placement at all times to perform concrete sampling and testing.

B. Subrade Inspection: Prior to the placing of concrete for footings and slabs on grade, the subgrade shall be inspected by the Geotechnical Testing Agency. The subgrade shall be moist and completely consolidated at the time of concreting. There must be no free water standing on the subgrade nor should there be any muddy or soft spots when the concrete is placed.

C. Pre-Placement Inspection: Before placing concrete, inspect formwork installation, reinforcing steel, for size, placement, size and minimum cover, and items to be embedded or cast-in. Notify Contractor of deficiencies and reinspect after corrected.

D. Placement Inspection: Provide full-time observation during concrete placement. Observe methods of conveying, depositing, and consolidation of concrete as well as hot and cold weather practices.

1. Observe preparations for placement of concrete:

a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
b. Inspect preparation of construction, expansion, and isolation joints.

2. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.

E. Curing Inspections: Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.

F. Testing Services: Take composite samples of fresh concrete at point of discharge from mixer (at point of discharge from end of pipe for concrete conveyed by pumping methods) in accordance with ASTM C172. Testing of composite samples shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each truck, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each truck, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.

a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

G. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

H. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

1. Non-Compliance: All test reports indicating non-compliance shall be faxed immediately to all parties on the test report distribution list and the hard copies submitted on different colored paper.

I. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device shallpermitted by Architect but will not be used as sole basis for approval or rejection of concrete.

J. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

K. Floor Flatness and Levelness: Engage a qualified testing laboratory to take measurements, to verify compliance with F_F, F_L, and other finish requirements. Measurements will occur within 72 hours after completion of concrete placement (weekends and holidays excluded). Make measurements before shores or forms are removed to insure the "as-built" levelness is

accurately assessed. Profile data for above characteristics may be collected using a laser level or any Type II apparatus (ASTM E1155, "profileograph" or "dipstick").

1. If individual slab section measures less than either of specified minimum local F_F, F_L numbers, that section shall be rejected and remedial measures shall be required. Sectional boundaries may be set at construction and contraction (control) joints, and not smaller than one-half bay.
2. If composite value of entire slab installation, combination of all local results, measures less than either of specified over F_F, F_L numbers, then whole slab shall be rejected and remedial measures shall be required.

L. Remedial Measures for Rejected Slabs: Correct rejected slab areas by grinding, planing, surface repair with underlayment compound or repair topping, retopping, or removal and replacement of entire rejected slab areas, as reviewed, until a slab finish constructed within specified tolerances is accepted.

CONCRETE MIX DESIGN SUBMITTAL FORM

Submit separate form for each mix design

Project: _____

General Contractor: _____

Concrete Contractor: _____

Concrete Supplier: _____

Plant Location: _____ Miles and Time to Project: _____

Mix Design Number: _____ Concrete Strength: _____

Used for: _____

A. DESIGN REQUIREMENTS:

Density: _____ pcf
Strength: _____ psi (28 day);
Air: _____ % specified

B. DESIGN MIX INFORMATION:

Based on
Standard Deviation Analysis: _____ or Trial Mix Test Data: _____

Materials:	**Type/Source**	**Specific Gravity**	**Weight/lb.**	**Absolute Vol. /cu.ft**
Cement:				
Flyash:				
Coarse:				
Fine:				
Water:				
Air:				
Other:				
		TOTAL:		

Admixtures:	**Product/Manufacturer**	**Dosage** oz./cu.yd
Water Reducer:		
Air Entraining Agent:		
High Range Water Reducing Admixture:		
Non-Corrosive Accelerator:		
Other:		
Other:		

C. FINAL MIX DESIGN DATA:

Water/Cement Ratio = _____
Initial Slump = _____ in. BEFORE adding superplasticizer
Final Slump = _____ in. AFTER adding superplasticizer
Unit Dry Wt. = _____ pcf
Unit Wet Wt. = _____ in.
Air Content = _____ %

D. STANDARD DEVIATION ANALYSIS (from experience records):

Number of Field Experience Cylinders Evaluated: _____
Average Strength of Field Experience Cylinders: _____ psi
Standard Deviation (s): _____ psi
Required Average Strength (f'cr): _____ psi

f'cr = f'c + 1.34s or f'cr = f'c + 2.33s - 500
(Refer to ACI 301 for increased deviation factor when less than 30 tests are available.)

E. TRIAL MIX TEST DATA:

COMPRESSIVE STRENGTH

Age (days)	Mix #1 (comp. str.)	Mix #2 (comp. str.)	Mix #3 (comp. str.)
7	_____psi	_____psi	_____psi
7	_____psi	_____psi	_____psi
28	_____psi	_____psi	_____psi
28	_____psi	_____psi	_____psi
28 day average:	_____psi	_____psi	_____psi

Mix designed proportioned to achieve f'cr = f'c + 1200 psi (1400 psi for strength higher than 5000 psi at 28 days)

F. REQUIRED ATTACHMENTS:

Coarse Aggregate Gradation Report: ____
Fine Aggregate Gradation Report: ____
Field Experience Test Report: ____
Trial Mix Test Reports: ____

END OF SECTION 03300

SECTION 03375

CONCRETE SEALERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes clear water-repellent coatings for the following surfaces:

1. All supported horizontal concrete deck surfaces and concrete slabs on grade. Seal 6 inches of all vertical concrete surfaces adjacent to sealed horizontal surfaces.

B. Related Sections include the following:

1. Division 3 Sections for concrete work including floor sealers and curing agents, precast concrete, and concrete restoration and cleaning.
2. Division 7 Section "Joint Sealants" for joint sealants.
3. Division 9 Section "Painting" for paints and coatings.

1.3 PERFORMANCE REQUIREMENTS

A. Provide water repellents with the following properties based on testing manufacturer's standard products, according to test methods indicated, applied to substrates simulating Project conditions using same materials and application methods to be used for Project.

1. Chloride-Ion Intrusion in Concrete: Transportation Research Board, National Research Council's NCHRP Report 244, Series I, II, III and IV Tests.

a. Reduction of Water Absorption: 80 percent.
b. Reduction in Chloride Content: 80 percent.
c. Penetration of one application 1/8 – ¼" inch.
d. Scaling Resistance of Concrete (ASTM C-672) – Excellent.
e. Alberta Transportation and Utilities Penetrating Sealer type 1B – Initial Water Repellency (minimum 82.5; Water Repellency after Abrasion (minimum) 82.5%.
f. Repellency Rating – 80% or better, based on comparison of untreated versus treated samples, where repellency rating of untreated samples = 0%. Calculations will be in accordance with NCHRP 244 procedures.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's specifications, surface preparation and application instructions, recommendations for water repellents for each surface to be treated, and protection and cleaning instructions. Include data substantiating that materials are recommended by manufacturer for applications indicated and comply with requirements.

B. Applicator Certificates: Signed by manufacturer certifying that the applicator complies with requirements.

C. Certification by water repellent manufacturer that products supplied comply with local regulations controlling use of VOCs.

D. Material Test Reports: Indicate and interpret test results for compliance of water repellents with requirements indicated.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who employs only persons trained and approved by water repellent manufacturer for application of manufacturer's products.

B. Testing Agency Qualifications: An independent testing agency with experience and capability to conduct testing indicated in "Performance Requirements" Article without delaying the Work, per ASTM E 548.

C. Regulatory Requirements: Comply with applicable rules of pollution-control regulatory agency having jurisdiction in Project locale regarding VOCs and use of hydrocarbon solvents.

D. Sealer Coordination: Review of other sections of these specifications in which curing compounds or paints, are to be provided on concrete surfaces to be sealed to ensure compatibility with the concrete sealer.

1.6 PROJECT CONDITIONS

A. Weather and Substrate Conditions: Do not proceed with application of water repellent under any of the following conditions, except with written instruction of manufacturer:

1. Ambient temperature is less than 40 deg F (4.4 deg C).
2. Concrete surfaces and mortar have cured for less than 28 days.
3. Rain or temperatures below 40 deg F (4.4 deg C) are predicted within 24 hours.
4. Application is earlier than 24 hours after surfaces have been wet.
5. Substrate is frozen or surface temperature is less than 40 deg F (4.4 deg C).
6. Windy condition exists that may cause water repellent to be blown onto vegetation or surfaces not intended to be coated.
7. Ambient temperature of application surface is more than 100 degree F.
8. Do not proceed with application of materials in rainy conditions or if heavy rain is anticipated within 8 hours after application. Materials shall not be applied to damp substrates. The surface should be sufficiently dry to observe the spray pattern during application.

1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Warranty:

1. The system manufacturer shall furnish the Owner a written single-source performance warranty that the Concrete Penetrating Sealer System will be free of defects related to workmanship or material deficiency for a five (5) year period from the date of substantial completion of the work provided under this section of the specification. The following problems shall be specifically covered under the warranty:

   a. The concrete surfaces which receive the concrete sealer shall not scale, dust or spall.

   b. The concrete sealer shall not permit water, salts, deicers, acids and oils to penetrate the treated surfaces.

2. Any repair required under the warranty will be made by the system manufacturer as follows:

   a. Scaling or dusting will be repaired by removing loose surface materials to sound substrate and reapplying the sealer system.

   b. Spalled surfaces (surface deterioration related to the expansive forces of corrosion of reinforcement steel) shall be repaired by epoxy concrete patching done in accordance with current application ACI standards.

3. Any required repairs under the warranty shall be made by the system manufacturer. The required written warranty shall be provided by the system manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Silanes:

   a. Sil-Act ATS 42; Advanced Chemical Technologies, Inc.
   b. Euco-Guard S-40; Euclid Chemical Company (The).
   c. Hydrozo 40; Harris Specialty Chemicals, Inc.
   d. Chem-Trete BSM 40; Huls America, Inc.

2. Silanes: With 3.3 lb/gal. (400 g/L) VOCs or less.

   a. Sil-Act ATS Multigard; Advanced Chemical Technologies, Inc.

b. Enviroseal 40; Harris Specialty Chemicals, Inc.

2.2 WATER REPELLENTS

A. Silanes, 40 Percent Solids: Penetrating sealing compound. A monomeric compound containing a minimum of 40 percent alkyltrialkoxysilanes with alcohol, mineral spirits, water, or other proprietary solvent carrier. Sealer material shall not alter the appearance or surface texture of concrete surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to repellent manufacturer's written instructions, to ensure surface is sufficiently dry.

1. Formed Concrete: Remove oil, curing compounds, laitance, and other substances that could prevent adhesion or penetration of water repellents.

B. Test for pH level, according to water repellent manufacturer's written instructions, to ensure chemical bond to silicate minerals.

C. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live plants and grass.

D. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

E. Test Application: Before performing water-repellent work, including bulk purchase and delivery of products, prepare a small application in an unobtrusive location and in a manner approved by Architect to demonstrate the final effect (visual, physical, and chemical) of planned application. Proceed with work only after Architect approves test application or as otherwise directed.

1. Prior to full scale surface preparation and application of selected material, a trail application shall be conducted. The area shall be 11 feet by 11 feet (121 square feet) in size, at a location determined by the Architect. The preferred location will be on a sloping ramp.
2. The trial area shall be cleaned according to manufacturer's recommendations in the same manner as planned for the entire project. This may include sweeping and cleaning with compressed air, water cleaning under pressure or shotblasting. For the purposes of this test only, sandblasting is an acceptable substitute for shotblasting.
3. Upon completion of surface preparation, a core will be removed and tested for water absorption. This is the Untreated Water Absorption value. The test area will then be treated with one gallon of the selected material. From the treated area, two core samples shall be removed. One is to be split with a chisel and dye tested for depth of sealer

penetration. The second core is to be tested for Treated Water Absorption. The repellency rating is calculated on the basis of untreated and treated water absorption values.

4. Once field test results are obtained, which meets requirements of Section 1.02.A.1.b and 1.02.A.1.c, the contractor will be authorized to perform full scale surface preparation and application of the selected material. Do not proceed with application unless directed in writing by the architect.
5. Cost of trial area application and testing shall be included in the contractor's price for sealer installation. Testing shall be conducted by the Architect or his designee. Additional quality control testing, if desired by the Owner in other areas or subsequent to the installation to determine warranty performance, shall be paid for by the Owner.

3.2 APPLICATION

A. Apply a heavy-saturation spray coating of water repellent on surfaces indicated for treatment using low-pressure spray equipment. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise indicated.

1. Product shall be applied as packaged at a rate of 125 sq. ft. per gallon. Do not dilute or alter the material.

2. Preferred method of application is with low pressure (15 PSI) airless spray equipment or with a heavily saturated brush or roller. Spray equipment should be equipped with solvent resistant gaskets and hoses.

3. When applying by brush or roller, care will be taken to insure that sufficient material is being applied to thoroughly saturate the treatment surfaces maintaining the appropriate square foot coverage rate required.

4. Product shall be applied to horizontal surfaces in a single saturating application.

5. Sufficient material shall be applied so that treated surfaces remain wet for a few minutes before penetration into the concrete.

6. Surface residues, pools and puddles shall be broomed out thoroughly until they completely penetrate into the surface.

7. Treated surfaces shall be protected from rain and other surface water for a period of not less than eight (8) hours after application.

8. Treated surfaces shall be protected from excessive foot and vehicular traffic for a period of not less than eight (8) hours after application.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Provide services of a factory-authorized technical service representative to inspect and approve the substrate before application and to instruct the applicator on the product and application method to be used.

B. Water Test: After the water repellent has dried, flood the treated surfaces with water as directed by the Architect. Apply additional coating to areas which show evidence of water absorption.

3.4 CLEANING

A. Protective Coverings: Remove protective coverings from adjacent surfaces and other protected areas.

B. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by water-repellent application. Comply with manufacturer's written cleaning instructions.

END OF SECTION 03375

SECTION 03410

PLANT-PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes plant-precast structural concrete units, including the following:

1. Long-span units.
2. Structural framing units.
3. Exterior spandrels, wall panels with Architectural Precast Finish or Masonry Brick Veneer.
4. Stair and Slab units.

B. Related Sections include the following:

1. Division 3 Section "Cast in Place Concrete."
2. Division 7 Section "Joint Sealants" for elastomeric joint sealants and sealant backings.
3. Division 4 Section "Unit Masonry Assemblies" for brick veneer to be installed on precast panels.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide precast structural concrete units and connections capable of withstanding design loads within limits and under conditions indicated.

1. Dead Loads: As indicated.
2. Live Loads: As indicated.
3. Wind Loads: As indicated.
4. Earthquake Loads: As indicated.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixes: For each concrete mix.

C. Shop Drawings: Detail fabrication and installation of precast structural concrete units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, openings, and types of reinforcement, including special reinforcement.

1. Indicate welded connections by AWS standard symbols. Detail loose and cast-in hardware, inserts, connections, and joints, including accessories.
2. Indicate locations and details of anchorage devices to be embedded in other construction.
3. Comprehensive engineering analysis signed and sealed by the qualified professional engineer responsible for its preparation.

D. Samples: For each type of finish indicated on exposed surfaces of precast structural concrete units, in sets of 3, illustrating quality of finishes, colors, and textures; approximately 12 by 12 by 2 inches (300 by 300 by 50 mm).

E. Samples of bearing pads.

F. Welding Certificates: Copies of certificates for welding procedures and personnel.

G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Concrete materials.
2. Reinforcing materials and prestressing tendons.
3. Admixtures.
4. Bearing pads.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed precast structural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm that complies with the following requirements and is experienced in manufacturing precast structural concrete units similar to those indicated for this Project and with a record of successful in-service performance.

1. Assumes responsibility for engineering precast structural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
2. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of precast structural concrete that are similar to those indicated for this Project in material, design, and extent.

3. Participates in PCI's Plant Certification program and is designated a PCI-certified plant for Group C, Category C3 or C4.
4. Has sufficient production capacity to produce required units without delaying the Work.

C. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

D. Design Standards: Comply with ACI 318 (ACI 318M) and the design recommendations of PCI MNL 120, "PCI Design Handbook--Precast and Prestressed Concrete."

E. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and camber and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products."

F. Product Options: Drawings indicate size, profiles, and dimensional requirements of precast concrete units and are based on the specific types of units indicated. Other fabricators' precast concrete units complying with requirements may be considered. Refer to Division 1 Section "Substitutions."

G. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.4, "Structural Welding Code--Reinforcing Steel."

H. Mockups: Before installing precast structural concrete units, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Full Size Panel: Upon approval of small sample panels, and before fabrication of any other architectural precast concrete work commences, construct one full height panel and column intersection and deliver it to the site at a location designated by the Architect. If this panel is approved by the Architect, it shall remain on site and be used as a standard of quality for architectural precast concrete work required for this project. Fabrication of the architectural precast work shall not commence until on site full size panel has been approved by the Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting fabrication.
4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

I. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver precast structural concrete units to Project site in such quantities and at such times to ensure continuity of installation. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so markings are visible.

B. Lift and support units only at designated lifting and supporting points as shown on Shop Drawings.

1.7 SEQUENCING

A. Furnish anchorage items to be embedded in other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MOLD MATERIALS

A. Molds: Provide molds and, where required, form-facing materials of metal, plastic, wood, or another material that is nonreactive with concrete and dimensionally stable to produce continuous and true precast concrete surfaces within fabrication tolerances and suitable for required finishes.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M, as follows:

1. Steel Reinforcement: ASTM A 615/A 615M, **Grade 60, deformed.**

2. **Provide epoxy coated reinforcing at curbs and washes on supported decks.**

D. Plain-Steel Wire: ASTM A 82, as drawn.

E. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

F. Epoxy-Coated-Steel Welded Wire Fabric: : ASTM A 884/A 884M, Class A coated, plain.

G. Supports: Manufacturer's bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place according to CRSI's "Manual of Standard Practice," PCI MNL 116, and as follows:

1. For uncoated reinforcement, use all-plastic.
2. For epoxy-coated reinforcement, use all-plastic bar supports.

2.3 PRESTRESSING TENDONS

A. Prestressing Strand: ASTM A 416/A 416M, Grade 250 or 270 (Grade 1725 or 1860), uncoated, 7-wire, low-relaxation strand.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, of same type, brand, and source.

B. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S.

C. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

D. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

E. Water-Reducing Admixture: ASTM C 494, Type A.

F. Retarding Admixture: ASTM C 494, Type B.

G. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

H. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

I. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.

J. Corrosion Inhibitor Admixture: DCI or DCI's Corrosion Inhibitor as manufactured by W.R. Grace and Co. or approved equal.

2.5 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished; AWS D1.1, Type A or B, with arc shields.

C. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.

D. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); carbon-steel, hex-head bolts and studs; carbon-steel nuts; and flat, unhardened steel washers.

E. Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123/A 123M, after fabrication, and ASTM A 153/A 153M, as applicable.

1. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.

F. Welding Electrodes: Comply with AWS standards.

G. Accessories: Provide clips, hangers, plastic shims, and other accessories required to install precast structural concrete units.

H. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion.

2.6 BEARING PADS

A. Provide bearing pads for precast structural concrete units as follows:

1. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer.
2. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer. Surface hardness of 80 to 100 Shore A durometer.

2.7 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application.

C. Epoxy Grout: ASTM C 881, 2-component epoxy resin, of type, grade, and class to suit requirements.

2.8 CONCRETE MIXES

A. Prepare design mixes for each type of concrete required.

B. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318 (ACI 318M).

D. Normal-Weight Concrete: Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): **5000 psi (34.5 MPa)**.

2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows, with a tolerance of plus or minus 1-1/2 percent:

   a. Air Content: 6 percent for 1-inch- (25-mm-) nominal maximum aggregate size.
   b. Air Content: 6 percent for 3/4-inch- (19-mm-) nominal maximum aggregate size.
   c. Air Content: 7 percent for 1/2-inch- (13-mm-) nominal maximum aggregate size.

E. Corrosion Inhibitor Admixture:

1. DCI or CDI's Corrosion Inhibitor shall be added at the rate of 2 gallons per cubic yard and active corrosion shall be inhibited to 6.0 pounds of chloride at the rebar.
2. Admixture company shall have a minimum of five years experience utilizing their calcium nitrite corrosion inhibitor in the U.S.
3. Corrosion Inhibitor shal have been used in a minimum of five projects of similar size.

F. Other Admixtures: Use water-reducing, high-range water-reducing, water-reducing and accelerating, or water-reducing and retarding admixtures according to manufacturer's written instructions.

G. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.9 FABRICATION

A. Formwork: Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pretensioning and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances.

1. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial-formula, form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's written instructions.
2. Unless forms for precast, prestressed concrete units are stripped before detensioning, design forms so stresses are not induced in precast concrete units because of deformation or movement of concrete during detensioning.

B. Built-in Anchorages: Accurately position built-in anchorage devices and secure to formwork. Locate anchorages where they do not affect position of main reinforcement or concrete placement. Do not relocate bearing plates in units unless approved by Architect.

1. Install Dovetail Anchor Slots as indicated.

C. Cast-in openings larger than 10 inches (250 mm) in diameter or 10 inches (250 mm) square according to Shop Drawings. Smaller holes may be field cut by trades requiring them, as approved by Architect.

D. Reinforcement: Comply with recommendations in CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete-placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required.
3. Place reinforcement to obtain at least the minimum coverage for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Prestress tendons for precast structural concrete units by either pretensioning or posttensioning methods. Comply with PCI MNL 116.

1. Delay detensioning until concrete has reached at least 70 percent of its compressive strength as established by test cylinders cured under the same conditions as concrete.
2. If concrete has been heat cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.
3. Detension pretensioned tendons either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.

F. Mix concrete according to PCI MNL 116 and requirements in this Section. After concrete batching, no additional water may be added.

G. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units. Comply with requirements in PCI MNL 116 for measuring, mixing, transporting, and placing concrete.

H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with PCI MNL 116.

I. Comply with ACI 306.1 procedures for cold-weather concrete placement.

J. Comply with ACI 305R recommendations for hot-weather concrete placement.

K. Identify pickup points of precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint casting date on each precast concrete unit on a surface that will not show in finished structure.

L. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture.

M. Product Tolerances: Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI *MNL 116 product tolerances.*

N. Finish formed surfaces of precast structural concrete as indicated for each type of unit, and as follows:

1. Standard Finish: Normal plant-run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycombs, or structural defects are not permitted.
2. Architectural Finish: Finished precast units shall be a medium sandblast finish and exposed aggregate finish, or clay masonry veneer, as indicated on the drawings, and shall have a uniform appearance in color and texture.

a. Interior face or spandrel and wall panels shall receive a smooth troweled finish.

O. Smooth steel trowel finish unformed surfaces. Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth, uniform finish.

1. Apply scratch finish to precast concrete units that will receive concrete topping after installation. *After initial strikeoff, transversely scarify surface to provide ridges* approximately 1/4 inch (6 mm) deep.

2. Provide a broom finish on parking surface.

P. Recess prestressing tendons a minimum of 1/2 inch (13 mm), fill recesses with grout, and apply a sack finish to vertical ends of precast concrete units.

2.10 LONG-SPAN UNITS

A. Type: Plant-fabricated, precast, prestressed concrete long-span units.

B. Furnish units free of voids and honeycombs.

C. Provide standard finish to precast concrete units, unless otherwise indicated.

D. Reinforce units to resist transportation and erection stresses.

E. Include cast-in weld plates where required.

F. Coordinate with other trades for installation of cast-in items.

G. Use Corrosion Inhibitor admixture at the rate of 2 gallons per cubic yard.

2.11 STRUCTURAL FRAMING UNITS

A. Type: Precast, prestressed structural concrete framing units.

B. Furnish units free of voids and honeycombs.

C. Provide standard finish to precast concrete units.

D. Reinforce units to resist transportation and erection stresses.

E. Include cast-in weld plates where required.

F. Coordinate with other trades for installation of cast-in items.

2.12 SOURCE QUALITY CONTROL

A. Owner will employ an independent testing agency to evaluate precast structural concrete fabricator's quality-control and testing methods.

1. Allow Owner's testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with Owner's testing agency and provide samples of materials and concrete mixes as may be requested for additional testing and evaluation.

B. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 116 requirements.

C. Strength of precast concrete units will be considered deficient if units fail to comply with PCI MNL 116 requirements, including the following:

1. Units fail to comply with compressive-strength test requirements.
2. Reinforcement and prestressed tendons of units do not comply with fabrication requirements.
3. Concrete curing and protection of units against extremes in temperature fail to comply with requirements.
4. Units are damaged during handling and erecting.

D. Testing: If there is evidence that the strength of precast concrete units may be deficient or may not comply with PCI MNL 116 requirements, Owner will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42.

1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
2. Cores will be tested in an air-dry condition per ACI 301 if units will be dry under service conditions.
3. Strength of concrete for each series of 3 cores will be considered satisfactory if the average compressive strength is equal to at least 85 percent of the 28-day design compressive strength and no single core is less than 75 percent of the 28-day design compressive strength.
4. Test results will be made in writing on the same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:

a. Project identification name and number.
b. Date when tests were performed.
c. Name of precast concrete fabricator.

d. Name of concrete testing agency.
e. Identification letter, name, and type of precast concrete unit or units represented by core tests; design compressive strength; type of break; compressive strength at break, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

E. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mix that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

F. Dimensional Tolerances: Units with dimensions smaller or larger than required and not complying with tolerance limits may be subject to additional testing.

1. Precast concrete units with dimensions larger than required will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units, as required, to comply with construction conditions.

G. Defective Work: Precast concrete units that do not comply with requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that comply with requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Bearing Pads: Install bearing pads as precast concrete units are being erected. Set pads on true, level, and uniform bearing surfaces and maintain in correct position until precast concrete units are placed.

B. Install precast structural concrete. Shore and brace precast concrete units to maintain location, stability, and alignment until permanent connections are installed.

C. Welding: Perform welding in compliance with AWS D1.1 and AWS D1.4, with qualified welders.

1. Protect precast concrete units and bearing pads from damage by field welding or cutting operations and provide noncombustible shields as required.
2. Repair damaged metal surfaces by cleaning and applying a coat of galvanized repair paint to galvanized surfaces.
3. Repair damaged metal surfaces by cleaning and repriming damaged painted surfaces.

D. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units unless approved by Architect.

E. Erection Tolerances: Install precast concrete units level, plumb, square, and true, without exceeding the recommended erection tolerances in PCI MNL 127, "Recommended Practice for Erection of Precast Concrete."

F. Grouting Connections and Joints: After precast concrete units have been placed and secured, grout open spaces at keyways, connections, and joints as follows:

1. Provide forms or other approved method to retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it hardens.

2. Non-structural joints: Cement grout consisting of one part Portland cement, 2-1/2 parts sand, and only enough water to properly mix and for hydration.

3. Structural joints: Shrinkage-resistant grout consisting of premixed compound and water to provide a flowable mixture without segregation or bleeding.

3.3 FIELD QUALITY CONTROL

A. Testing: Engage a qualified independent testing and inspecting agency to perform field tests and inspections.

B. Field welds and connections using high-strength bolts will be subject to tests and inspections.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.4 CLEANING

A. Clean exposed surfaces of precast concrete units after erection to remove weld marks, other markings, dirt, and stains.

1. Wash and rinse according to precast concrete fabricator's written recommendations. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes.

END OF SECTION 03410

SECTION 04810

UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:

1. Concrete masonry units.
2. Face brick, both field installed and shop installed to precast structural concrete units.
3. Building (common) brick.
4. Mortar and grout.
5. Reinforcing steel.
6. Masonry joint reinforcement.
7. Ties and anchors.
8. Miscellaneous masonry accessories.
9. Precast Masonry Lintels.

B. Related Sections include the following:
1. Division 3 Section "Plant-Precast Structural Concrete" for precast concrete.
2. Division 7 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.

C. Products installed, but not furnished, under this Section include the following:
1. Manufactured reglets in masonry joints for metal flashing, furnished under Division 7 Section "Sheet Metal Flashing and Trim."
2. Hollow-metal frames in unit masonry openings, furnished under Division 8 Section "Steel Doors and Frames."

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602

1. For Concrete Unit Masonry: As indicated.
2. For Brick Unit Masonry: f'm = 2000 psi.

1.5 SUBMITTALS

A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.

B. Shop Drawings: Show fabrication and installation details for the following:
1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
2. Precast Masonry Lintels.

C. Samples for Initial Selection: For the following:

1. Unit masonry Samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.
2. Colored mortar Samples showing the full range of colors available.

D. Samples for Verification: For the following:

1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
2. Colored mortar Samples for each color required, showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project.
3. Weep holes/vents in color to match mortar color.
4. Accessories embedded in the masonry.

E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.

F. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

G. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:

1. Each type of masonry unit required.

a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
b. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.

2. Mortar complying with property requirements of ASTM C 270.

3. Grout mixes complying with compressive strength requirements of ASTM C 476. Include description of type and proportions of grout ingredients.

H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
2. Each combination of masonry unit type and mortar type. Include statement of net-area compressive strength of masonry units, mortar type, and net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
3. Each material and grade indicated for reinforcing bars.
4. Each type and size of joint reinforcement.
5. Each type and size of anchor, tie, and metal accessory.

I. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

J. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with hot-weather requirements.

K. Field Quality Control Test Reports: Submit test reports to Architect within 3 days of testing.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Preconstruction Testing Service: Engage a qualified independent testing agency to perform the following preconstruction testing:

1. Clay Masonry Unit Test: For each clay masonry unit indicated, per ASTM C 67.
2. Concrete Masonry Unit Test: For each concrete masonry unit indicated, per ASTM C 140.
3. Grout Test: For compressive strength per ASTM C 1019.

E. Mockups: Before installing unit masonry, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Locate mockups in the locations indicated or, if not indicated, as directed by Architect.
2. Build mockup of typical wall area as shown on Drawings.

3. Build mockups for the following types of masonry in sizes approximately 48 inches long by 48 inches high by full thickness, including face and backup wythes and accessories. Include a sealant-filled joint at least 16 inches long in each mockup.

   a. Each type of exposed unit masonry construction.
   b. Typical exterior wall with through-wall flashing installed for a 24-inch length in corner of mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).

4. Clean exposed faces of mockups with masonry cleaner as indicated.
5. Where masonry is to match existing, erect mockups adjacent and parallel to existing sur-
6. Notify Architect seven days in advance of dates and times when mockups will be con-
7. Protect accepted mockups from the elements with weather-resistant membrane.
8. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
9. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

   a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.

10. Demolish and remove mockups when directed.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

   1. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.

1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. General: Provide shapes indicated and as follows:

1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners, unless otherwise indicated.

B. Concrete Masonry Units: ASTM C 90 and as follows:

2.4 REINFORCING STEEL

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60.

2.5 MASONRY JOINT REINFORCEMENT

A. General: ASTM A 951 and as follows:
   1. Hot-dip galvanized, carbon-steel wire for both interior and exterior walls.
   2. Wire Size for Side Rods: W2.8 or 0.188-inch diameter.
   3. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
   4. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units where indicated.

B. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches o.c.

C. For multiwythe masonry, provide types as follows:
   1. Adjustable (2-piece) type with single pair of side rods ladder type vertical loop ties spaced not more than 16 inches o.c. and with separate adjustable box type veneer ties engaging the cross ties. Cross ties are to be welded rectangular vertical loop. Space side rods for embedment within each face shell of backup wythe and size adjustable ties to extend at least halfway through outer wythe but with at least 5/8-inch cover on outside face.
   2. Products: Subject to compliance with requirements, provide one of the following:

      a. Multi-wythe Joint Reinforcement:

         No. 280 Dub'l Loop-Lok Type Ladder, by Hohmann & Barnard, Inc..

2.6 TIES AND ANCHORS, GENERAL

A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.

B. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.

C. Steel Sheet, Galvanized after Fabrication: ASTM A 366/A 366M cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153.

D. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.7 BENT WIRE TIES

A. General: Rectangular units with closed ends and not less than 4 inches wide. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.

   1. Where coursing between wythes does not align, use adjustable ties composed of 2 parts; 1 with pintles, the other with eyes; with maximum misalignment of 1-1/4 inches.

2. Where wythes are of different materials, use adjustable ties composed of 2 parts; 1 with pintles, the other with eyes; with maximum misalignment of 1-1/4 inches.

B. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire.

2.8 ANCHORS FOR CONNECTING TO CONCRETE

A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section: Refer to Section 03300.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.1875-inch diameter hot-dip galvanized steel wire.

2.9 RIGID ANCHORS

A. General: Fabricate from steel bars as follows:

1. 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins.
2. As indicated.
3. Finish: Hot-dip galvanized to comply with ASTM A 153.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.

B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.
2. PVC: ASTM D 2287, Type PVC-65406.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Plastic Weep Hole/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, designed to fill head joint with outside face held back 1/8 inch from exterior face of masonry, in color selected from manufacturer's standard.

E. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.

1. Provide units with either two loops or four loops as needed for number of bars indicated.

F. Available Products: Subject to compliance with requirements, cavity drainage materials and related materials that may be incorporated into the Work include, but are not limited to, the following:

1. Plastic Weep Hole/Vent:

   a. Cell Vent; Dur-O-Wal, Inc.
   b. Cell Vent; Wire-Bond, Masonry Reinforcing Corp of America
   c. Quadro-Vent QV; by Hohmann & Barnard, Inc.

2. Reinforcing Bar Positioners:

   a. D/A 811; Dur-O-Wal, Inc.
   b. No. 376 Rebar Positioner; Heckman Building Products, Inc.
   c. #RB Rebar Positioner; Hohmann & Barnard, Inc.
   d. O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.

2.11 MASONRY CLEANERS

A. Utilize type of cleaning solution recommended by manufacturer of masonry units.

B. Where finished walls of brick and CMU are in combination or close proximity, protect the exposure of the CMU to the cleaning process of the brick work by necessary means.

2.12 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.
1. Limit cementitious materials in mortar to portland cement, and lime.
2. For masonry below grade, in contact with earth, and where indicated, use Type M.
3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.

D. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Limit pigments to the following percentages of cement content by weight:

1. For mineral-oxide pigments and portland cement-lime mortar, not more than 10 percent.
2. For carbon-black pigment and portland cement-lime mortar, not more than 2 percent.
3. Mortar shall match each existing mortar color.

E. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

2.13 SOURCE QUALITY CONTROL

A. Contractor shall engage a qualified independent testing agency to perform source-quality-control testing indicated below:
   1. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Brick Tests: For each type and grade of brick indicated, units will be tested according to ASTM C 67.

C. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.
   4. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.

B. Build recesses to accommodate items specified in this Section and in other Sections of the Specifications.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.

D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. Wetting of Brick: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.

3.3 CONSTRUCTION TOLERANCES

A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.

D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

1. One-half running bond with vertical joint in each course centered on units in courses above and below except where another bond type is indicated or required.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

F. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Division 7 Section "Firestopping."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.
2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.

B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

1. At cavity walls, bevel beds away from cavity, to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against the cavity face of the brick.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.6 BONDING OF MULTIWYTHE MASONRY

A. Use masonry joint reinforcement installed in horizontal mortar joints to bond wythes together.

B. Corners: Provide interlocking masonry unit bond in each wythe and course at corners, unless otherwise indicated.

1. Provide continuity with masonry joint reinforcement at corners by using prefabricated "L" units as well as masonry bonding.

C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:

1. Provide continuity with masonry joint reinforcement by using prefabricated "T" units.
2. Provide rigid metal anchors not more than 24 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.7 CAVITIES

A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.

1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.

3.8 MASONRY JOINT REINFORCEMENT

A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

    a. Reinforcement above is in addition to continuous reinforcement.

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.9 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 24 inches o.c. horizontally.

3.10 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to concrete backup with masonry-veneer anchors to comply with the following requirements.

1. Insert anchor sections in dovetail slots.
2. Embed tie sections in masonry joints.
3. Space anchors as indicated, but not more than 16 inches (406mm) o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 sq.ft. of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.11 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Form control joints in concrete masonry as follows:
1. Install preformed control-joint gaskets designed to fit standard sash block or:
2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake joint.

C. Form expansion joints in brick made from clay or shale as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in joint fillers where indicated.
4. Form open joint of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Keep joint free and clear of mortar.

3.12 LINTELS

A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

1. In non-load bearing walls and partitions, provide precast lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars indicated or required to support loads indicated. Cure precast lintels by the same method used for concrete masonry units.

B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.13 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

C. Install flashing as follows:

1. At multiwythe masonry walls, including cavity walls, extend flashing from exterior face of outer wythe of masonry, through outer wythe, turned up a minimum of 4 inches, and through inner wythe to within 1/2 inch of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through inner wythe and turn flashing up approximately 2 inches, unless otherwise indicated.
2. At masonry-veneer walls, extend flashing from exterior face of veneer, through veneer, up face of sheathing at least 8 inches, and behind air-infiltration barrier or building paper.
3. At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn flashing up not less than 2 inches to form a pan.
4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.
5. Extend sheet metal and composition flashing flush with exterior face of wall.

D. Install weep hole/vents in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:

1. Use plastic weep hole/vents to form weep holes.
2. Space weep holes 24 inches o.c.
3. Place cavity drainage material immediately above flashing in cavities.

E. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.14 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements of ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.15 FIELD QUALITY CONTROL

A. Engage a qualified independent testing agency to perform field quality-control testing indicated below.
1. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof. As a minimum, take and prepare at least two samples daily of mortar and grout mixes.

C. Mortar properties will be tested per ASTM C 780.

D. Grout will be sampled and tested for compressive strength per ASTM C 1019.

E. Brick Tests: For each type and grade of brick indicated, units will be tested according to ASTM C 67.

F. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

G. During installation of the masonry inspect the following:

1. Size and location of structural elements.

2. Type, size and location of anchors.

3. Size and grade of reinforcement.

4. Location of reinforcement.

5. Construction of mortar joints.

6. Protection of masonry.

7. Construction of control and expansion joints.

H. Prior to grouting, inspect grout space, placement of reinforcement.

I. Inspect placement of grout.

3.16 MASONRY WASTE DISPOSAL

A. Recycling: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 04810

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes structural steel.

1.2 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

C. Welding certificates.

D. Mill test reports.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

B. Comply with applicable provisions of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992.

B. Channels, Angles ASTM A 36.

C. Plate and Bar: ASTM A 36.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

1. Finish: Plain

2. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 SOURCE QUALITY CONTROL

A. Engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports. Comply with testing and inspection requirements of Part 3, Article "Field Quality Control."

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding.

PART 3 - EXECUTION

3.1 ERECTION

A. Examination: Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design.

C. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

D. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.2 FIELD CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested according to AWS D1.1.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 05120

SECTION 05310

STEEL DECK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof deck.

1.2 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Include layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

1.3 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

B. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Epic Metals Corp.
2. Nucor Corp.; Vulcraft Div.
3. United Steel Deck, Inc.
4. Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 29.

1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230), G60 (Z180) zinc coating; cleaned, pretreated, and primed with manufacturer's baked-on, lead- and chromate-free rust-inhibitive primer.
2. Deck Profile: Type WR, wide rib.
3. Profile Depth: As indicated.
4. Design Uncoated-Steel Thickness: As indicated.

2.3 ACCESSORIES

A. Accessories: Steel deck manufacturer's standard accessory materials, including mechanical fasteners, closure strips, pour stops, and closures for deck.

B. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

C. Repair Paint: Lead- and chromate-free rust-inhibitive primer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section.

B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

1. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

G. Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

H. Repairs and Protection:

1. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
2. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on bottom surface of prime-painted deck immediately after installation, and apply repair paint.

3.2 FIELD QUALITY CONTROL

A. Testing: Engage a qualified independent testing agency to perform field quality-control testing.

B. Field welds will be subject to inspection.

C. Remove and replace work that does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

END OF SECTION 05310

SECTION 05521

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Steel pipe and tube handrails and railings.

1.3 PERFORMANCE REQUIREMENTS

A. General: In engineering handrails and railings to withstand structural loads indicated, determine allowable design working stresses of handrail and railing materials based on the following:

1. Structural Steel: AISC S335, "Specification for Structural Steel Buildings Allowable Stress Design and Plastic Design with Commentary."

B. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stresses of materials for handrails, railings, anchors, and connections:

1. Top Rail of Guards: Capable of withstanding the following loads applied as indicated:

   a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
   b. Uniform load of 50 lbf/ft. (730 N/m) applied in any direction.
   c. Concentrated and uniform loads above need not be assumed to act concurrently.

2. Handrails Not Serving As Top Rails: Capable of withstanding the following loads applied as indicated:

   a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
   b. Uniform load of 50 lbf/ft. (730 N/m) applied in any direction.
   c. Concentrated and uniform loads above need not be assumed to act concurrently.

3. Infill Area of Guards: Capable of withstanding a horizontal concentrated load of 50 lbf applied to 1 sq. ft. (0.09 sq. m) at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area.

a. Load above need not be assumed to act concurrently with loads on top rails in determining stress on guard.

C. Thermal Movements: Provide handrails and railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected handrails and railings.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Show fabrication and installation of handrails and railings. Include plans, elevations, sections, component details, and attachments to other Work.

1. For installed handrails and railings indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of handrails and railings that are similar to those indicated for this Project in material, design, and extent.

1.6 STORAGE

A. Store handrails and railings in a dry, well-ventilated, weathertight place.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify handrail and railing dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating handrails and railings without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate installation of anchorages for handrails and railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.9 SCHEDULING

A. Schedule installation so handrails and railings are mounted only on completed walls. Do not support temporarily by any means that does not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS

A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.

B. Steel and Iron: Provide steel and iron in the form indicated, complying with the following requirements:

1. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:

a. Galvanized finish for exterior installations and where indicated.
b. Type F, or Type S, Grade A, standard weight (Schedule 40), unless another grade and weight are required by structural loads.

2. Steel Tubing: Cold-formed steel tubing, ASTM A 500, Grade A, unless another grade is required by structural loads.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
4. Iron Castings: Malleable iron complying with ASTM A 47, Grade 32510 (ASTM A 47M, Grade 22010).
5. Iron Castings: Gray iron complying with ASTM A 48, Class 30 (ASTM A 48M, Class 200).

C. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.2 WELDING MATERIALS, FASTENERS, AND ANCHORS

A. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Fasteners for Anchoring Handrails and Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.

1. For aluminum handrails and railings, use fasteners fabricated from Type 304 or Type 316 stainless steel.
2. For steel handrails, railings, and fittings, use plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.

C. Fasteners for Interconnecting Handrail and Railing Components: Use fasteners fabricated from same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

1. Provide concealed fasteners for interconnecting handrail and railing components and for attaching them to other work, unless otherwise indicated.

D. Cast-in-Place and Postinstalled Anchors: Anchors of type indicated below, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Cast-in-place anchors.
2. Chemical anchors.
3. Expansion anchors.

2.3 PAINT

A. Shop Primers: Provide primers to comply with applicable requirements in Division 9 Section "Painting."

B. Shop Primer for Galvanized Steel: Zinc-dust, zinc-oxide primer formulated for priming zinc-coated steel and for compatibility with finish paint systems indicated, and complying with SSPC-Paint 5.

2.4 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.5 FABRICATION

A. General: Fabricate handrails and railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble handrails and railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Form changes in direction of railing members as follows:

1. By bending.
2. By flush radius bends.
3. By mitering at elbow bends.
4. By inserting prefabricated flush-elbow fittings.
5. By any method indicated above, applicable to change in direction involved.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

E. Welded Connections: Fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose. Weld connections continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

F. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail and railing members to other work, unless otherwise indicated.

G. Provide inserts and other anchorage devices for connecting handrails and railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.

H. For railing posts set in concrete, provide preset sleeves of steel not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (12 mm) greater than outside dimensions of post, and steel plate forming bottom closure.

I. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

J. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

K. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.

L. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members that are exposed to exterior or to moisture from condensation or other sources.

M. Fabricate joints that will be exposed to weather in a watertight manner.

N. Close exposed ends of handrail and railing members with prefabricated end fittings.

O. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch (6 mm) or less.

P. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

Q. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide exposed fasteners with finish matching appearance, including color and texture, of handrails and railings.

2.7 STEEL FINISHES

A. Galvanized Handrails and Railings: Hot-dip galvanize steel and iron handrails and railings to comply with ASTM A 123. Hot-dip galvanize hardware for steel and iron handrails and railings to comply with ASTM A 153/A 153M.

B. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

C. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

D. For galvanized handrails and railings, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

E. For nongalvanized steel handrails and railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

F. Preparation for Shop Priming: After galvanizing, thoroughly clean handrails and railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic-phosphate process.

G. Apply shop primer to prepared surfaces of handrail and railing components, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Stripe paint edges, corners, crevices, bolts, and welds.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required to install handrails and railings. Set handrails and railings accurately in location, alignment, and elevation; measured from established lines and levels and free from rack.

1. Do not weld, cut, or abrade surfaces of handrail and railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Adjust handrails and railings before anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.3 ANCHORING POSTS

A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's written instructions:

B. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's written instructions:

1. Nonshrink, nonmetallic grout.
2. Nonshrink, nonmetallic grout or anchoring cement.

C. Cover anchorage joint with flange of same metal as post, attached to post as follows:

1. Welded to post after placing anchoring material.
2. By set screws.

D. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch (3-mm) build-up, sloped away from post.

E. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For aluminum pipe railings, attach posts as indicated using fittings designed and engineered for this purpose.
2. For stainless-steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
3. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

F. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.4 ANCHORING RAILING ENDS

A. Anchor railing ends into concrete and masonry with round flanges connected to railing ends and anchored into wall construction with postinstalled anchors and bolts.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces.

1. Weld flanges to railing ends.
2. Connect flanges to railing ends using nonwelded connections.

3.5 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.

3.6 CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.7 PROTECTION

A. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05521

SECTION 06105 - MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Rooftop equipment bases and support curbs.
2. Wood blocking and nailers.

1.3 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. SPIB - Southern Pine Inspection Bureau.
4. WCLIB - West Coast Lumber Inspection Bureau.
5. WWPA - Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Fire-retardant-treated wood.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.
3. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

B. Wood Structural Panels:

1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
2. Thickness: As indicated.
3. Factory mark panels according to indicated standard.

2.2 FIRE-RETARDANT-TREATED MATERIALS

A. General: Provide fire-retardant-treated materials for all wood and panel products. Provide materials that comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
2. Use treatment that does not promote corrosion of metal fasteners.
3. Use Exterior type for all lumber and panel products, except where used for roof blocking.

2.3 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Non-Load-Bearing Applications: Construction, Stud, or No. 2 and any of the following species:

1. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
2. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
3. Eastern softwoods; NELMA.

4. Northern species; NLGA.
5. Western woods; WCLIB or WWPA.

2.4 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:

1. Rooftop equipment bases and support curbs.
2. Blocking.
3. Cants.
4. Nailers.
5. Furring.
6. Grounds.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:

1. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
2. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
3. Eastern softwoods; NELMA.
4. Northern species; NLGA.
5. Western woods; WCLIB or WWPA.

2.5 PANEL PRODUCTS

A. Miscellaneous Concealed Plywood: Exterior sheathing, of thickness as indicated.

B. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4 inch (12.7 mm) thick.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Wood Screws: ASME B18.6.1.

D. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.

F. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 PANEL PRODUCT INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

END OF SECTION 06105

SECTION 07540 - THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Adhered membrane roofing system with filed applied battens.

B. Related Sections include the following:

1. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
2. Division 7 Section "Sheet Metal Flashing and Trim" for metal trim at roof level not specified in this Section.
3. Division 7 Section "Joint Sealants."

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail Resistance: MH.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.

1. Base flashings and membrane terminations.

C. Samples for Verification: For the following products:

1. 12-by-12-inch (300-by-300-mm) square of sheet roofing, of color specified, including T-shaped side and end lap seam.
2. 12-inch (300-mm) length of battens.
3. 12-inch (300-mm) length of PVC coated metal flashings.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of meeting performance requirements.

F. Qualification Data: For Installer and manufacturer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

H. Research/Evaluation Reports: For components of membrane roofing system.

I. Maintenance Data: For roofing system to include in maintenance manuals.

J. Warranties: Special warranties specified in this Section.

K. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Manufacturer Qualifications: A qualified manufacturer that has FMG approval for membrane roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations: Obtain components for membrane roofing system from roofing membrane manufacturer.

E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

F. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories fasteners cover boards substrate board and other components of membrane roofing system.
2. Warranty Period: 15 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 PVC ROOFING MEMBRANE

A. PVC Sheet: ASTM D 4434, Type II, Grade 1, fiber reinforced and fabric backed, as follows:

1. Product: Subject to compliance with requirements, provide "Sarnafil G410" by Sarnafil Inc.
2. Thickness: 60 mils (1.5 mm), nominal.
3. Exposed Face Color: As selected by Architect from manufacturer's full range of colors.

2.3 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

C. Bonding Adhesive: Manufacturer's standard solvent or water-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.

D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

E. PVC Battens: Manufacturer's standard extruded PVC battens designed to be field heat welded to the roof membrane and simulate the appearance of a traditional standing seam roof. Color of battens to match color selected for roof membrane.

F. PVC Coated Metal Flashings and Trim: Manufacturer's standard 25 gage G90 galvanized steel sheet with 20 mil PVC coating laminated to one side. Color to match color selected for roof membrane.

G. Multi-Purpose Tape Seal: Manufacturer's standard compressible self adhesive tape design to seal bottom of metal trim and flashings and prevent the infiltration of wind blown rain or air.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.4 SUBSTRATE BOARDS

A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate Type X, 5/8 inch (16 mm) thick.

1. Product: Subject to compliance with requirements, provide "Dens-Deck" by Georgia-Pacific Corporation.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening substrate panel to roof deck.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of substrate board.
3. Verify that surface plane flatness and fastening of steel roof deck comply with requirements in Division 5 Section "Steel Deck."
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturer's written instructions.

3.4 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

1. Install sheet according to ASTM D 5036.

B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply solvent-based bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

E. Bonding Adhesive: Apply water-based bonding adhesive to substrate at rate required by manufacturer and immediately install roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

F. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

G. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

H. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

I. PVC Coated Steel Trim and Flashing: Install in accordance with manufacturer's written instructions and approved details. Seal bottom of trim or flashing with multi-purpose seal tape.

J. PVC Battens: Install in accordance with manufacturer's written instructions and approved details by heat welding to roof membrane. Space battens at 19 inches on center.

3.5 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing.

D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07540

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes sheet metal flashing and trim in the following categories:

1. Roof-drainage systems.
2. Exposed trim and fasciae.
3. Metal flashing.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 7 Section "Joint Sealants" for elastomeric sealants.
2. Division 7 Section "Thermoplastic Membrane Roofing" for PVC coated metal flashing used in conjunction with roof installation.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

B. Fabricate and install flashings at roof edges to comply with recommendations of FM Loss Prevention Data Sheet 1-49 for the following wind zone:

1. Wind Zone 2: Wind pressures of 31 to 45 psf (1.48 to 2.15 kPa).

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

C. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

D. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.

1. 8-inch- (200-mm-) square Samples of specified sheet materials to be exposed as finished surfaces.
2. 12-inch- (300-mm-) long Samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.

E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.6 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 METALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:

1. Factory-Painted Aluminum Sheet: ASTM B 209 (ASTM B 209M), 3003-H14, with a minimum thickness of 0.040 inch (1.0 mm), unless otherwise indicated.

   a. Available Manufacturers; Subject to compliance with requirements, manufacturers offering products which may be incorporated into the work include but are not limited to the following:

      1) Atas International, Inc.

2. Extruded Aluminum: ASTM B 221 (ASTM B 221M), alloy 6063-T52, with a minimum thickness of 0.080 inch (2.0 mm) for primary legs of extrusions that are anodized, unless otherwise indicated.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

B. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

C. Gutter Screen: 1/4-inch (6-mm) hardware cloth installed in sheet metal frames. Fabricate screen and frame of same basic material as gutters and downspouts.

2.3 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with elastomeric sealant. Provide rivets for additional strength.

E. Expansion Provisions: Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Gutters with Girth up to 15 Inches (380 mm): Fabricate from the following material:

1. Aluminum: 0.050 inch thick.
2. Profile: SMACNA Figure 1-2, Style A, dimensions as indicated, with spacers and brackets per SMACNA Figure 1-12.
3. Spacers: 1/8 inch x 1 inch stainless flat bar, unfinished spaced at 36" on center.
4. Brackets: 3/16 inch x 1-1/4 inch stainless steel flat bar shop painted to match gutter, spaced at 36" on center.
5. Gutter Screens: SMNACNA Figure 1-24B and Section B-B, with ¼ inch stainless steel mesh.

C. Downspouts: Fabricate from the following material:

1. Aluminum: 0.050 inch thick.
2. Profile: SMACNA Figure 1-32B.
3. Hangers: SMACNA Figure 1-35A, spaced at 5'-0" on center.

D. Exposed Trim, Gravel Stops, and Fasciae: Fabricate from the following material:

1. Aluminum: 0.032 inch (1.2 mm) thick.

    a. Where solid wood backing is not indicated provide .050 inch thickness.

E. Metal Flashing and Drip Edges: Fabricate from the following material:

1. Aluminum: 0.0320 inch (0.8 mm) thick.

2.5 ALUMINUM EXTRUSION FABRICATIONS

A. Aluminum Extrusion Units: Fabricate extruded-aluminum running units with formed or extruded-aluminum joint covers for installation behind main members where possible. Fabricate mitered and welded corner units.

2.6 ALUMINUM FINISHES

A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.

B. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.

1. Fluoropolymer 2-Coat Coating System: 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 605.2.

   a. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.
   b. Provide for the following:

      1) Gutters
      2) Downspouts.
      3) All fascia, trim, exposed flashing, and drip edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.

D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

E. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

F. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with elastomeric sealant. Rivet joints for additional strength.

G. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

H. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual and as indicated, (in the event of a conflict the more stringent requirements take precedence) to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.

I. Install continuous gutter screens on all gutters with noncorrosive fasteners.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07620

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes sealants for the following applications, including those specified by reference to this Section:

B. This Section includes sealants for the following applications:

1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:

   a. Control and expansion joints in cast-in-place concrete.
   b. Joints between architectural precast concrete units.
   c. Control and expansion joints in unit masonry.
   d. Joints between different materials listed above.
   e. Perimeter joints between materials listed above and frames of doors and windows.
   f. Other joints as indicated.

2. Exterior joints in the following horizontal traffic surfaces:

   a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
   b. Joints between precast concrete units.
   c. Joints between different materials listed above.
   d. Other joints as indicated.

3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
   d. Joints between precast beams, tees, planks etc. (including underside).
   e. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
   f. Other joints as indicated.

4. Interior joints in the following horizontal traffic surfaces:

   a. Joints between precast concrete units.
   b. Other joints as indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in the sealant schedules at the end of Part 3.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

B. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

C. Stain-Test-Response Characteristics: Where elastomeric sealants are specified in the Elastomeric Joint-Sealant Schedule to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Continuous-Immersion-Test-Response Characteristics: Where elastomeric sealants will be immersed continuously in water, provide products that have undergone testing according to ASTM C 1247, including initial six-week immersion period and additional immersion periods specified below, and have not failed in adhesion or cohesion when tested with substrates indicated for Project.

1. Two additional four-week immersion periods.

2.4 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin.
2. Type O: Open-cell material.
3. Type B: Bicellular material with a surface skin.
4. Type: Any material indicated above.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:

    a. Concrete.
    b. Masonry.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

    a. Metal.
    b. Glass.

B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

F. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.

    a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

3.6 ELASTOMERIC JOINT-SEALANT SCHEDULE

A. Low-Modulus Nonacid-Curing Silicone Sealant ES-1: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Available products include the following:

    a. 790; Dow Corning.
    b. Silpruf; GE Silicones.
    c. 864; Pecora Corporation.
    d. 890; Pecora Corporation.

e. Spectrem 1; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 100 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

   a. Use O Joint Substrates:

7. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
8. Applications: Use for all vertical and horizontal non-traffic joints.

B. Pourable Silicone Sealant **[ES-2]**: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Available products include but are not limited to the following:

   a. Chem-Calk 550; Bostik, Inc.
   b. Vulkem 255; Mameco International.
   c. Pourthane; W.R. Meadows, Inc.
   d. NR-300 Urexpan, Type M; Pecora Corporation.
   e. PSI-270SL; Polymeric Systems, Inc.
   f. Sikaflex – 2c SL; Sika Corporation.
   g. SL 2; Sonneborn Building Products Div., ChemRex, Inc.
   h. THC-901; Tremco.

2. Type and Grade: M (multicomponent) and P (pourable).

3. Use(s) Related to Exposure: T (traffic).

4. Use(s) Related to Joint Substrates: M, G, A and, as applicable to joint substrates indicated, O.

END OF SECTION 07920

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Steel doors.
2. Steel door frames.

B. Related Sections include the following:

1. Division 4 Section "Unit Masonry Assemblies" for installing anchors and grouting frames in masonry construction.
2. Division 8 Section "Door Hardware" for door hardware and weather stripping.
3. Division 9 Section "Painting" for field painting factory-primed doors and frames.

1.3 DEFINITIONS

A. Steel Sheet Thicknesses: Thickness dimensions, including those referenced in ANSI A250.8, are minimums as defined in referenced ASTM standards for both uncoated steel sheet and the uncoated base metal of metallic-coated steel sheets.

1.4 SUBMITTALS

A. Product Data: For each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire-resistance ratings, and finishes.

B. Shop Drawings: Show the following:

1. Elevations of each door design.
2. Details of doors including vertical and horizontal edge details.
3. Frame details for each frame type including dimensioned profiles.
4. Details and locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, accessories, joints, and connections.
7. Coordination of glazing frames and stops with glass and glazing requirements.

C. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.5 QUALITY ASSURANCE

A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1. Test Pressure: Test at atmospheric pressure.
2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Doors and Frames:

a. Ceco Door Products; a United Dominion Company.
b. Curries Company.
c. Pioneer Industries Inc.
d. Republic Builders Products.
e. Steelcraft; a division of Ingersoll-Rand.

2.2 MATERIALS

A. Metallic-Coated Steel Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with an A40 (ZF120) zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.

2.3 DOORS

A. General: Provide doors of sizes, thicknesses, and designs indicated.

B. Exterior Doors: Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).
2. Provide doors fabricated from galvanized steel sheet.

2.4 FRAMES

A. General: Provide steel frames for doors, transoms, sidelights, borrowed lights, and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.

B. Frames of 0.067-inch- (1.7-mm-) (16 gage) thick galvanized steel sheet for:

1. All frames.

C. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on strike jambs of single-door frames and two silencers on heads of double-door frames.

D. Plaster Guards: Provide 0.016-inch- (0.4-mm-) thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.

E. Supports and Anchors: Fabricated from not less than 0.042-inch- (1.0-mm-) thick, electrolytic zinc-coated or metallic-coated steel sheet.

1. Wall Anchors in Masonry Construction: 0.177-inch- (4.5-mm-) diameter, steel wire complying with ASTM A 510 (ASTM A 510M) may be used in place of steel sheet.

F. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A 153/A 153M, Class C or D as applicable.

2.5 FABRICATION

A. General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

B. Exterior Door Construction: For exterior locations and elsewhere as indicated, fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- (1.3-mm-) thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.

C. Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between pairs of doors. Not more than 3/4 inch (19 mm) at bottom.

D. Clearances for Fire-Rated Doors: As required by NFPA 80.

E. Single-Acting, Door-Edge Profile: Beveled edge.

F. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

G. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

H. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

I. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

J. Frame Construction: Fabricate frames to shape shown.

1. Fabricate frames with mitered or coped and continuously welded corners and seamless face joints.
2. Provide welded frames with temporary spreader bars.

K. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

L. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

2.6 FINISHES

A. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

B. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1. Except for frames located in existing walls or partitions, place frames before construction of enclosing walls and ceilings.
2. In masonry construction, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

C. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.

1. Fire-Rated Doors: Install within clearances specified in NFPA 80.
2. Smoke-Control Doors: Install to comply with NFPA 105.

3.2 ADJUSTING AND CLEANING

A. Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.

B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08110

SECTION 08410 - ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior entrance systems.

B. Related sections include the following:
1.
2. Division 8 Section "Glazed Aluminum Curtain Walls."
3. Division 8 Section "Door Hardware."
4. Division 8 Section "Glazing."

1.3 SYSTEM DESCRIPTION

A. General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:

1. Air infiltration and water penetration exceeding specified limits.
2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.

B. Glazing: Physically and thermally isolate glazing from framing members.

C. Wind Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction or the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.

1. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4 inch (19 mm), whichever is smaller, unless otherwise indicated.
2. Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.

a. Test Pressure: 150 percent of inward and outward wind-load design pressures.
b. Duration: As required by design wind velocity; fastest 1 mile (1.609 km) of wind for relevant exposure category.

D. Hurricane-Resistance Test Performance: Provide entrance and storefront systems that pass large and small missile-impact tests, as required by systems' location above grade, and cyclic-pressure tests according to testing requirements of authorities having jurisdiction.

E. Seismic Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.

F. Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.

1. Provide a minimum 1/8-inch (3.18-mm) clearance between members and top of glazing or other fixed part immediately below.

G. Live Loads: Provide entrance and storefront systems, including anchorage, that accommodate the supporting structures' deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.

H. Air Infiltration: Provide entrance and storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft. (75.2 Pa).

I. Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24 lbf/sq. ft. (299 Pa). Water leakage is defined as follows:

1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

J. Thermal Movements: Provide entrance and storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

K. Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.

L. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.1.

M. Average Thermal Conductance: Provide storefront systems with average U-values of not more than 0.63 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) when tested according to AAMA 1503.1.

N. Dimensional Tolerances: Provide entrance and storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

1.4 SUBMITTALS

A. Product Data: For each product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.

B. Shop Drawings: For entrance and storefront systems. Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, and attachments to other work.

1. For entrance systems, include hardware schedule and indicate operating hardware types, quantities, and locations.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

D. Samples for Verification: Of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

E. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of entrance and storefront systems with requirements based on comprehensive testing of current systems.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.

1. Engineering Responsibility: Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Testing Agency Qualifications: Demonstrate to Architect's satisfaction, based on Architect's evaluation of criteria conforming to ASTM E 699, that the independent testing agency has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

C. Source Limitations: Obtain each type of entrance and storefront system through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of entrance and storefront systems and are based on the specific systems indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

1. Do not modify intended aesthetic effect, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating systems without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Arch Amarlite.
2. EFCO Corporation.
3. Kawneer Company, Inc.
4. Pittco Architectural Metals, Inc.
5. Tubelite Architectural Systems.
6. WCI Company; Waltek.
7. YKK AP America Inc.

B. Basis of Design: 350 Series; Kawneer Company, Inc.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
3. Welding Rods and Bare Electrodes: AWS A5.10.

B. Steel Reinforcement: Complying with ASTM A 36 (ASTM A 36M) for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 (ASTM A 570M) for hot-rolled sheet and strip.

C. Glazing as specified in Division 8 Section "Glazing."

D. Glazing Gaskets: Manufacturer's standard pressure-glazing system of black, resilient glazing gaskets, setting blocks, and shims or spacers, fabricated from an elastomer of type and in hardness recommended by system and gasket manufacturer to comply with system performance requirements. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.

E. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.

F. Secondary Sealant: For use as weatherseal, compatible with structural silicone sealant and other system components with which it comes in contact, and that accommodates a 50 percent increase or decrease in joint width at the time of application when measured according to ASTM C 719.

1. Color: Black.

G. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.

2.3 COMPONENTS

A. Doors: Provide manufacturer's standard 1-3/4-inch- (44.5-mm-) thick glazed doors with minimum 0.125-inch- (3.2-mm-) thick, extruded tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie-rods.

1. Glazing Stops and Gaskets: Provide manufacturer's standard snap-on extruded-aluminum glazing stops and preformed gaskets.
2. Stile Design: Wide stile; over 4 inches (101.6 mm) wide.

B. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Reinforce members as required to retain fastener threads.
2. Do not use exposed fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

E. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, complying with ASTM A 666, of type selected by manufacturer for compatibility with system.

F. Weather Stripping: Manufacturer's standard replaceable weather stripping as follows:

1. Compression Weather Stripping: Molded neoprene complying with ASTM D 2000 requirements or molded PVC complying with ASTM D 2287 requirements.

2.4 HARDWARE

A. General: Provide hardware as specified in Division 8 Section "Door Hardware."

B. Weather Sweeps: Manufacturer's standard weather sweep for application to exterior door bottoms and with concealed fasteners on mounting strips.

2.5 FABRICATION

A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

1. Fabricate components for screw-spline frame construction.

B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

C. Prepare components to receive concealed fasteners and anchor and connection devices.

D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.

E. Welding: Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

F. Glazing Channels: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."

G. Glazing Channels: Provide minimum clearances for thickness and type of plastic sheet indicated according to plastic sheet manufacturer's written instructions.

H. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

I. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units as required for installing hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.

1. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.

2.6 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

D. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer 2-Coat Coating System: 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 605.2.

a. Color and Gloss: Provide custom color, matching Architect's sample.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.

B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.

D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 7 Section "Joint Sealants."

E. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.

F. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.

1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.

G. Install glazing to comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.

1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
2. Install structural silicone sealant according to sealant manufacturer's written instructions.
3. Mechanically fasten glazing in place until structural sealant is cured.
4. Remove excess sealant from component surfaces before sealant has cured.

H. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.

I. Install perimeter sealant to comply with requirements of Division 7 Section "Joint Sealants," unless otherwise indicated.

J. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:

1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.

2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm). Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

3.3 ADJUSTING AND CLEANING

A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.

B. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08410

SECTION 08711 - DOOR HARDWARE (SCHEDULED BY NAMING PRODUCTS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following:

a. Swinging doors.

B. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames" for astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
2. Division 8 Section "Aluminum Entrances & Storefronts" for aluminum doors.

1.3 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:

a. System schematic.
b. Point-to-point wiring diagram.
c. Riser diagram.
d. Elevation of each door.

C. Samples: For exposed door hardware of each type indicated below, in specified finish, full size. Tag with full description for coordination with the Door Hardware Schedule. Submit samples before, or concurrent with, submission of the final Door Hardware Schedule.

1. Door Hardware: As follows:

a. As requested by Architect.

2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.

    a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.

3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

        1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
5. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.

E. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

F. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.

1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

G. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.

H. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

E. Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," as follows:

a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

b. Door Closers: Comply with the following maximum opening-force requirements indicated:

1) Interior Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.

c. Thresholds: Not more than 1/2 inch (13 mm) high. Bevel raised thresholds with a slope of not more than 1:2.

2. NFPA 101: Comply with the following for means of egress doors:

   a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
   b. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
   c. Thresholds: Not more than 1/2 inch (13 mm) high.

F. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Address for delivery of keys.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver keys to manufacturer of key control system.

D. Deliver keys to Owner by registered mail or overnight package service.

1.6 COORDINATION

A. Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

B. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets indicated in door and frame schedule, and the Door Hardware Schedule at the end of Part 3.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products or products equivalent in function and comparable in quality to named products from other manufacturers listed.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule. Specified manufacturers are listed in bold face type.

2.2 HINGES AND PIVOTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hinges:

    a. Hager Companies (HAG).
    b. **McKinney Products Company**; Div. of ESSEX Industries, Inc. (MCK).
    c. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

2. Continuous Geared Hinges:

    a. Hager Companies (HAG).
    b. Markar Products, Inc. (MP).
    c. **McKinney Products Company**; Div. of ESSEX Industries, Inc. (MCK).
    d. Pemko Manufacturing Co., Inc. (PEM).
    e. Zero International, Inc. (ZRO).

B. Standards: Comply with the following:

1. Butts and Hinges: BHMA A156.1.

C. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

1. Corners: Square.

D. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
3. Screws: Phillips flat-head screws; machine screws (drilled and tapped holes) for metal doors. Finish screw heads to match surface of hinges.

2.3 LOCKS AND LATCHES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Mechanical Locks and Latches:

a. Best Lock Corporation (BLC).
b. **Sargent Manufacturing Company**; Div. of ESSEX Industries, Inc. (SGT).
c. Schlage Lock Company; an Ingersoll-Rand Company (SCH).
d. Yale Security Inc.; Div. of Williams Holdings (YAL).

B. Standards: Comply with the following:

1. Mortise Locks and Latches: BHMA A156.13.

C. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.

D. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

2.4 DOOR BOLTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flush Bolts:

a. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
b. Hager Companies (HAG).
c. Ives: H. B. Ives (IVS).

d. NT Quality Hardware; an Ingersoll-Rand Company (NTQ).
e. **Rockwood Manufacturing Company** (RM).

B. Standards: Comply with the following:

1. Manual Flush Bolts: BHMA A156.16.

C. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Mortise Flush Bolts: Minimum 3/4-inch (19-mm) throw.

2.5 EXIT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Precision Hardware, Inc. (PH).
2. **Sargent Manufacturing Company**; Div. of ESSEX Industries, Inc. (SGT).
3. Von Duprin; an Ingersoll-Rand Company (VD).

B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

2.6 CYLINDERS AND KEYING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cylinders: Same manufacturer as for locks and latches.

B. Standards: Comply with the following:

1. Cylinders: BHMA A156.5.

C. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Six.
2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.

D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:

1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

E. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

F. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:

1. Existing System: Master key or grand master key locks to Owner's existing system.

a. Cylinders shall be master keyed.

G. Keys: Provide nickel-silver keys complying with the following:

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: **"DO NOT DUPLICATE."**

2. Quantity: In addition to one extra blank key for each lock, provide the following:

a. Cylinder Change Keys: Three per each cylinder.
b. Master Keys: Five.

2.7 ACCESSORIES FOR PAIRS OF DOORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Removable Mullions:

a. Precision Hardware, Inc. (PH).
b. **Sargent Manufacturing Company**; Div. of ESSEX Industries, Inc. (SGT).
c. Von Duprin; an Ingersoll-Rand Company (VD).

2. Astragals:

a. Hager Companies (HAG).
b. National Guard Products, Inc. (NGP).
c. **Pemko Manufacturing Co.**, Inc. (PEM).
d. Reese Enterprises, Inc. (RE).
e. Zero International, Inc. (ZRO).

C. Standards: Comply with the following:

1. Removable Mullions: BHMA A156.3.

D. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.

2.8 CLOSERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Surface-Mounted Closers:

a. LCN Closers; an Ingersoll-Rand Company (LCN).
b. Norton Door Controls; Div. of Yale Security Inc. (NDC).
c. **Sargent Manufacturing Company**; Div. of ESSEX Industries, Inc. (SGT).

B. Standards: Comply with the following:

1. Closers: BHMA A156.4.

C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.9 STOPS AND HOLDERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Baldwin Hardware Corporation (BH).
2. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
3. Ives: H. B. Ives (IVS).
4. **Rockwood Manufacturing Company** (RM).

B. Standards: Comply with the following:

1. Stops and Bumpers: BHMA A156.16.

2.10 DOOR GASKETING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Door Gasketing:

a. National Guard Products, Inc. (NGP).

b. **Pemko Manufacturing Co.**, Inc. (PEM).
c. Reese Enterprises, Inc. (RE).
d. Zero International, Inc. (ZRO).

B. Standard: Comply with BHMA A156.22.

2.11 THRESHOLDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. National Guard Products, Inc. (NGP).
2. **Pemko Manufacturing Co.**, Inc. (PEM).
3. Reese Enterprises, Inc. (RE).
4. Zero International, Inc. (ZRO).

B. Standard: Comply with BHMA A156.21.

2.12 FABRICATION

A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Steel Machine or Wood Screws: For the following fire-rated applications:

a. Mortise hinges to doors.
b. Strike plates to frames.
c. Closers to doors and frames.

2.13 FINISHES

A. Standard: Comply with BHMA A156.18.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. BHMA Designations: Comply with base material and finish requirements indicated by the following:

1. BHMA 600: Primed for painting, over steel base metal.
2. BHMA 605: Bright brass, clear coated, over brass base metal.
3. BHMA 606: Satin brass, clear coated, over brass base metal.
4. BHMA 609: Satin brass, blackened, satin relieved, clear coated, over brass base metal.
5. BHMA 611: Bright bronze; clear coated, over bronze base metal.
6. BHMA 612: Satin bronze, clear coated, over bronze base metal.
7. BHMA 613: Dark-oxidized satin bronze, oil rubbed, over bronze base metal.
8. BHMA 618: Bright nickel plated, clear coated, over brass or bronze base metal.
9. BHMA 619: Satin nickel plated, clear coated, over brass or bronze base metal.
10. BHMA 622: Flat black coated, over brass or bronze base metal.
11. BHMA 623: Light-oxidized statuary bronze, clear coated, over bronze base metal.
12. BHMA 624: Dark-oxidized statuary bronze, clear coated, over bronze base metal.
13. BHMA 625: Bright chromium plated over nickel, over brass or bronze base metal.
14. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
15. BHMA 627: Satin aluminum, clear coated, over aluminum base metal.
16. BHMA 628: Satin aluminum, clear anodized, over aluminum base metal.
17. BHMA 629: Bright stainless steel, over stainless-steel base metal.
18. BHMA 630: Satin stainless steel, over stainless-steel base metal.
19. BHMA 651: Bright chromium plated over nickel, over steel base metal.
20. BHMA 652: Satin chromium plated over nickel, over steel base metal.
21. BHMA 689: Aluminum painted, over any base metal.
22. BHMA 690: Dark bronze painted, over any base metal.
23. BHMA 691: Light bronze painted, over any base metal.
24. BHMA 717: Bright aluminum, uncoated; aluminum base metal.
25. BHMA 718: Satin aluminum, uncoated; aluminum base metal.
26. BHMA 722: Dark-oxidized bronze, oil rubbed, over architectural bronze base metal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 series.

1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SCHEDULE

A. HARDWARE SET 1

1	Con't Hinge	MCK-12HD-satin anodized (MCK)
1	Exit Device	12-8805-ETE-US32D (SGT)
1	Closer	4210-AL (LCN)
1	Weatherstrip Set	By door manufacturer
1	Threshold	2005AS (PEM)

B. HARDWARE SET 2

2	Con't Hinges	MCK-12HD-satin anodized (MCK)
2	Exit Devices	12-8805-ETE-US32D (SGT)
2	Closers	4210-AL (LCN)
2	Weatherstrip Sets	By door manufacturer
1	Threshold	2005AS (PEM)
1	Removable Mullion	980 (SGT) shop paint to match curtain wall

C. HARDWARE SET 3

3	Hinges	4½ x 4½ TA2314-32D (MCK)
1	Lockset	8204-LNE-630 (SGT)
1	Closer	4210-AL (LCN)
1	Weatherstrip	S88D (PEM)
1	Threshold	2005AS (PEM)

D. HARDWARE SET 3

6	Hinges	4½ x 4½ TA2314-32D (MCK)
2	Lockset	8204-LNE-630 (SGT)
1	Closer	4210-AL (LCN)
1	Set Flush Bolts	550-630 (RM)
1	Astragal	355AS (PEM)
1	Weatherstrip	S88D (PEM)
1	Threshold	2005AS (PEM)

END OF SECTION 08711

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Glazed curtain walls.
4. Glazed entrances.

1.3 DEFINITIONS

A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

B. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

C. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

   a. Specified Design Wind Loads: As indicated.
   b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.

      1) Load Duration: 60 seconds or less.

   c. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow action.

      1) Load Duration: 30 days.

   d. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch (25 mm), whichever is less.

      1) For monolithic-glass lites heat treated to resist wind loads.
      2) For insulating glass.
      3) For laminated-glass lites.

   e. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.
   f. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

   1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

   1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
   2. For insulating-glass units, properties are based on units with lites 6 mm thick and a nominal 1/2-inch- (13-mm-) wide interspace.
   3. Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).
   4. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.
   5. Solar Optical Properties: NFRC 300.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass and of 12-inch- (300-mm-) long Samples for sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

C. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass.

1. Each color of tinted float glass.
2. Insulating glass for each designation indicated.

D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

G. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

H. Product Test Reports: From a qualified testing agency indicating the following products comply with requirements, based on comprehensive testing of current products:

1. Tinted float glass.
2. Coated float glass.
3. Insulating glass.
4. Glazing sealants.
5. Glazing gaskets.

I. SWRI Validation Certificate: For each elastomeric glazing sealant specified to be validated by SWRI's Sealant Validation Program.

J. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

C. Source Limitations for Clear Glass: Obtain clear float glass from one primary-glass manufacturer.

D. Source Limitations for Tinted Glass: Obtain tinted, heat-absorbing, and light-reducing float glass from one primary-glass manufacturer for each tint color indicated.

E. Source Limitations for Insulating Glass: Obtain insulating-glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.

F. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

G. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
2. Glass Testing Agency Qualifications: An independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

H. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
3. Test elastomeric glazing sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

I. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glass type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants.

1. Use manufacturer's standard test methods to determine whether priming and other specific preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

    a. Perform tests under normal environmental conditions replicating those that will exist during installation.

2. Submit not fewer than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, and insulating units) as well as one sample of each glazing accessory (gaskets, tape sealants, setting blocks, and spacers).
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

J. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

K. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. SIGMA Publications: SIGMA TM-3000, "Vertical Glazing Guidelines."

L. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following inspecting and testing agency:

1. Insulating Glass Certification Council.
2. Associated Laboratories, Inc.
3. National Accreditation and Management Institute.

M. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated in schedules at the end of Part 3.

2.2 PRIMARY FLOAT GLASS

A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); class as indicated in schedules at the end of Part 3.

2.3 HEAT-TREATED FLOAT GLASS

A. Fabrication Process: By vertical (tong-held) or horizontal (roller-hearth) process, at manufacturer's option, except provide horizontal process where indicated as tongless or free of tong marks.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select); class, kind, and condition as indicated in schedules at the end of Part 3.

2.4 INSULATING GLASS

A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in the Insulating-Glass Schedule at the end of Part 3.

1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article. Provide Kind FT (fully tempered) where safety glass is indicated.

B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule at the end of Part 3 are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

C. Sealing System: Dual seal, with primary and secondary sealants as follows:

1. Manufacturer's standard sealants.

D. Spacer Specifications: Manufacturer's standard spacer material and construction.

E. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:

1. Aluminum with mill or clear-anodized finish.
2. Desiccant: Molecular sieve or silica gel, or blend of both.
3. Corner Construction: Manufacturer's standard corner construction.

2.5 ELASTOMERIC GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.

B. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant in the Glazing Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

1. Additional Movement Capability: Where additional movement capability is specified in the Glazing Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements in ASTM C 920 for uses indicated.

C. Glazing Sealant for Fire-Resistive Glazing Products: Identical to product used in test assembly to obtain fire-protection rating.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.7 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.

B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. Neoprene, ASTM C 864.
2. EPDM, ASTM C 864.
3. Silicone, ASTM C 1115.
4. Thermoplastic polyolefin rubber, ASTM C 1115.
5. Any material indicated above.

C. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene.
2. EPDM.
3. Silicone.
4. Thermoplastic polyolefin rubber.
5. Any material indicated above.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.9 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

C. Grind smooth and polish exposed glass edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by *Project conditions* during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where the length plus width is larger than 50 inches (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 PROTECTION AND CLEANING

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.8 MONOLITHIC FLOAT-GLASS SCHEDULE

A. Uncoated Clean Float Glass G-1: Where glass designated as G-1 is indicated, provide Class 1, King FT, Condition A (clear, fully tempered, uncoated) float glass.

B. Uncoated Tinted Float Glass G-2: Where glass as designated below is indicated, provide Class 2 (tinted, heat-absorbing, and light-reducing) glass lites complying with the following:

1. Tint Color: Green.
2. Visible Light Transmittance: 65%.
3. Solar Heat Gain Coefficient: 0.49.
4. Outdoor Visible Reflectance: 7%.
5. Uncoated Tinted Fully Tempered Float Glass: Condition A (uncoated surfaces), Kind FT (fully tempered).
6. Basis of Design: "Ever Green": LOF.

3.9 INSULATING-GLASS SCHEDULE

A. Insulating Glass IG-1: Where glass of this designation is indicated, provide uncoated insulating-glass units complying with the following:

1. Overall Unit Thickness and Thickness of Each Lite: 25 and 6 mm
2. Interspace Content: Air.
3. Indoor Lite: Type I (transparent glass, flat), Class 1 (clear) float glass.

    a. Kind HS (heat strengthened), Condition A (uncoated surfaces) as required for structural performance or compliance with safety glazing regulations.

4. Outdoor Lite: Use G-2, Type I (transparent glass, flat) float glass.

   a. Class 2 (tinted, heat absorbing, and light reducing).

      1) Tint Color: Green.

   b. Kind HS (heat strengthened), Condition A (uncoated surfaces) as required for structural performance or compliance with safety glazing regulations.

5. Visible Light Transmittance: 59%.
6. Winter Nighttime U-Value: 6.48.
7. Summer Daytime U-Value: 0.58.
8. Solar Heat Gain Coefficient: 0.38.
9. Shading Coefficient: 0.46.
10. Basis of Design: Evergreen Insulating Glass; LOF.

3.10 GLAZING SEALANT SCHEDULE

A. Low-Modulus Nonacid-Curing Silicone Glazing Sealant GS-[#]: Where glazing sealants of this designation are indicated, provide products complying with the following:

1. Products: Available products include the following:

   a. 790; Dow Corning.
   b. Silpruf; GE Silicones.
   c. VP 275; Ohio Sealants, Inc.
   d. 864; Pecora Corporation.
   e. Spectrem 1; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 150 percent movement.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.

   a. Use O Glazing Substrates: Coated glass, color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, and wood.

7. Applications: For all glazing applications as required to provide weather and water tightness.

END OF SECTION 08800

1. Sidesway (Story Drift): Accommodate building story drift when wind loads effect maximum overturning moment. Calculate story drift according to requirements of authorities having jurisdiction.
2. Deflection of framing members in a direction normal to wall plane is limited to 1/360 of clear span, 3/4 inches (19 mm) maximum, where plaster or gypsum board surfaces are subject to bending.
3. Deflection of framing members overhanging an anchor point is limited to 2 times the length of the cantilevered member, divided by 175.
4. Test Performance: Provide glazed aluminum curtain wall system that does not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.

    a. Test Pressure: 150 percent of inward and outward wind-load design pressures.
    b. Duration: As required by design wind velocity; fastest 1 mile (1.609 km) of wind for relevant exposure category.

F. Seismic Loads: Provide glazed aluminum curtain wall system, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.

G. Dead Loads: Provide glazed aluminum curtain wall system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load. Provide a minimum 1/8-inch (3.18-mm) clearance between members and top of fixed panels, glazing, or other fixed part immediately below. Provide a minimum 1/16-inch (1.59-mm) clearance between members and operable windows and doors.

H. Live Loads: Provide glazed aluminum curtain wall system, including anchorage, that accommodates supporting structure's deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.

I. Air Infiltration: Provide glazed aluminum curtain wall system with permanent resistance to air leakage through system of not more than 0.06 cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 6.24 lbf/sq. ft. (299 Pa).

    1. Provide operable windows with permanent resistance to air leakage complying with AAMA 101 requirements for types of windows indicated.

J. Water Penetration: Provide glazed aluminum curtain wall system that does not evidence water leakage when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of inward acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 10 lbf/sq. ft. (479 Pa). Water leakage is defined as follows:

    1. According to AAMA 501.1.
    2. Uncontrolled water infiltrating system or appearing on system's normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

K. Thermal Movements: Provide glazed aluminum curtain wall system, including anchorage, that accommodates thermal movements of system and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, noise or vibration, and other detrimental effects.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

L. Structural Support Movement: Provide glazed aluminum curtain wall system that accommodates structural movements including, but not limited to, sway, twist, column shortening, long-term creep, and deflection.

M. Average Thermal Conductance: Provide glazed aluminum curtain wall system with an average U-value of not more than 0.66 Btu/sq. ft. x h x deg F (3.75 W/sq. m x K) when tested according to AAMA 1503.1.

N. Sound Transmission: Provide glazed aluminum curtain wall system with average sound transmission loss through system of not less than 34 decibels (dB) when tested according to ASTM E 90.

O. Dimensional Tolerances: Provide glazed aluminum curtain wall system, including anchorage, that accommodates dimensional tolerances of building frame and other adjacent construction.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each product specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.

C. Shop Drawings showing fabrication and installation of glazed aluminum curtain wall system including plans, elevations, sections, details of components, and attachments to other units of Work.

1. For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples for initial selection in the form of manufacturer's color charts, showing the full range of colors available for components with factory-applied color finishes.

E. Samples for verification of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

F. Cutaway Sample of each vertical-to-horizontal intersection of system, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

1. Joinery.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

G. Welder certificates indicating that welders comply with requirements specified in "Quality Assurance" Article.

H. Installer certificates signed by manufacturer certifying that installers comply with requirements in "Quality Assurance" Article.

I. Preconstruction test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance with performance requirements of glazed aluminum curtain wall system.

J. Product test reports from a qualified independent testing agency evidencing compliance of glazed aluminum curtain wall system with requirements based on comprehensive testing of manufacturer's current system.

K. Field test reports from a qualified independent inspecting and testing agency indicating and interpreting test results relative to compliance with performance requirements of glazed aluminum curtain wall system.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of glazed aluminum curtain wall systems that are similar to those indicated for this Project in material, design, and extent.

C. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing glazed aluminum curtain wall systems similar to those required for this Project and who is acceptable to manufacturer.

1. Engineering Responsibility: Engage a qualified professional engineer to prepare or supervise the preparation of data for glazed aluminum curtain wall systems, including drawings, testing program development, test-result interpretation, and comprehensive engineering analysis that shows systems' compliance with specified requirements.
2. Engineering Responsibility: Prepare data for glazed aluminum curtain wall systems, including drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

D. Source Limitations: Obtain each type of glazed aluminum curtain wall system from one source and by a single manufacturer.

E. Product Options: Drawings indicate size, profiles, and dimensional requirements of glazed aluminum curtain wall system and are based on the specific system indicated. Other manufacturers' systems with equal performance characteristics may be considered.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

2. Basis of Design: 1600 Wall, Kawneer Company, Inc.

F. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."

1. Engage welders who have satisfactorily passed AWS qualification tests for welding processes involved and who are currently certified for these processes.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
2. Review structural loading limitations.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review required inspecting, testing, and certifying procedures.
5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures including, but not limited to, excessive deflection.
2. Noise or vibration caused by thermal movements.
3. Failure of system to meet performance requirements.
4. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
5. Failure of operating components to function normally.
6. Water leakage.
7. Glazing breakage.

C. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Arch Amarlite.
2. EFCO Corporation.
3. Kawneer Company, Inc.
4. Robertson-Ceco; Cupples.
5. Tubelite Architectural Systems.
6. YKK AP America Inc.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Welding Rods and Bare Electrodes: AWS A5.10.

B. Steel Reinforcement: ASTM A 36 (ASTM A 36M) for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 (ASTM A 570M) for hot-rolled sheet and strip.

C. Glazing as specified in Division 8 Section "Glazing."

D. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers; in hardness recommended by manufacturer.

E. Glazing sealants and fillers as specified in Division 8 Section "Glazing."

F. Framing system gaskets and joint fillers as recommended by manufacturer for joint type.

G. Sealants and joint fillers for joints within glazed aluminum curtain wall system as specified in Division 7 Section "Joint Sealants."

H. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.3 COMPONENTS

A. Insulated Spandrel Panels: Manufacturer's standard laminated aluminum-faced panels of thickness indicated, flat with no deviations in plane exceeding 1/16 inch in 24 inches (1.5 mm in 600 mm) or 1/8 inch (3 mm) over entire panel.

1. Face Sheets: 0.024-inch (0.6-mm) minimum thickness finished to match system framing.

   a. Texture: Embossed.

2. Concealed Back Sheets: Aluminum or galvanized steel in manufacturer's standard thickness.
3. Stabilizer Sheets: 1/8-inch- (3-mm-) thick tempered hardboard.
4. Core: Extruded-polystyrene thermal insulation complying with ASTM C 578, Type IV requirements and with an aged thermal-resistivity value of 5 deg F x h x sq. ft./Btu x in. at 75 deg F (35 K x m/W at 24 deg C).
5. Edge Configuration: Sealed.

B. Exterior Trim: Stainless steel complying with ASTM A 666, Type 302, 304, or 316 requirements; with No. 4 finish; and in profiles indicated.

C. Brackets and Reinforcements: Provide manufacturer's standard high-strength aluminum brackets and reinforcements. Provide nonstaining, nonferrous shims for aligning system components.

D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Finish exposed portions to match glazed aluminum curtain wall.

1. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
2. Where fasteners anchor into aluminum less than 0.125 inch (3.2 mm) thick, provide reinforcement to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads finished to match framing members, unless otherwise indicated.

E. Anchors: 3-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

F. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, complying with ASTM A 666, of type selected by manufacturer for compatibility with system.

2.4 FABRICATION

A. General: Fabricate glazed aluminum curtain wall system according to Shop Drawings. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

C. Prepare components to receive concealed fasteners and anchor and connection devices.

D. Fabricate components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

E. Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld before finishing components. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

F. Glazing Pockets: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."

G. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Frame Units: Factory assemble frame units according to Shop Drawings to greatest extent possible. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Assemble components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

1. Install glazing according to Shop Drawings. Comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.

2.5 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

D. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer 2-Coat Coating System: 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 605.2.

   a. Color and Gloss: As selected by Architect from manufacturer's full range of choices for color and gloss.

2.6 STEEL PRIMING

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying primer.

B. Surface Preparation: Perform manufacturer's standard cleaning operations to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel.

C. Priming: Apply manufacturer's standard corrosion-resistant primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of glazed aluminum curtain wall system. Do not proceed with installation until unsatisfactory conditions have been corrected or accommodations acceptable to Architect have been made.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum curtain wall system. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.

B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints; condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.

D. Install framing members plumb and true in alignment with established lines and grades.

E. Install factory-assembled frame units plumb and true in alignment with established lines and grades.

F. Install column covers plumb and true in alignment with established lines and grades.

G. Install operable windows plumb and level, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to provide specified performance and proper operation.

H. Anchorage: After system components are positioned, fix connections to building structure as indicated on Shop Drawings.

1. Provide separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

I. Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.

J. Install glazing according to Shop Drawings. Comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.

K. Install sealant according to Shop Drawings. Comply with requirements of Division 7 Section "Joint Sealants," unless otherwise indicated.

L. Install firesafing in locations indicated. Comply with requirements of Division 7 Section "Building Insulation," unless otherwise indicated.

M. Erection Tolerances: Install glazed aluminum curtain wall system to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet (3 mm in 3 m); 1/4 inch in 40 feet (6 mm in 12 m).

2. Level: 1/8 inch in 20 feet (3 mm in 6 m); 1/4 inch in 40 feet (6 mm in 12 m).
3. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm); where a reveal or protruding element separates aligned surfaces by less than 2 inches (50.8 mm), limit offset to 1/2 inch (12.7 mm).
4. Location: Limit variation from plane or location shown on Shop Drawings to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/2 inch (12.7 mm) over total length.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing agency to perform testing indicated.

B. Air Infiltration: Test areas of installed system indicated on Drawings for compliance with system performance requirements according to ASTM E 783.

C. Water Penetration: Test areas of installed system indicated on Drawings for compliance with system performance requirements according to ASTM E 1105 at minimum differential pressure of 20 percent of inward acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24 lbf/sq. ft. (299 Pa).

D. Water Spray Test: After completing the installation of 75-feet- (23-m-) by-2-story minimum area of glazed aluminum curtain wall system, test system for water penetration according to AAMA 501.2 in a 2-bay area directed by Architect.

E. Repair or remove Work that does not meet requirements or that is damaged by testing; replace to conform to specified requirements.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure glazed aluminum curtain wall system is without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08920

SECTION 09912 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

2. For painting of parking lines, arrows, and curb edges in parking structure refer to Section 02580.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

2. Painting includes field painting of exposed precast connections.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:

a. Elevator entrance doors and frames.
b. Elevator equipment.
c. Finished mechanical and electrical equipment.
d. Light fixtures.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Foundation spaces.
b. Furred areas.
c. Ceiling plenums.
d. Utility tunnels.

e. Pipe spaces.
f. Duct shafts.
g. Elevator shafts.

3. Finished metal surfaces include the following:

a. Anodized aluminum.
b. Stainless steel.
c. Chromium plate.

4. Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators.
b. Linkages.
c. Sensing devices.
d. Motor and fan shafts.

5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 2 Section "Pavement Markings" for painting of parking lines in parking structure.
2. Division 5 Section "Metal Fabrications" for shop priming ferrous metal.
3. Division 8 Section "Steel Doors and Frames" for factory priming steel doors and frames.

1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

A. Product Data: For each paint system indicated. Include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples for Initial Selection: For each type of finish-coat material indicated.

1. After color selection, Architect will furnish color chips for surfaces to be coated.

C. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
3. Submit three samples on the following substrates for Architect's review of color and texture only:
   a. Ferrous Metal: **4-inch** wide and **8-inch** long Samples of solid metal for each color and finish.

D. Qualification Data: For Applicator.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain primers for each coating system from the same manufacturer as the finish coats.

C. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

D. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.6 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Benjamin Moore & Co. (Benjamin Moore).
2. M. A. Bruder & Sons, Inc. (M. A. B. Paint).
3. PPG Industries, Inc. (Pittsburgh Paints).
4. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: As selected by Architect from manufacturer's full range.

2.3 CONCRETE UNIT MASONRY BLOCK FILLERS

A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers.

1. Benjamin Moore; Moore's IMC Latex Block Filler No. M88: Applied at a dry film thickness of not less than 8.1 mils (0.206 mm).
2. M. A. B. Paint; Block Kote No. 1000 Acrylic Latex Block Filler 064-145: Applied at a dry film thickness of not less than 12.0 mils (0.305 mm).
3. Pittsburgh Paints; 6-7 SpeedHide Interior/Exterior Masonry Latex Block Filler: Applied at a dry film thickness of not less than 6.0 to 12.5 mils (0.152 to 0.318 mm).
4. Sherwin-Williams; PrepRite Interior/Exterior Block Filler B25W25: Applied at a dry film thickness of not less than 8.0 mils (0.203 mm).

2.4 EXTERIOR PRIMERS

A. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.

1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
2. M. A. B. Paint; Rust-O-Lastic Anti-Corrosive Primer 073-132: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
3. Pittsburgh Paints; 90-712 Pitt-Tech One Pack Interior/Exterior Primer Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
4. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

B. Exterior Galvanized Metal Primer: Factory-formulated galvanized metal primer for exterior application.

1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
2. M. A. B. Paint; Rust-O-Lastic Hydro-Prime II Acrylic (DTM) Maintenance Primer 073-189: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
3. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
4. Sherwin-Williams; Galvite HS Paint B50WZ3: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).

2.5 INTERIOR PRIMERS

A. Use primer products specified for exterior work.

2.6 EXTERIOR FINISH COATS

A. Exterior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for exterior application.

1. Benjamin Moore; Moorcraft Super Spec Flat Latex House Paint No. 171: Applied at a dry film thickness of not less than 1.2 mils (0.030 mm).

2. M. A. B. Paint; Fresh Kote Latex House Paint 409 Line: Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).
3. Pittsburgh Paints; 6-600 Series SpeedHide Exterior House Paint Flat Latex: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
4. Sherwin-Williams; A-100 Exterior Latex Flat House & Trim Paint A6 Series: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).

B. Exterior Full-Gloss Alkyd Enamel: Factory-formulated full-gloss alkyd enamel for exterior application.

1. Benjamin Moore; Moore's IMC Urethane Alkyd Enamel M22: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
2. M. A. B. Paint; Rust-O-Lastic Finish Coating 074 Line: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
3. Pittsburgh Paints; 7-814 Pittsburgh Paints Industrial Gloss-Oil Interior/Exterior Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
4. Sherwin-Williams; Industrial Enamel B-54 Series: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).

2.7 INTERIOR FINISH COATS

A. Use finish coat products specified for exterior work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or

impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.

2. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to **[SSPC-SP 6/NACE No. 3]**.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

3. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
10. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Paint the following items:

   a. All miscellanous metal fabrications, including exposed portions of lintels, bearing plates, bollards, etc.
   b. All railing systems.
   c. Steel doors and frames.
   d. Exposed structural steel beams, columns, etc.
   e. Interior of elevator shafts, flat black.

2. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
3. Omit primer over metal surfaces that have been shop primed and touchup painted.
4. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
5. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is not required, except conduit, junction boxes, etc. located within elevator shafts.

F. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

G. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

H. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:

1. Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.

2. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 EXTERIOR PAINT SCHEDULE

A. Concrete and Masonry: Provide the following finish systems over concrete and masonry substrates at interior of elevator shafts:

1. Flat Acrylic Finish Two finish coats over a primer.

a. Primer: : Concrete unit masonry block filler.
b. Finish Coats: Exterior flat acrylic paint.

B. Ferrous Metal: Provide the following finish systems over exterior ferrous metal surfaces:

1. Full-Gloss Alkyd-Enamel Finish: Two finish coats over a rust-inhibitive primer.

a. Primer: Exterior ferrous-metal primer. Primer is limited to touch-up on shop primed surfaces.
b. Finish Coats: Exterior full-gloss alkyd enamel.

C. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated metal surfaces:

1. Full-Gloss Alkyd-Enamel Finish: Two finish coats over a galvanized metal primer

a. Primer: Exterior galvanized metal primer.
b. Finish Coats: Exterior full-gloss alkyd enamel.

3.8 INTERIOR PAINT SCHEDULE

A. Use the same paint systems specified for exterior surfaces.

END OF SECTION 09912

SECTION 10200 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Fixed, extruded-aluminum louvers.

B. Related Sections include the following:

1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
2. Wind Loads: Determine loads based on a uniform pressure of 30 lbf/sq. ft. (1436 Pa), acting inward or outward.

B. Seismic Performance: Provide louvers capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

C. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

E. Airborne Sound Transmission Loss: Provide acoustical louvers complying with airborne sound transmission loss ratings indicated, as demonstrated by testing manufacturer's stock units identical to those specified, except for length and width according to ASTM E 90.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.

1. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Wiring Diagrams: Power, signal, and control wiring for motorized adjustable louvers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Qualification Data: For professional engineer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2, "Structural Welding Code--Aluminum."

C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

D. UL and NEMA Compliance: Provide motors and related components for motor-operated adjustable louvers that are listed and labeled by UL and comply with applicable NEMA standards.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Louvers:

a. Airline Products Co.
b. American Warming and Ventilating, Inc.
c. Construction Specialties, Inc.
d. Greenheck.
e. Nystrom Building Products.
f. Reliable Products; Hart & Cooley, Inc.
g. Ruskin Company; Tomkins PLC.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.

D. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.

1. Use types and sizes to suit unit installation conditions.
2. Use hex-head or Phillips pan-head screws for exposed fasteners, unless otherwise indicated.

E. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Maintain equal louver blade spacing to produce uniform appearance.

E. 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.

1. Frame Type: Channel, unless otherwise indicated.

F. Include supports, anchorages, and accessories required for complete assembly.

G. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.

1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Storm-Resistant Louver.

1. Louver Depth: 4 inches (100 mm).
2. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.125 inch for blades and 0.125 inch for frames.
3. Performance Requirements:

    a. Free Area: Not less than 5.0 sq. ft. for 48-inch- (1.2-m-) wide by 48-inch- (1.2-m-) high louver.
    b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 700-fpm (3.6-m/s) free-area velocity.
    c. Wind-Driven Rain Performance: Not less than 95 percent effectiveness when subjected to a rain fall rate of 8 inches (200 mm) per hour and a wind speed of 50 mph (22.4 m/s) at a core area intake velocity of 400 fpm (2.0 m/s).

4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 LOUVER SCREENS

A. General: Provide screen at each exterior louver indicated.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Bird screening.

B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Reinforce extruded-aluminum screen frames at corners with clips.
2. Finish: Mill finish, unless otherwise indicated.
3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.

D. Louver Screening for Aluminum Louvers:

1. Bird Screening: Stainless steel, 1/2-inch- (12.7-mm-) square mesh, 0.047-inch (1.19-mm) wire.

2.6 BLANK-OFF PANELS

A. Insulated, Blank-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets.

1. Thickness: 1 inch (25 mm).
2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.
3. Insulating Core: Foamed-plastic rigid insulation board.

4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than 0.080-inch (2.0-mm) nominal thickness, with corners mitered and with same finish as panels.
5. Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch (3.2-by-25-mm) PVC compression gaskets.
6. Panel Finish: Same finish applied to louvers.
7. Attach blank-off panels to back of louver frames with stainless-steel, sheet metal screws.
8. Coordinate location and size of blank-off panels with HVAC Contractor.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish louvers after assembly.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.

B. High-Performance Organic-Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Fluoropolymer Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

a. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.

B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 10200

SECTION 10520 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Portable fire extinguishers.
2. Fire-protection cabinets for the following:

a. Portable fire extinguishers.

3. Provide six fire extinguishers and cabinets, to be installed in locations as directed by the Architect.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.

1. Fire Extinguishers: Include rating and classification.
2. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain fire extinguishers and cabinets through one source from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."

C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide extinguishers listed and labeled by FM.

1.5 COORDINATION

A. Coordinate size of cabinets to ensure that type and capacity of fire extinguishers indicated and provided by Owner under separate Contract are accommodated.

B. Coordinate size of cabinets to ensure that type and capacity of hoses, hose valves, and hose racks indicated are accommodated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Portable Fire Extinguishers:

a. Amerex Corporation.
b. Ansul Incorporated.
c. J.L. Industries, Inc.
d. Kidde: Walter Kidde, The Fire Extinguisher Co.
e. Larsen's Manufacturing Company.
f. Potter-Roemer; Div. of Smith Industries, Inc.
g. Watrous; Div. of American Specialties, Inc.

2. Fire-Protection Cabinets:

a. Amerex Corporation.
b. Ansul Incorporated.
c. J.L. Industries, Inc.
d. Kidde: Walter Kidde, The Fire Extinguisher Co.
e. Larsen's Manufacturing Company.
f. Potter-Roemer; Div. of Smith Industries, Inc.
g. Watrous; Div. of American Specialties, Inc.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: Carbon steel, complying with ASTM A 366/A 366M, commercial quality, stretcher leveled, temper rolled.

B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B 209 (ASTM B 209M).
2. Extruded Shapes: ASTM B 221 (ASTM B 221M).

2.3 PORTABLE FIRE EXTINGUISHERS

A. General: Provide fire extinguishers of type, size, and capacity for each cabinet and other locations indicated.

B. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, in enameled-steel container.

2.4 FIRE-PROTECTION CABINETS

A. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

1. Fire-Rated Cabinets: Listed and labeled to meet requirements of ASTM E 814 for fire-resistance rating of wall where it is installed.

a. Provide factory-drilled mounting holes.

2. Cabinet Metal: Enameled-steel sheet.

B. Cabinet Type: Suitable for the following:

1. Fire extinguisher.

C. Cabinet Mounting: Suitable for the following mounting conditions:

1. Surface Mounted: Cabinet box fully exposed and mounted directly on wall.

D. Cabinet Trim Material: Manufacturer's standard, as follows:

1. Steel sheet.

E. Door Material: Manufacturer's standard, as follows:

1. Steel sheet.

F. Door Glazing: Manufacturer's standard, as follows:

1. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm.

G. Door Style: Manufacturer's standard design, as follows:

1. Center glass panel with frame.

H. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.

1. Provide minimum 1/2-inch- (13-mm-) thick door frames, fabricated with tubular stiles and rails, and hollow-metal design.

2. Provide inside latch and lock for break-glass panels.

I. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

2.5 ACCESSORIES

A. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher, of sizes required for types and capacities of extinguishers indicated, with plated or baked-enamel finish.

1. Provide brackets for extinguishers located in cabinets.

B. Break-Glass Strike: Provide manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.

C. Lettered Door Handle: Provide one-piece, cast-iron door handle with the word "FIRE" embossed into face.

D. Door Locks: Provide cylinder lock, with all cabinets keyed alike.

E. Identification: Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location. Locate as indicated by Architect.

1. Identify fire extinguisher in cabinet with the words "FIRE EXTINGUISHER" applied to door.

a. Application Process: Vinyl letters.
b. Lettering Color: Red.
c. Orientation: Vertical.

2.6 COLORS AND TEXTURES

A. Colors and Textures: As selected by Architect from manufacturer's full range for these characteristics.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Cabinet and Door Finishes: Provide manufacturer's standard baked-enamel paint for the following:

1. Exterior of cabinets and doors, except for those surfaces indicated to receive another finish.
2. Interior of cabinets and doors.
3. Color: As selected by Architect from manufacturer's full range.

2.8 STEEL FINISHES

A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.

B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged units.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing fire-protection specialties.

B. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

1. Fasten mounting brackets to cabinets, square and plumb.
2. Fasten cabinets to structure, square and plumb.

END OF SECTION 10520

SECTION 14240 - HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes hydraulic passenger elevators.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for excavation to accommodate plunger-cylinder assembly.
2. Division 3 Section "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
3. Division 4 Section "Unit Masonry" for setting sleeves, inserts, and anchoring devices in masonry.
4. Division 5 Section "Metal Fabrications" for the following:

    a. Attachment plates and angle brackets for supporting guide-rail brackets.
    b. Divider and hoist beams.
    c. Structural-steel shapes for subsills.
    d. Pit ladders.

5. Division 16 Section "Premises Telephone Wiring" for telephone service to elevators.
6. Division 16 Sections for electrical service for elevators to and including fused disconnect switches at machine room door.

1.3 DEFINITIONS

A. Defective Elevator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.4 SUBMITTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.

B. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.

C. Samples: For exposed finishes of cars, hoistway doors and frames, and signal equipment; 3-inch-(75-mm-) square samples of sheet materials; and 4-inch (100-mm) lengths of running trim members.

D. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

E. Maintenance Manuals: Include operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Owner's information at Project closeout as specified in Division 1.

F. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Elevator manufacturer or an experienced installer approved by elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, "Safety Code for Elevators and Escalators."

1. Seismic Risk Zone: Project is located in Zone 0 or 1.

C. Accessibility Requirements: In addition to local governing regulations, comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."

1.6 COORDINATION

A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.

B. Furnish well casing and coordinate delivery with related excavation work.

C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Written warranty, signed by manufacturer agreeing to repair, restore, or replace defective elevator work within specified warranty period.

1. Warranty Period: 12 months from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance service by skilled employees of the elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment.

1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, 7-day-per-week emergency callback service.

a. Response Time: Two hours or less.

B. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

C. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner with terms, conditions, and obligations as set forth in, and in the same form as, "Draft of Elevator Maintenance Agreement" at end of this Section, starting on date initial maintenance service is concluded.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering hydraulic elevators that may be incorporated into the Work include, but are not limited to, the following:

1. Dover Elevator Systems.
2. Fujitec America, Inc.
3. Montgomery KONE Inc.
4. Otis Elevator Co.
5. Schindler Elevator Corp.
6. Schumacher Elevator Co.

2.2 MATERIALS AND COMPONENTS

A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard preengineered elevator systems and as required for a complete system.

B. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations. Provide either of the following:

1. Pump, with fan-cooled squirrel-cage induction motor, mounted on top of oil tank with vibration isolation mounts. Enclose pump in prime-painted steel enclosure lined with 1-inch- (25-mm-) thick, glass-fiber insulation board.
2. Submersible pump, with submersible squirrel-cage induction motor, suspended inside tank from vibration isolation mounts.
3. Provide motor with wye-delta or solid-state starting.
4. Provide variable-voltage variable-frequency motor control.
5. Coordinate disconnect switch requirement for battery operated lowering feature with Electrical Contractor.

C. Hydraulic Silencers: Provide hydraulic silencer containing pulsation-absorbing material in a blowout-proof housing at pump unit.

D. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide flexible connectors to minimize sound and vibration transmissions from power unit.

1. Provide dielectric couplings at plunger/cylinder units.
2. Casing for Underground Piping: PVC pipe complying with ASTM D 1785 joined with PVC fittings complying with ASTM D 2466 and solvent cement complying with ASTM D 2564.

E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Specification Section.

F. Protective Cylinder Casings: PVC pipe casings complying with ASME A17.1, of sufficient size to provide not less than 1-inch (25-mm) clearance from cylinder, and extending above pit floor.

G. Corrosion Protective Filler: A solventless, petroleum-based gel formulated for filling the space between hydraulic cylinders and protective casings. Filler is heavier than water, electrically nonconductive, and liquefies at approximately 150 deg F (66 deg C).

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Diversified Enterprises; No-Ox-Id R-R #6110A.
b. Pacific Standard Chemical Co.; Union-Gard 160.

H. Car Frame and Platform: Welded steel units.

I. Finish Materials: Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated:

1. Polished Stainless Steel: ASTM A 666, Type 304, with No. 8 mirror polished finish.
2. Satin Stainless Steel: ASTM A 666, Type 304, with No. 4, directional satin finish.
3. Nickel Silver Extrusions: ASTM B 151 (ASTM B 151M), alloy UNS No. C74500.
4. Enameled-Steel Sheet: Cold-rolled steel sheet complying with ASTM A 366/A 366M, matte finish, stretcher-leveled standard of flatness; hot-rolled steel sheet complying with ASTM A 569/A 569M may be used for door frames. Provide with factory-applied enamel finish; colors as selected by Architect.
5. Prime-Painted Steel Sheet: Cold-rolled steel sheet, ASTM A 366/A 366M, or hot-rolled steel sheet, ASTM A 569/A 569M, with factory-applied rust-inhibitive primer.
6. Laminating Glass: Comply with ASTM C 1172. Provide 2 panes of clear float glass laminated together with polyvinyl butyral interlayer in an autoclave with heat plus pressure.

2.3 OPERATION SYSTEMS

A. Passenger Elevators: Provide manufacturer's standard microprocessor operation system for each elevator or group of elevators as required to provide type of operation system indicated.

1. Multiple-Car Group: Provide "group automatic operation" as defined in ASME A17.1.

B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated.

1. Battery-Powered Lowering: If power fails, cars that are at a floor remain at that floor, open their doors, and shut down. Cars that are between floors are lowered to a preselected floor, open their doors, and shut down. Cars that are below the preselected floor are lowered to the next lower floor, open their doors, and shut down. System includes rechargeable battery and automatic recharging system.
2. Priority Service: Service is initiated by a keyswitch at designated floors. One elevator is removed from group operation and directed to the floor where service was initiated. On arriving at the floor, elevator opens its doors and parks and a lighted sign directs passengers to exit elevator. Car is placed in operation by selecting a floor and pressing door close button or by operating keyswitch to put car in independent service. After responding to floor selected or being removed from independent service, car is returned to group operation. If car is not placed in operation within a preset time after being called, it is returned to group operation.
3. Independent Service: Keyswitch in car control station removes car from group operation and allows it to respond only to car calls. Key cannot be removed from keyswitch when car is in independent service. When in independent service, doors close only in response to the door close button.
4. Loaded-Car Bypass: When car load exceeds a predetermined weight, car will respond only to car calls, not to hall calls. Predetermined weight can be adjusted.
5. Automatic Dispatching of Loaded Car: When car load exceeds a predetermined weight, doors will begin closing.
6. Nuisance Call Cancel: When car calls exceed a preset number while car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted.

2.4 SIGNAL EQUIPMENT

A. General: Provide signal equipment for each elevator or group of elevators with hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements of acrylic or other permanent, nonyellowing translucent plastic.

B. Car Control Stations: Provide fully recessed car control stations with applied metal faceplates. Mount in return panel adjacent to car door, if not otherwise indicated.

1. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation.
2. Mark buttons and switches with manufacturer's standard identification for required use or function that complies with ASME A17.1.
3. Mount controls at heights complying with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."

C. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.

D. Fire Department Communication System: Provide telephone jack in each car and required conductors in traveling cable for fire department communication system specified in Division 16 Sections.

E. Car Position Indicator: For passenger elevator cars, provide illuminated-signal type, digital-display type, or segmented type, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.

1. Include travel direction arrows if not provided in car control station.

F. Hall Push-Button Stations: Provide one hall push-button station at each landing.

1. Provide units with flat faceplate for mounting with body of unit recessed in wall.

G. Hall Lanterns: Provide units with illuminated arrows, but provide single arrow at terminal landings.

1. Provide units with flat faceplate for mounting with body of unit recessed in wall and with illuminated elements projecting from faceplate for ease of angular viewing.
2. Place lanterns either above or beside each hoistway entrance, unless otherwise indicated. Mount at a minimum of 72 inches (1829 mm) above finished floor.
3. With each lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.

    a. At manufacturer's option, audible signals may be placed on each car.

H. Hall Position Indicators: Provide illuminated-signal type or digital-display type, located above each hoistway entrance at ground floor. Provide units with flat faceplate for mounting with body of unit recessed in wall.

1. Integrate ground-floor hall lanterns with hall position indicators.

I. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations with text and graphics according to ASME A17.1, Appendix H.

2.5 DOOR REOPENING DEVICES

A. Infrared Array: Provide door reopening devices with a uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.

B. Door Edge Device: Provide retractable edge shoes on elevator entrance doors that cause doors to stop and reopen upon contacting an obstruction. Include photoelectric device with timed cutout that projects dual-light beams across car entrance at 5- and 29-inch (127- and 737-mm) heights; the beams, when interrupted, cause doors to stop and reopen.

1. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.6 PASSENGER ELEVATOR CAR ENCLOSURES

A. General: Provide manufacturer's standard steel-framed car enclosures with nonremovable wall panels, suspended ceiling, trim, accessories, access doors, doors, power door operators, sills (thresholds), lighting, and ventilation.

1. Floor: Provide vinyl composition floor, in color and style as selected from manufacturer's standards.
2. Metal Wall Panels: Flush hollow-metal construction, fabricated from metal indicated.
3. Fabricate car with recesses and cutouts for signal equipment.
4. Fabricate car door frame integrally with front wall of car.
5. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel.
6. Sills: Extruded metal, with grooved surface, 1/4 inch (6.4 mm) thick. Provide polished finish on aluminum.
7. Ceiling: Stainless steel panels with satin finish with concealed fluorescent light fixtures in cove.
8. Handrails: Manufacturer's standard handrails, of metal indicated.

2.7 PASSENGER HOISTWAY ENTRANCES

A. General: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Provide frame size and profile to coordinate with hoistway wall construction.

1. Where gypsum board wall construction is indicated, provide self-supporting frames with reinforced head sections.

B. Materials and Fabrication: Provide manufacturer's standards but not less than the following:

1. Stainless-Steel Frames: Formed stainless-steel sheet.
2. Stainless-Steel Doors and Transoms: Flush, hollow-metal construction, fabricated from stainless steel.
3. Sills: Extruded metal, with grooved surface, 1/4 inch (6.4 mm) thick. Provide polished finish on aluminum.
4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

2.8 PASSENGER ELEVATORS

A. Elevator Nos.: 1 and 2.

1. Type: Under-the-car single cylinder.
2. Rated Load: 4500 lb (2043 kg).
3. Rated Speed: 150 fpm (0.76 m/s).
4. Operation System: Group automatic operation, two-car group.
5. Auxiliary Operations:

   a. Battery lowering.
   b. Priority service at all floors.
   c. Independent service.
   d. Loaded-car bypass.
   e. Automatic dispatching of loaded car.
   f. Nuisance call cancel.

6. Car Enclosures: As follows:

   a. Inside Width: 68 inches.
   b. Inside Depth: 95 inches.
   c. Inside Height: 88 inches (2235 mm).
   d. Front Walls: Satin stainless steel with integral car door frames.
   e. Car Fixtures: Satin stainless steel.
   f. Side Wall Panels: Satin stainless steel.
   g. Rear Wall Panels: Glazed with laminated safety glass installed in aluminum tube framing system. Provide black high performance organic coating finish for aluminum frame. (Glazing is to permit view into elevator car for security purposes.)
   h. Reveals: Enameled steel.
   i. Door Faces (Interior): Satin stainless steel.
   j. Door Sills: Aluminum.
   k. Ceiling: Stainless steel panels with cove lighting.
   l. Handrails: Satin stainless steel, at side and rear walls.
   m. Floor prepared to receive resilient tile, supplied with elevator.

7. Hoistway Entrances: As follows:

a. Width: 48 inches (1219 mm).
b. Height: 84 inches (2134 mm).
c. Type: Single-speed center opening.
d. Frames at all floors: Satin stainless steel.
e. Doors at all floors: Satin stainless steel.
f. Sills: Aluminum.

8. Hall Fixtures Satin stainless steel.
9. Additional Requirements: As follows:

a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
b. Provide protective blanket hooks in all four cars and two complete sets of full-height blankets.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Verify critical dimensions, and examine supporting structure and other conditions under which elevator work is to be installed. Proceed with installation only after unsatisfactory conditions have been corrected.

1. For the record, prepare a written report, endorsed by Installer, listing dimensional discrepancies and conditions detrimental to performance.

3.2 INSTALLATION

A. Excavation for Jack: Drill excavation in each elevator pit to accommodate installation of cylinders; comply with applicable requirements in Division 2 Section "Earthwork."

1. Provide[waterproof well casings to retain walls of well hole.

B. Install cylinders in protective casings within well casing. Before installing protective casing, remove water and debris from well casing and provide permanent waterproof seal at bottom of well casing. Fill void space between protective casing and cylinder with corrosion-protective filler.

1. Align cylinders and fill space between well casing and protective casing with fine sand.

C. Install cylinders plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor. Seal between well casing and pit floor with 4 inches (100 mm) of nonshrink, nonmetallic grout.

D. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.

E. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.

F. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent-cement fittings.

G. Install piping above the floor, where possible. Where not possible, cover underground piping with permanent protective wrapping before backfilling.

H. Lubricate operating parts of systems as recommended by manufacturers.

I. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

J. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and direction of travel.

K. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.

B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.

3.4 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.

B. Make a final check of each elevator operation with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

3.5 PROTECTION

A. Temporary Use: Do not use elevators for construction purposes unless cars are provided with temporary enclosures, either within finished cars or in place of finished cars, to protect finishes from damage.

1. Provide full maintenance service by skilled, competent employees of elevator Installer for elevators used for construction purposes. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Use same parts and supplies as used in the manufacture and installation of original equipment.
2. Provide protective coverings, barriers, devices, signs, and other procedures to protect elevators. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

END OF SECTION 14240

SECTION 15000

SPECIAL REQUIREMENTS FOR MECHANICAL AND ELECTRICAL WORK

TABLE OF CONTENTS — PAGE NO.

PART 1 - GENERAL 1
1.1 RELATED DOCUMENTS 1
1.2 DEFINITIONS 1
1.3 CODES AND STANDARDS 1
1.4 INTENT 2
1.5 DRAWINGS 2
1.6 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS 3
1.7 VISITING THE SITE 3
1.8 EQUIPMENT AND MATERIALS 3
1.9 SHOP DRAWINGS 5
1.10 RECORD DRAWINGS 7
1.11 LAWS, ORDINANCES, PERMITS AND FEES 7
1.12 INDEMNIFICATION 7
1.13 ORGANIZATION OF WORK 8
1.14 PROTECTION OF WORK AND PROPERTY 9
1.15 TEMPORARY OPENINGS 9
1.16 SHUTDOWNS 9
1.17 ACCESS DOORS IN FINISHED CONSTRUCTION 10
1.18 PIPE EXPANSION 10
1.19 SCAFFOLDING, RIGGING, HOISTING 10
1.20 BASES AND SUPPORTS 10
1.21 SEISMIC RESTRAINT 11
1.22 SLEEVES, PIPE AND CONDUIT INSERTS AND ANCHOR BOLTS 11
1.23 ESCUTCHEONS 12
1.24 MANUFACTURERS' IDENTIFICATION 13
1.25 EQUIPMENT NAMEPLATES 13
1.26 IDENTIFICATION 13
1.27 DRIP PANS 14
1.28 TOOLS 14
1.29 QUIET OPERATION 15
1.30 RUBBISH REMOVAL 15
1.31 CLEANING, PIPING AND EQUIPMENT 15
1.32 DELIVERY OF MATERIAL 15
1.33 EXCAVATION AND BACKFILL 15
1.34 GRADING 17
1.35 PAINTING 17
1.36 TESTS 18
1.37 OPERATING INSTRUCTIONS 19
1.38 GUARANTEE 20
1.39 OPERATION PRIOR TO COMPLETION 20
1.40 INSTALLATION OF MOTORS AND CONTROL EQUIPMENT 20
1.41 ELECTRIC MOTORS 21
1.42 INDIVIDUAL MOTOR STARTERS 23
1.43 MOTOR CONTROLLERS 24
1.44 SEMI-FINAL AND FINAL SITE VISITS FOR OBSERVATION 25

PART 2 - PRODUCTS - (NOT USED) 25
PART 3 - EXECUTION - (NOT USED) 25

END OF TABLE OF CONTENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Where items of the General Conditions are repeated in this Section of the Specifications, it is intended to qualify or to call particular attention to them; it is not intended that any other parts of the General Conditions shall be assumed to be omitted if not repeated herein.

B. This Section applies equally and specifically to all Contractors and Subcontractors supplying labor and/or equipment and/or materials as required under the Plumbing and Electrical Sections of the Specifications.

1.2 DEFINITIONS

A. "The Contractor" or "Each Contractor" means specifically, the Contractor or Subcontractor working under his respective Section (Plumbing or Electrical) of this Specification.

B. "Provide" means to supply, erect, install, and connect up in complete readiness for regular operation, the particular work referred to.

C. "Furnish" means to supply and deliver to the job.

D. "Piping" includes, in addition to pipe, all fittings, valves, hangers, and other accessories related to such piping.

E. "Concealed" means hidden from sight as in chases, furred spaces, shafts, hung ceilings, or embedded in construction.

F. "Exposed" means "not concealed" as defined above. Work in trenches, crawl spaces, and tunnels shall be considered "exposed" unless otherwise specifically noted.

G. "Approved equal" means any equipment or material which, in the opinion of the Architect, is equal in quality, durability, appearance, strength, design, performance, physical dimensions, and arrangement to the equipment or material specified, and will function adequately in accordance with the general design.

H. "Governmental" means all municipal, state and federal governmental agencies.

I. Where any device or part of equipment is herein referred to in the singular number (such as "the pump"), such reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the Drawings.

J. "Plumbing Contractor" means the Contractor doing Plumbing and Fire Protection Work.

1.3 CODES AND STANDARDS

A. BOCA Building Code, International Mechanical Code

B. N.J. Uniform Construction Code

C. NFPA National Fire Protection Association

D. ASME American Society of Mechanical Engineers

E. ANSI American National Standards Institute

F. ASTM American Society for Testing Materials

G. AWWA American Water Works Association

H. IBR Institute of Boiler and Radiator Manufacturers

I. NEMA National Electrical Manufacturers Association

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

K. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.

L. ARI Air Conditioning and Refrigeration Institute

M. UL Underwriters' Laboratories

N. AMCA Air Moving and Conditioning Association

O. ADC Air Diffusion Council

P. AABC Associated Air Balance Council

Q. National Standard Plumbing Code with all New Jersey State Amendments.

R. Local Water Company Rules and Regulations

S. NFPA-90A Air Conditioning and Ventilation Systems

T. National Electric Code

1.4 INTENT

A. It is the intention of the Specifications and Drawings to call for finished work, tested, and ready for operation. All materials, equipment, and apparatus shall be new and of first-class quality.

B. Any apparatus, appliance, material, or work not shown on Drawings, but mentioned in the Specifications, or vice versa, or any incidental accessories, or minor details not shown but necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided without additional expense to the Owner.

1.5 DRAWINGS

A. The Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of equipment; ducts, conduits, piping, and fixtures.

B. The locations of all items shown on the Drawings or called for in the Specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect before being installed. Do not scale Drawings.

C. Follow Drawings in laying out work and check Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom and space conditions appear inadequate, Architect shall be notified before proceeding with installation.

D. If directed by the Architect, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

E. Piping or ductwork connected to equipment may require different size connection than indicated on the Drawings. The Contractor shall provide transition pieces as required at the equipment.

1.6 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

A. Any questions or disagreements arising as to the true intent of this Specification or the Drawings or the kind and quality of work required thereby shall be decided by the Architect, whose interpretations thereof shall be final, conclusive, and binding on all parties.

B. In case of disagreement between Drawings and Specifications, or within either document itself, the better quality, greater quantity or more costly work shall be included in the Contract Price and the matter referred to the Architect's attention for decision and/or adjustment.

C. Maintain an awareness to avoid space conflict with other trades.

D. Purchase the equipment and material required in accordance with field measurements taken at the proper time during the construction progress.

1.7 VISITING THE SITE

A. Before submitting the final proposal, examine the site of the proposed work to determine the existing conditions that may affect the work, as this Section will be held responsible for any assumptions in regard.

1.8 EQUIPMENT AND MATERIALS

A. All proposed substitutions of equipment of other manufacturers than those specified shall be attached to the base bid in an itemized list. Directly opposite each item indicate the amount to be added to or deducted from the base bid if the proposal is accepted. Failure to furnish such an itemized list will be interpreted to mean that it is agreed to provide all items exactly as drawn and specified. The information given in the above itemized list will in no way affect the determination of low bidder.

B. The material or equipment proposed for substitution is equal to or superior to that specified; and that the material or equipment called for on the Drawings or in the Specifications cannot be delivered to the job in time to complete the work in proper sequence to the work of other trades, due to conditions beyond control.

C. All pipe and fittings shall be manufactured in the United States of America.

D. To receive consideration, requests for substitutions must be accompanied by documentary proof of equality and difference in price and delivery, if any, in the form of certified quotations from suppliers of both specified and proposed equipment. In case of a difference in price, the Owner shall receive a credit and all benefits of the difference in cost involved in any substitutions.

E. The words "or approved equal" shall be understood to apply only to those items of equipment and material listed under the paragraph "List of Approved Manufacturers" or as otherwise indicated on the Drawings or in the Specifications.

F. Within twenty (20) working days after the acceptance of the proposal, and prior to the submission of any shop drawings for review, a complete list of manufacturers shall be submitted to the Architect of all equipment and materials proposed for the work. No reviews will be rendered on shop drawings submitted before the complete list of manufacturers is reviewed.

G. If material or equipment is installed before the Contractor obtained "No Objections" comment from Architect, and/or in the opinion of the Architect the material or equipment does not meet the intent of the Drawings and Specifications, the removal and replacement shall be made at no extra cost to the Owner.

H. If material or equipment is installed before the Contractor obtained "No Objections" comment from the Architect, trade installing same shall be liable for the removal and replacement at no extra charge to the Owner if, in the opinion of the Architect, the material or equipment does not meet the intent of the Drawings and Specifications.

I. The words "or approved equal" are understood to follow:

1. The name of any manufacturer, vendor, equipment or materials;

2. Any trade name, plate number, or catalog number;

3. Any detailed description used to define equipment or material; except where otherwise indicated on the Drawings or in the Specifications.

4. It is the intent of these Specifications that wherever a manufacturer of a product is specified, and the terms "other approved" or "or approved equal" are used, the substituted item must conform in all respects to the specified item. Consideration will not be given to claim that the substituted item meets the performance requirements with lesser construction (such as lesser heat exchange surface, etc.) Performance as delineated in schedules and in the Specifications shall be interpreted as minimum performance.

J. All equipment and materials required for installation under these Specifications shall be new and without blemish or defect. All electrical equipment shall bear labels attesting to Underwriters' Laboratories approval. Where no specific indication as to the type or quality of the material or equipment is indicated, a first class standard article shall be furnished.

K. Where it is proposed to use an item of equipment other than that specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring, or of any other part of the mechanical, electrical, or architectural layout, all such redesign, and all new drawings and detailing required therefore shall, with the review of the Architect and subsequent comments by the Architect "No Exception" or "Exception as Noted" on the shop drawings, be prepared at no additional cost to the Owner.

L. Where such deviation from contract documents requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the Drawings, furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring, and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

M. All equipment of one type (such as fan, coils, etc.) shall be the product of the same manufacturer.

N. Note that the comments "No Exception" or "Exceptions as Noted" marked on the shop drawings or other information submitted in accordance with the requirements herein before specified does not assure that the Engineer, Architect, or any other Owner's representative attests to the dimensional accuracy or dimensional suitability of the material or equipment involved or the mechanical performance of equipment. Comments on the shop drawings does not invalidate the Plans and Specifications if the shop drawings are in conflict with the Plans and Specifications.

1.9 SHOP DRAWINGS

A. Prior to delivery to job site, but sufficiently in advance of requirements necessary to allow Architect ample time for review, submit copies (as stated in "General Conditions") of shop drawings of all equipment, materials, piping, sleeves, conduit, ductwork, and wiring diagrams, and further obtain written comments "No Exception" or "Exception as Noted" for same from the Architect, before installing any of these items.

B. For piping, sheet metal, sleeve layout, and reflected ceiling plan shop drawings, submit a sepia transparency. After the transparency is notated and corrected by the Architect, it will be returned. Then the required number of corrected prints will be prepared.

C. Shop drawings shall consist of manufacturer's certified scale drawings, cuts, or catalogs, including descriptive literature and complete certified characteristics of equipment, showing dimensions, capacity, code requirements, motor and drive testing, as indicated on the Drawings or Specifications.

D. Certified performance curves for all pumping and fan equipment shall be submitted for review.

E. Shop drawings submitted with insufficient information shall be rejected without review.

F. Shop drawings shall be either mailed or hand delivered to the Architect. Any shop drawing information transmitted by fax shall be rejected without review.

G. Shop drawings which are larger than 11" x 17" shall be submitted in the form of a reproducible sepia with two prints. Shop drawings which are larger than 11" x 17" and which are not provided in the form noted shall be rejected without review.

H. Shop drawings submitted in insufficient number of copies shall be rejected without review.

I. Samples of materials or equipment, when requested by the Architect, shall be submitted for review.

J. Shop drawings, samples, specifications, etc. which are not labeled with all of the following information shall be rejected without review:

1. Project name
2. Project location
3. Contractor's name and address
4. Sub-Contractor's name and address
5. Applicable section and article number of specifications
6. Contractor's approval stamp and signature
7. Submission number
8. Specific service for which material is to be used.

K. Catalogs, pamphlets, or other documents submitted to describe items on which review is being requested, shall be specific and identification in catalog, pamphlet, etc., of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.

L. Shop drawings indicating an unsuitable manufacturer shall be rejected without review.

M. Ductwork shop drawings shall be drawn with double line ductwork and shall indicate the elevation above finished floor of all ducts, location and height of building structure (beams, etc.), lengths of fabrication pieces and fittings. Show new and existing work. Shop drawings submitted shall be ready for sheet metal fabrication.

N. The comments "No Exception" or "Exceptions as Noted" rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are reviewed, said review does not in any way relieve responsibility, or necessity, of furnishing material or performing work as required by the Contract Drawings and Specifications.

O. "EXCEPTIONS, AS NOTED" means, unless otherwise noted on the drawings to approved for construction, fabrication and/or manufacture subject the provision that the work shall be carried out in compliance with all annotations and/or corrections indicated on the shop drawings and in accordance with the requirements of the Contract Documents. If also marked "RESUBMIT", "EXCEPTIONS AS NOTED" is invalid and a corrected submittal of the drawing is required.

P. If a shop drawing is resubmitted and does not comply with all of the comments indicated on the previous submission(s), and does not reflect specific reasons for such non-compliance, it shall be rejected without review.

Q. Label resubmitted shop drawings with a stamp indicating the submittal number, for example: SECOND SUBMISSION; THIRD SUBMISSION, etc. and send separate transmittals for each item being submitted so that one transmittal does not cover more than one specific item or group of items from one manufacturer.

R. Failure to submit shop drawings in ample time for checking shall not entitle an extension of Contract time, and no claim for extension by reason of such default will be allowed.

S. Prior to submission of shop drawings, thoroughly check each shop drawing, reject those not conforming to the Specifications, and indicate (by signature) that the shop drawings submitted meet Contract requirements. Deviations and/or exceptions to the contract documents should be clearly noted as being deviations and/or exceptions. The Contractor will later be required to correct such deviation and/or exceptions at his own expense, if they have not been noted and approved on the shop drawing.

T. All shop drawings showing routing of ductwork, piping and conduit, shall be not less than ⅜" = 1'-0" scale.

U. Incorporate a numbering system to help keep track of shop drawing submittals as follows:

1. P ..... Plumbing shop drawings

2. E ..... Electrical shop drawings

V. Concurrent numbers shall follow the prefix letter. Example: E-1, E-2, etc. In addition, shop drawings requiring resubmission should bear the number of the original submission and bear a suffix as follows: E-1A (second submission), E-1B (third submission), etc.

W. Before request for acceptance and final payment for the work, write a letter to the Architect stating that all shop drawings are brought to a condition "No Exception" or "Exception as Noted". Any outstanding shop drawings must be cleared with the Engineer.

1.10 RECORD DRAWINGS

A. The Contractor shall furnish, coordinate, produce and distribute record drawings as stated within the General Conditions of the Contract.

B. During construction keep an accurate record of all deviations between the work as shown on the Drawings and that which is actually installed.

C. Secure from the Architect, a complete set of Mylar transparencies of the Drawings and note thereon all changes. Make a complete record of all changes and revisions in the original design which exist in the complete work. The cost for the Mylar transparencies shall be paid for by each trade.

D. Furnishing above transparencies and preparing these Record Drawings shall be at no additional cost to the Owner. When all revisions showing the work as finally installed are made, the corrected Mylar transparencies shall be submitted for review by the Architect.

E. After review of the "Record Drawings" transparencies by the Architect, provide the Owner with one set of black-line prints and Mylar transparencies, at no additional cost to the Owner.

1.11 LAWS, ORDINANCES, PERMITS AND FEES

A. Give all necessary notices, obtain all permits and pay all governmental taxes, fees, and other costs in connection with the work; file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required Certificates of Inspection for the work and deliver to the Architect before request for acceptance and final payment for the work. File for and obtain all required equipment use permits, controlled inspections, backflow prevention device (BFP) sign-offs and all other required filings.

B. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings, (in addition to Contract Drawings and Documents) in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.

C. All materials furnished and all work installed shall comply with the rules and recommendations of the National Fire Protection Association, with all requirements of local utility companies, with the recommendations of the fire insurance rating organization having jurisdiction, and with the requirements of all governmental departments having jurisdiction.

D. Include in the bid, without extra cost to the Owner, retaining the service of a licensed professional engineer to perform all required inspections, equipment use permits.

1.12 INDEMNIFICATION

A. Pay all royalties and defend all suits or claims for infringement of any patent rights and save the Owner harmless from loss on account thereof.

B. If process or article specified is an infringement of a patent, promptly notify the Architect in writing, and any necessary changes shall be as provided in the Contract for changes in the work. If the

Contractor performs any work specified knowing it to be an infringement of patent, he shall bear all costs arising therefrom.

C. Take out all necessary insurance, free of extra charge, and agree to indemnify and save harmless the party contracting for services against loss or expense, by reason of the liability imposed by law upon such party for damages because of bodily injuries, including death at any time resulting therefrom, accidentally sustained by any person or persons or on account of damage to property arising out of or in consequence of the performance of this Contract, whether such injuries to persons or damage to property are due or claimed to be due to any negligence in the performance of the Contract, the party contracting for services, employees or agents, or any other person.

1.13 ORGANIZATION OF WORK

A. The work throughout shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineers, Owners and Architects, who will jointly interpret the meaning of the Drawings and Specifications, and shall have the power to reject any work and materials which, in their judgement, are not in full accordance therewith.

B. The work called for under this Contract shall be carried on simultaneously with the work of other trades in a manner such as not to delay the overall progress of the work. Furnish promptly to other trades involved at the project, all information and measurements relating to the work which they may require. Cooperate with them in order to secure the harmony necessary in the interest of the project as a whole.

C. Furnish and install all work as fast as possible to meet all construction schedules.

D. Keep a competent superintendent in charge of the work at all times. Such superintendent shall be replaced if unsatisfactory to the Owner.

E. Upon award of contract, consult with the Architect and negotiate with subcontractors and manufacturers, and within thirty (30) days submit five (5) copies of a preliminary list of major equipment, for approval, complete with name of manufacturer, dates of purchase orders, and delivery dates to the site. Also submit within thirty (30) days, five (5) copies of a preliminary schedule of installation of the various systems. This list shall be revised monthly and five (5) copies shall be submitted. The second submittal shall contain the names of manufacturers of scheduled equipment (with names, addresses, and telephone numbers of local representatives).

F. Maintain a complete file of shop drawings at all times available to the Owner's representative.

G. Every facility shall be provided to permit inspection of the work by the Owner's representative during the course of construction.

H. Where items of equipment and/or materials are indicated in the Specifications as being furnished by other trades for installation, assume responsibility for the unloading of such equipment and/or materials from the delivery trucks, and for providing safe storage for same as required pending installation.

I. Where the work is to be installed in close proximity to work of other trades, or where there is evidence that the work is to interfere with work of other trades, assist in working out space conditions to make a satisfactory adjustment.

J. Prepare composite coordinated working drawings and sections at a suitable scale not less than ⅜" = 1'-0" clearly showing how the work is to be installed in relation to the work of other trades. If the

installation is made before coordinating with other trades, make all necessary changes in the work without extra charge to the Owner.

K. Before submitting shop drawings for sleeves, piping and ductwork, the Plumbing Subcontractor shall prepare a combined ⅜" = 1'-0" scale shop drawing for piping indicating location of piping with dimensions for each floor. A transparent copy of these shop drawings shall be given to the other trades.

L. Electrical Contractor. The Electrical Contractor shall indicate the location of all lighting fixtures and conduit runs on these shop drawings. The Electrical Contractor shall give the transparent copy of these shop drawings, with lighting fixtures and conduit runs indicated to the Plumbing Contractor. The Plumbing Contractor shall indicate his piping on these shop drawings. Each Contractor shall keep each transparent copy not more than three (3) working days.

M. A Coordination Meeting shall be held with the Plumbing and Electrical Contractors under the supervision of the General Contractor. After coordination, each Contractor shall sign the transparent copy. Submit these drawings to the Architect for review and he shall call any conflicts that could not be resolved in the coordination meetings, and/or deviation from original design, to the Architect's attention. After receiving written review from the Architect, each Contractor shall prepare the shop drawings as required under the paragraph "Shop Drawings" in the Specifications.

1.14 PROTECTION OF WORK AND PROPERTY

A. Maintain and protect all equipment, materials and tools from loss or damage from all causes until final acceptance by the Owner.

B. Assume responsibility for the protection of any finished work or other trades from damage or defacement by the operations and remedy any such injury or damages.

1.15 TEMPORARY OPENINGS

A. Ascertain from examination of the Architectural Drawings whether any special temporary openings in the building will be required for the admission of apparatus provided under the Contract and notify the Architect accordingly. In the event of failure to give sufficient notice to the Architect in time to arrange for these openings during construction, assume all costs of providing such openings thereafter.

1.16 SHUTDOWNS

A. When installation of a new system requires the temporary shutdown of an existing operating system, the connection of the new system shall be performed at such regular time or at overtime when designated by the Owner at no additional cost to the Owner.

B. The Owner shall be notified of the estimated duration of the shutdown period at least ten (10) days in advance of the date the work is to be performed.

C. Work shall be arranged for continuous performance, including overtime, when approved by the Owner, if required, to assure that existing operating services will be shut down only during the time actually required to make necessary connections.

1.17 ACCESS DOORS IN FINISHED CONSTRUCTION

A. Install all work so that all parts required are readily accessible for inspection, operation, maintenance and repair. Minor deviations from the Drawings may be made to accomplish this, but changes of magnitude shall not be made without prior written review from the Architect.

B. Wherever mechanisms requiring access for maintenance, reading of instruments, or for operation are concealed in the structure and wherever else indicated on the Drawings, supply access doors of sizes necessary to provide ready access to the concealed items. Group together valves, controls, dampers, traps, expansion joints, cleanouts, gauges, switches, and other equipment requiring access in walls and furred spaces to reduce the number of access doors.

C. Access doors shall be Milcor Style A, B or K, L or M, as manufactured by Inland Steel Products Co. or approved equal. Minimum access door shall be 12" x 12". For installation in plastered wall or ceiling, provide Style "K" or "L" as required. For installation in masonry walls, provide Style "M". For installation in acoustical tile surfaces, provide Style "AT". For installation in acoustical plaster surfaces provide Style "AP". Fire resistive access doors for suspended dry wall ceiling shall be Style ATR's. Provide fire rated access doors at fire rated shafts, stairwells, corridors and at all other walls with Fire Rating.

D. All plumbing, electric and heating and ventilating access doors etc., shall be provided with Corbin #2722-1/2 master keyed cylinder locks. These locks shall be supplied and installed by the respective Contractor. These cylinder locks shall be purchased through the General Contractor's subcontractor for hardware after submission and review of the panel schedule as hereinafter specified.

E. Prepare a schedule showing location of all panels, cabinets, etc. to receive the Corbin lock. This schedule shall designate, by building and room number, the panel or cabinet location and shall be submitted to the Architect. This schedule is required for use in preparation of keying information. Locks shall not be purchased prior to review of this schedule.

1.18 PIPE EXPANSION

A. All pipe connections shall be installed to allow for freedom of movement of the pipe during the expansion and contraction without proper anchors and guides shall be provided where necessary and/or when shown on the Drawings. Anchors and guides shall be subject to the review of the Architect.

1.19 SCAFFOLDING, RIGGING, HOISTING

A. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of all equipment and materials furnished under this Section of the Specifications, and remove same from premises when no longer required.

B. In the event that supplementary bracing of the basic building structure is required to assure a secure rigging procedure and a secure route for the equipment being handled, assume full responsibility for such supplementary bracing.

1.20 BASES AND SUPPORTS

A. Provide all bases and supports not part of the building structure of required size, type and strength, as approved by the Architect, for all equipment and materials furnished by him. All equipment, bases, and supports shall be adequately anchored to the building structure to prevent shifting of position under operating conditions.

B. The Section furnishing the equipment shall provide not less than six-inch high concrete bases for all pumps, refrigeration machines, compressors, and rotating machinery. Bases shall extend six inches beyond machinery base in all directions, with top edge chamfered. Provide ½" x 6" steel dowels into floors to anchor bases. Provide anchor bolts set in pipe sleeves, two sizes larger than anchor bolts for securing machinery. After anchor bolts are aligned with equipment bases, fill sleeves with concrete and allow to set.

C. Concrete bases are specified under other Sections of the Specification. Each Contractor shall furnish dimensioned drawings to the General Contractor. Steel dowels, sleeves and anchor bolts shall be furnished and set by the Contractor.

D. New concrete pads shall be doweled into the existing concrete with ½" rods at corners, drilled 6" deep and grouted. An epoxy bonding agent shall be applied between the old and new concrete. Concrete shall be 3000 psi reinforced with one middle layer 4 x 4 - w2.9 x w2.9.

1.21 SEISMIC RESTRAINT

A. All mechanical and electrical systems including equipment, conduit, piping and ductwork shall be installed so as to resist seismic loading as indicated in Section 15050 of the specification.

B. The section installing the equipment shall provide required seismic restraints.

1.22 SLEEVES, PIPE AND CONDUIT INSERTS AND ANCHOR BOLTS

A. Provide and assume responsibility for the location and maintenance in proper position of all sleeves, inserts, and anchor bolts required for the work. In the event that failure to do so requires cutting and patching of finished work, it shall be done without additional cost to the Owner.

B. All pipes and conduits passing through masonry walls or partitions shall be provided with sleeves having an internal diameter larger than the outside diameter of the pipe or insulation enclosing the pipe or conduit. Sleeves shall be Schedule 40 black steel pipe.

C. Sleeves through foundation walls shall be James B. Clow & Sons No. F-1430 or F-1435 cast iron wall sleeve with intermediate integral flange. Sleeves shall be set with ends flush with each face of wall. The space between sleeve and pipe shall be packed with a mechanical rubber seal, such as "Link Seal" manufactured by Thunderline Corp., (VICO) and then with oakum to within 2" of each face of the wall. The remaining space shall be packed and made watertight with a waterproof compound.

D. Sleeves through concrete floors or interior masonry walls shall be Schedule 40 black steel pipe, set flush with finished wall surfaces, but extending ½" above finished floors. The open sleeve space shall be packed with non-combustible materials.

E. Sleeves through non-masonry partitions shall be 22 gauge galvanized sheet steel, set flush with finished surfaces of partitions.

F. Inserts shall be preset concrete inserts with steel reinforced rods through the insert and both ends hooked over the reinforced mesh. Inserts shall be of individual type of malleable iron construction with accommodation for removable nuts and threaded rods up to ¾" diameter, permitting lateral adjustment, except as otherwise noted. Individual inserts shall be Grinnell Fig. 279 up to 5" pipe and conduit, Fig. 282, 6" and up to 8" pipe and conduit, Fig. 152 above 8" and up to 12" pipe and conduit. For figures 282 and 152, they shall come with an opening at the tip to allow reinforcing rods up to

½" diameter to be passed through the insert body. Rods shall extend a minimum of 4" on either side of the insert. Pipes larger than 12" shall be suspended from steel members only.

G. In general, all piping and conduit shall be supported from structural steel building members only or approved malleable steel inserts imbedded in concrete pours. Concentrated loads up to 200 lbs. can use inserts in concrete. All other loads shall be hung from steel building members. Inserts shall not be located in the same deck flute as ceiling tabs nor within 2 feet in any direction from ceiling tabs. Inserts shall not be spaced closer than 4 feet on center in all directions.

H. Where layout revisions are required, and are approved after concrete deck is poured, piping conduit 3" and smaller may be supported at Intermediate Points by Phillips' ¾" expansion bolts with lead shields, provided main supports are welded to structural steel and are not more than twenty feet on centers.

I. The Contractor shall have the option of providing 18 gauge sheet metal sleeves in lieu of Schedule 40 steel pipe.

J. Piping and conduit 3" and smaller shall be supported from existing slab by "Phillips" ¾ expansion bolts with lead shields. Piping 4" and larger shall be supported by means of 4" x 4" x ⅜" clip knee angle with ¾" expansion bolt in shear and supporting rod at 90° from another bolt or using two expansion bolts per hanging post - pipes 8' and larger shall be supported from steel building members.

K. Provide sleeves for pipes passing through roofs. Sleeves passing through roofs shall be as detailed on drawings extending min. 12" above finished roof. All pipes passing through roof shall be minimum of 10" from walls or other construction to permit proper flashing. Provide counter flashing.

L. Where sleeves pass through waterproofed floors, they shall be IPS brass pipe sleeves of the required diameter, brazed at the bottom to 18" x 18", 16-ounce copper flashing for bond with waterproofing. The tops of the sleeves shall extend ½" above finished floor.

M. No ductwork, piping, conduit or equipment shall be supported from corrugated decking construction. For this area provide supplementary steel to support ductwork, piping, conduit or equipment. Supplemental steel members shall be welded to building structural steel.

N. All hangers, rods and supports shall be installed prior to construction fireproofing.

O. The required fire resistance rating of floor or floor/ceiling assemblies and walls shall be maintained where a penetration is made for electrical, mechanical, plumbing pipes, conduits, ducts and systems. Fire stopping shall be provided at openings around vents, pipes, ducts, conduits at floor levels and walls with non-combustible materials. For openings around pipes and conduits and/or sleeves, 3M product Caulk CP 25 and Putty 303 or approved equal shall be provided.

1.23 ESCUTCHEONS

A. Provide escutcheons on pipes wherever they pass through ceilings, walls, or partitions.

B. Escutcheons or pipes passing through outside walls shall be Ritter Pattern and Casting Co., No. 1, solid, cast brass, flat type secured to pipe with set screw.

C. Escutcheons for pipes passing through floors shall be Ritter Pattern and Casting Co., No. 36A, split-hinged, cast brass type, designed to fit pipe on one end and cover sleeve projecting through floor on the other end.

D. Escutcheons for pipes passing through interior walls, partitions, and ceilings shall be Ritter Pattern and Casting Co., No. 3A, split-hinged, cast brass chromium plated type.

1.24 MANUFACTURERS' IDENTIFICATION

A. Manufacturer's nameplate, name or trademark, shall be permanently affixed to all equipment and material furnished under this Specification. Where such equipment is in a finished occupied space, the nameplate shall be in a concealed but accessible location. The nameplate of a Subcontractor or Distributor will not be acceptable.

1.25 EQUIPMENT NAMEPLATES

A. Provide for each item of equipment, including panelboards, disconnects, breakers, starters, switches, and all control devices, etc., a permanently attached nameplate made of black surface, white core laminated bakelite with incised letters. Subcontractor furnishing equipment shall provide nameplate. Nameplates shall be a minimum of 3" long by 1½" wide and shall bear the equipment name and item number in ½" high white letters as designated in the equipment schedule. Mounting screws shall have chrome plated acorn headed screws.

1.26 IDENTIFICATION

A. Identification shall be in accordance with "Scheme for Identification of Piping System ANSI A13.1" and OSHA safety color regulation.

B. Markers shall be snap-on type as manufactured by Seton Nameplate Corp., New Haven, Conn. (Setmark System), Bunting Stamp Co. Inc., Pittsburgh, P.A. or approved equal. Markers shall completely encircle the pipe with a substantial overlap. No adhesive shall be used. They shall be manufactured of U.L. approved, self-extinguishing plastic. When the pipe, including insulation (if any), is larger than 6 inches diameter, markers shall be strap-on type. Markers for medical gas piping shall be by means of metal tags, stenciling, stamping or with adhesive markers, in a manner which is not readily removable.

C. Provide identification for piping and conduit for electrical work.

D. Pipe shall be lettered and valves tagged in accordance with the schedule below. Lettering shall be located near each valve and branch connection and at intervals of not over 40 feet (10 feet on fire lines) on straight runs of pipe. Provide flow arrows for all piping at each marker. Adjacent to the legend, stencil the size of the pipe, conduit or ductwork. Letter Colors are as follows: Yellow with black letters, green with white letters, blue with white letters and red with white letters.

STENCIL AND VALVE TAG SCHEDULE			
Service	Stencil Designation	Color	Tag Designation
Fire Standpipe	Fire Standpipe	Red	FSP
Storm Sewer	Storm Sewer	Green	---

E. Exposed conduits for alarm and communication systems shall be banded at intervals of not over 10 feet. Bands shall be of the following colors:

Fire Alarm System ..... Red

Security System ..... Blue & Yellow

Telephone System ..... Green & Yellow

F. HIGH VOLTAGE" in black letters two inches high, stenciled at 10-foot intervals over a continuous painted orange background.

G. Except where other means of identification are specified, electric cabinets, switchboards, motor control centers, transformers, system control boards, disconnecting switches, remote control switches, individual motor starters and motor control pushbutton stations shall be stenciled to show the service and number, if any, of the equipment controlled, as appropriate. Panelboards and other electrical equipment located in finished areas, such as offices, shall have the identification placed on the inside of the cabinet doors.

H. Cabinets housing 460Y/265 Volt panelboards shall have "460/265 volt" stenciled in 2-inch high yellow letters on the inside of the cabinet doors.

I. Cabinet housing emergency lighting panelboards shall have the word "EMERGENCY" stenciled in 2-inch high red letters on the outside of the cabinet, in addition to other lettering required above.

J. The bolted covers of housings for disconnecting switches or links in bus ducts between network transformers and switchboards shall be lettered to identify the equipment within.

K. Serial numbers shall be stenciled on the tanks and covers of transformers having their nameplates attached to the high voltage switch chamber covers.

1.27 DRIP PANS

A. Examine the drawings, and in cooperation with the Electrical Work confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than three feet from a vertical line to electric switchboards, panelboards, or similar equipment.

B. Where the installation of piping does not comply with the requirements of foregoing paragraph, where feasible the piping shall be relocated.

C. Provide copper gutters as follows:

1. Provide a gutter of 16 ounce cold rolled copper under every pipe which is within 2'-0" (two feet) of being vertically over any motor, electrical controllers, switchboards, panelboards, or the like.

2. Each gutter shall be soldered and made watertight, properly suspended; and carefully pitched to a convenient point for draining. Provide a ¾ inch drain, to nearest floor drain or slopsink.

3. In lieu of such separate gutters, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 3'-0" in all directions beyond the motor, over which such piping has to run.

1.28 TOOLS

A. All special tools for proper operation and maintenance of the equipment shall be delivered to the Owner's representative and a receipt requested for same at no additional cost to the Owner.

1.29 QUIET OPERATION

A. All equipment and material shall operate under all conditions of load without any sound or vibration which in the opinion of the Architect is objectionable. Where sound or vibration conditions arise which are considered objectionable by the Architect, eliminate same in a manner reviewed by the Architect.

1.30 RUBBISH REMOVAL

A. The job site shall be maintained free of all rubbish, rubble, waste material, packaging materials, etc. accumulating as a result of the work. Assume responsibility for the cleaning up of packaging removed from materials and equipment furnished by other trades for the installation. Note that final acceptance of the work is contingent upon the project being free of all excess and waste materials resulting from the work.

B. Clean all parts of the building exterior spaces and adjacent roads, sidewalks, and pavement, free from material and debris resulting from the execution of the work. Debris resulting from interior construction shall be neatly stacked on each floor near elevators, material hoists and rubbish chutes, as directed by the Architect or his representative. Debris resulting from exterior construction shall be similarly stacked. All debris so stacked will be removed under other Sections. Excess material will not be permitted to accumulate either on the interior, exterior or on sidewalk.

1.31 CLEANING, PIPING AND EQUIPMENT

A. Clean all piping and equipment of all foreign substances inside and out before being placed in operation.

B. If any part of a system should be stopped by foreign matter after being placed in operation, the system shall be disconnected, cleaned, and reconnected wherever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired when the system is reconnected at no additional cost to the Owner.

C. During construction, properly cap all pipes and equipment nozzles so as to prevent the entrance of sand, dirt, etc.

1.32 DELIVERY OF MATERIAL

A. Deliver the material and store same in spaces indicated by the Architect and assume full responsibility for damage to structure caused by any overloading of the material.

1.33 EXCAVATION AND BACKFILL

A. All excavation trenching, backfilling and compaction required for each Section shall be done by the respective contractor for that Section.

B. Each Contractor shall provide all labor, materials, equipment and appliances required to complete the excavating, backfill and pumping required for his work, to the extent specified hereinafter.

C. Unclassified excavation shall include the excavation of all materials encountered in the work, such as earth, boulders, rock, shale, rubble, masonry or timber foundations, stumps and all materials without classification. Do all excavation, trenching and backfilling necessary to construct and complete the utility and all its appurtenances. All excavation shall be made by open cut from the

surface. No tunneling will be allowed except by written consent of the Architect. Provide all necessary shoring and bracing. Care shall be taken to avoid undermining of all existing utilities, footings or foundations. Take full responsibility for any additional work resulting from his excavating and trenching.

D. Locations and elevations of pipe lines, conduits, cables, etc., shown are not to be used as final for installation of work; however, they are to be followed as closely as possible, ground conditions permitting. Exact locations of grade shall be determined on job.

E. Under no circumstances, lay pipe or conduit or install appurtenances in water. Keep trenches free from water. Perform all necessary pumping as required to keep trenches free from water at no additional cost to the Owner.

F. Before starting the excavation work, strip all existing sod and soil within entire limits of this Contract, which is suitable for top soil and stockpile in location approved by the Architect.

G. Take precaution by frequently spraying excavation area during excavation with water, in order to prevent dust being blown. Stockpiles of fill and topsoil shall also be kept moist by water spray.

H. Where existing utilities are encountered, support, shore and protect said existing utilities and allow ample time for such measures as may be necessary for continuances of such services.

I. Notch under pipe bells to provide solid bearing for the entire body of pipe.

J. Excavation for utilities, and appurtenances (such as manholes, etc.), shall be to required depths below existing or finished grades. Note areas of cut and/or fill and schedule and perform work accordingly. Where utilities are installed in filled areas, fill shall be compacted to 95% of its maximum density, by the Contractor, who is installing the particular utility, before installing in the utility line, manhole or other appurtenances.

K. Excavations shall be sheeted and braced where necessary. Assume responsibility for all damage to persons, structures, and property resulting from the quality, strength, placing, maintaining and removing or lack of sheeting. Repair or replace any existing underground piping or conduit disturbed or damaged.

L. Width of trenches shall be adequate for work required to be done in trench for proper installation of the utility system.

M. All steel sheeting ordered left in place shall be cut off at least 6" below the bottom of the pavement foundation or 2 feet below natural ground in unpaved areas. Provide and maintain all such safeguards necessary for the protection of persons, the safety of cell traffic movement and the protection of all the structures encountered. No trench shall be opened more than 200 feet in advance of the completed work without permission of the Architect.

N. As soon as the joints are inspected and tested for acceptance, backfill material consisting of sand or approved earth shall be evenly and carefully placed and tamped around and over the pipe in layers not exceeding six (6) inches in thickness to one (1) foot over the top of the pipe. Backfill for the remainder of the trench shall be approved material and shall contain no stone more than six (6) inches in its largest dimensions. From a point one (1) foot over the top of the pipe, the backfill shall be deposited in thoroughly rammed and compacted layers not over twelve (12) inches thick. No backfilling shall be done with frozen earth. The trench shall be brought to an elevation so as to allow the placement of the temporary pavement in paved areas and to the surface of the ground as it existed prior to the work in non-paved areas. Should there be a deficiency of proper material for this purpose,

furnish and place such additional material as may be directed by the Architect. When so directed, the backfill shall be trench backfill to a depth to be determined by the Architect. Generally, backfilling shall be to final grade, or subgrade to receive other Section's work. Compaction shall be to 95% maximum density under pavement and 92% under grass areas.

O. All backfill shall be tamped and shall be done so far as practicable by suitable mechanical means. The machine used shall be of a type satisfactory to the Architect, as to power of blows and area of rammer and shall be used in such a manner as to thoroughly compact the backfill to a degree which will insure against later settlement. The Architect reserves the right to require flushing of trench, in addition to tamping, where, in his opinion, same will further settle the backfill.

P. Excavated material suitable and required for backfilling shall be stockpiled in the area selected by the Architect. All excavated material in excess of that required for backfilling shall be immediately removed to location directed by Architect. The Contractor shall leave clear and in good order all roadways and sidewalks affected by the construction. Where unstable or backfilled ground is encountered, the Contractor shall furnish and install suitable concrete or brick pier supports at each joint and on ten (10) foot centers maximum.

1.34 GRADING

A. Grade the excavated area to its original grade and restore the area to its original position. The entire area in the vicinity of construction where excavation, filling and backfilling has been done shall be raked clean of all trash and other debris. After completion of this work all trash and debris shall be removed from the premises. Cleaning of the premises shall be done at intervals, sufficiently often to maintain an orderly appearance of the construction area and as directed by the Architect.

B. Final grading shall be done under other Sections of the Specifications.

1.35 PAINTING

A. Painting Schedule

1. Paint the following:

a. Uninsulated Black Steel Piping:

(1) Exposed in Finished Rooms or Finished Spaces: 1 coat of primer and 2 coats of latex semi-gloss enamel.

(2) Exposed in Unfinished Rooms, or Unfinished Spaces, or in Pipe Shafts: 1 coat of primer and 2 coats of finish.

(3) Exposed Exterior to a Building: 1 coat of primer and 2 coats of exterior acrylic latex gloss enamel.

b. Uninsulated Galvanized, Cast Iron, Brass or Copper Piping:

(1) Exposed in Finished Rooms or Finished Spaces: 1 coat of primer and 2 coats of latex semi-gloss enamel.

(2) Exposed Exterior to a Building: 1 coat of primer and 2 coats of exterior acrylic latex gloss enamel.

(3) Exposed in Unfinished Rooms or Unfinished Spaces: 1 coat of primer and 2 coats of finish.

c. Hangers, Supports and Accessories:

(1) Exposed: Paint to match adjacent piping, pipe insulation or ductwork insulation.

(2) All black steel or iron pipe hangers, rods, inserts, brackets and accessories for supporting piping systems: 1 coat of primer and 2 coats of latex semi-gloss enamel. Paint black steel hanger rods, threaded on the job site, with a primer immediately after installation.

(3) Metal Fabrications in Finished Spaces: Paint over shop coat with 2 coats of alkyd gloss enamel.

d. Uninsulated Exposed Valves, Flanges, Unions and Irregular Surfaces in Piping Systems Installed in Finished Rooms or Finished Spaces: 1 coat of primer and 1 coat of black heat resistant enamel.

e. Underground pipe and conduits - two coats of black asphaltum paint.

B. Color Coding:

1. Apply finish paints of colors indicated opposite the various items listed below where such items are installed in Electrical Equipment Rooms, Machine Rooms:

Piping, Exposed - Bare and Insulated on Unfinished Spaces and Rooms:
Fire Protection ..... Red

2. Equipment - Bare and Insulated (Except Factory Painted): Grey.

C. Nameplates on all equipment shall be cleaned and left free of paint.

D. All lead bends and lead safes and flashing shall be painted with two coats of waterproof black asphaltum varnish.

1.36 TESTS

A. All piping, wiring, and equipment shall be tested as specified under the various sections of the work. Labor, materials, instruments and power required for testing shall be furnished under the particular Section of the Specifications.

B. Tests shall be performed satisfaction of the Architect. The Architect will be present at such test, when he deems necessary and such other parties as may have legal jurisdiction.

C. Pressure tests shall be applied to piping only before connection of equipment and installation of insulation. In no case shall piping, equipment, or accessories be subjected to pressure exceeding their rating.

D. All defective work shall be promptly repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the review of the Architect.

E. Any damages resulting from tests shall be repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Architect.

F. The duration of tests shall be as determined by all authorities having jurisdiction, but in no case less than the time prescribed in each Section of the Specifications.

G. Equipment and systems which normally operate during certain seasons of the year shall be tested during the appropriate season. Tests shall be performed on individual equipment, systems, and their controls. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, functioning, and performance, the latter shall be operated simultaneously with the equipment or system being tested.

H. The electrical work shall include providing any assistance (such as removal of switchboard and panelboard trims and covers, pull and junction box covers, etc.) deemed necessary by the Architect to check compliance with the Drawings and Specifications.

1.37 OPERATING INSTRUCTIONS

A. Two months prior to the completion of all work and the final inspection of the installation by the Owner, five (5) copies of a complete Instruction Manual, bound in booklet form and suitably indexed, shall be submitted to the Architect for review. All written material contained in the manual shall be typewritten or printed.

B. The Manual shall contain the following items:

Table of Contents (Plumbing and Electrical)

I. Introduction - Explanation of Manual and its use.

II. Description of Systems

1. Complete schematic drawings of all systems.
2. Functional and sequential description of all systems.
3. Relationship of system where applicable to the supervisory data system.

III. Systems Operation

1. Start-up procedures.
2. Shut-down procedures.
3. Reset and adjustment and balancing procedures.
4. Seasonal operation.
5. All posted instruction charts.

IV. Maintenance

1. Cleaning and replacement - lines, components, filters, strainers, ducts, fans, etc.
2. Lubrication.
3. Charging and filling.
4. Purging and draining.
5. Systems trouble shooting charts.
6. Instruments checking and calibration.
7. Procedures for checking out functions with remote (Supervisory Data Console) indication and control.

8. Recommended list of spare parts.

V. Listing of Manufacturers

VI. Manufacturer's Data (Where multiple model, type and size listings are included, clearly and conspicuously indicate those that are pertinent to this installation).

1. Description - Literature, drawings, illustrations, certified performance charts, technical data, etc.
2. Operation.
3. Maintenance - including complete trouble-shooting charts.
4. Parts List.
5. Names, addresses and telephone numbers of local recommended repair and service companies.
6. Guarantee data.
7. Model No. and Serial No. of all equipment.

1.38 GUARANTEE

A. The Contractor guarantees by his acceptance of the Contract that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified, and that if during a period of one year from date of completion and acceptance of work any such defects in workmanship, material or performance appear, he shall immediately replace, repair, or otherwise correct the defect or deficiency without cost to the Owner within a reasonable time. Notify the Architect in writing of the time required to do work. For heating systems the guarantee period must include one continuous heating season from November 1st to April 1st.

B. Replace or repair to the satisfaction of the Owner any and all damage done to the building or its contents or to the work of other trades in consequence of work performed in fulfilling guarantee.

C. This Article is general in nature and will not waive stipulations of other claims which specify guarantee periods in excess of one (1) year.

D. In the event default on this Guarantee, the Owner may have such work done as required & charge the cost to the Contractor.

E. The date of acceptance shall be the date of final payment by the Owner or notice of acceptance by the Owner, whichever is later.

1.39 OPERATION PRIOR TO COMPLETION

A. The Owner may require operation of parts or all of the installation for the beneficial occupancy prior to final completion and acceptance of the building.

B. The operation shall not be construed to mean acceptance of the work by the Engineer for the Owner. The Owner will furnish supervisory personnel to direct operation of the entire system and the Contractor shall continue to assume this responsibility until final acceptance.

1.40 INSTALLATION OF MOTORS AND CONTROL EQUIPMENT

A. The Electrical Contractor shall furnish and install power wiring for all electrical devices.

B. For single phase motors which are not interlocked with other motors and which have temperature control or motor control devices in the power circuit, furnishing of control devices, installation and wiring shall be by the Electrical Contractor.

C. Electrically operated equipment supplied by other trades, which are to be installed and wired by the Electrical Contractor, shall be delivered with detailed instructions for their installation and wiring in sufficient time and proper sequence to meet the work schedule.

D. Each contractor shall furnish all electrical motors, starters and other motor control devices for motor driven equipment required for the work. In his work, the Electrical Contractor shall provide the code required disconnect switches for all motors, except where otherwise noted. The setting of all motors, required for mechanical equipment, including unmounted motors, shall be done as part of the mechanical work.

E. Whether or not shown on the drawings, the Electrical Contractor shall furnish and install a local disconnect switch at each motor which is not in sight from the controller location.

1.41 ELECTRIC MOTORS

A. Each Contractor shall provide all electric motors required for driving all motor driven equipment required to be furnished under his Section of the Specification.

B. All motors shall be designed for 3 phase, 60 cycle alternating current operation with 460 volts across the motor terminals, except that, unless otherwise specified herein, all motors ⅓ HP and smaller shall be designed for single phase, 60 cycle alternating current at 120 volts across the terminals. Before ordering motors, ascertain the actual voltages and other current characteristics that will be available and permissible for each motor. Report the same in writing to the Architect and obtain approval before ordering motors. The designation of current characteristics in these Specifications does not relieve the responsibility for ascertaining the actual conditions of electric service available for each motor or for the proper operation of all motors under the actual conditions.

C. The speed, horsepower, type and other essential data for each motor, if not given under paragraphs describing the various motor driven apparatus, or in schedules on the drawings shall be obtained from the manufacturer of the respective apparatus and shall be submitted to the Architect for his review. All two speed motors shall be single winding type.

D. Provide oversized motor junction box for 2 speed motors.

E. All motors shall be built in accordance with the latest rules of the National Electrical Manufacturers Assn., and of the Institute of Electrical and Electronic Engineers and also as hereinafter specified.

F. Motors ½ HP and larger shall have Class B insulation. All motors shall be rated for continuous duty and shall be designed for temperature rises not to exceed 55°C for fully enclosed type, 55°C for splashproof types and 40°C for all other motors excepting as otherwise specified herein. Motors shall be capable of withstanding momentary overloads of fifty (50%) without injurious heating. They shall operate without excessive heating, flashing or sparking under any conditions within the specified capacity of load and speed. All motors shall operate quietly and shall be replaced if, in the Architect's opinion, they do not do so. All motors which are in the airstream of air conditioning units, shall be totally enclosed type.

G. Motors ½ HP and larger shall have ball or roller bearings with pressure grease lubrication, except where otherwise noted.

H. Direct connected motors shall be furnished without an adjustable base. All motors connected to driven equipment by belt shall be furnished with adjustable sliding bases, except fractional motors with slotted mounting holes.

I. All motor leads shall be permanently identified and supplied with connectors.

J. Motors shall have nameplates giving manufacturer's name, serial number, horsepower, speed, voltage, phase and current characteristics.

K. The insulation resistance between stator conductors and frames of motors at the time of final inspection shall be not less than one-half megohm.

L. All motors shall be of the proper type for the duty and shall have sufficient torque to start and run the equipment to which they are connected and starting currents and running currents shall not exceed the limits imposed by the laws or rules and regulations of the public authorities having jurisdiction or of the electrical utility company. All motors shall have sufficient horsepower capacity and rated duty to operate the apparatus to which they are connected so as to give the speeds and performances specified, but the horsepower shall be in no case less than that stated herein or shown on the drawings. A schedule giving the characteristics of the motors proposed for each type of service shall be submitted to the Architect for approval.

M. The maximum full load speed of each direct connected motor shall be suitable for the equipment it drives.

N. Except where V-belt drive is specified, the fan wheels for ventilating fans shall be mounted on the motor shafts, which shall be designed for this duty.

O. All motors except motors furnished as an integral part of equipment and factory installed on the equipment, shall be of same manufacture.

P. Polyphase motors shall be squirrel cage induction high efficiency energy saver type, suitable for the starting torque and current requirements.

Q. Single phase motors shall be of the capacitor start induction run or split phase type as required for proper operation of the driven equipment.

R. The efficiency of energy efficient motors shall be verified in accordance with NEMA standard MG1-12.53a. Minimum acceptable efficiency shall be as follows:

Rating	H.P.	Efficiency
200/460 Volts	5 HP	89.5%
3 Phase, 60 c/s	7.5 HP	91.7%
1.15 Service Factor	10 HP	91.7%
40° C. Ambient	15 HP	92.4%
	20 HP	93.0%
	25 HP	93.6%
	30 HP	94.1%
	40 HP	94.5%
	50 HP	94.5%
	60 HP	95.4%
	75 HP	95.4%
	100 HP	95.4%

125 HP	95.4%
150 HP	96.2%
200 HP	96.2%
250 HP	96.2%
300 HP	96.2%

1.42 INDIVIDUAL MOTOR STARTERS

A. For single-phase motors ⅛ HP or smaller, starters shall be manual, 120 volts, single-pole or 240 volts, 2-pole with thermal overload protection and pilot light. Where interlocking or automatic control (other than for unit and cabinet heaters) is required, starters shall be combination circuit breaker and magnetic starter with pilot light.

B. For 3-phase motors ½ HP and over, starters shall be full-voltage combination circuit breaker and magnetic across-the-line contactor, rated 208 or 480 volts, 3-pole. All magnetic starters shall have three thermal overloads.

C. Unless otherwise specified, motors 50 HP and over, rated 200 volts and motors 100 HP and over, rated 460 volts shall be furnished with reduced voltage starters of the autotransformer closed transition type.

D. For motors requiring electric interlocks, or automatic control features, starters shall be equipped with the necessary auxiliary relays and contacts to provide the control features desired. Such starters shall be also provided with "hand-off-auto" pushbuttons mounted in cover. For two-speed motors, provide "high-low-off-auto" four position selector switch. Furnish adjustable 20-second time delay between high and low speeds for motors 10 HP and above.

E. In addition to any auxiliary contacts required for interlocking purposes, each magnetic starter shall be equipped with one normally open auxiliary control circuit contact either for "sealing in" or as a spare for future use.

F. Indicating lights shall be transformer or series resistor type. There shall be one red light for each single speed motor to indicate when motor is running. For multiple speed motors one indicating light for each speed shall be provided.

G. The starter disconnecting means shall be circuit breakers. The external operating handle shall clearly indicate "ON" or "OFF" position of the switch and shall be interlocked with the door to require throwing the handle to the "OFF" position to open the door. The handle shall be arranged for locking both the door closed and the disconnect in the "OFF" position with up to 3 padlocks. Provide defeat device in cover to permit opening door in "ON" position.

H. Circuit breakers in combination starter units shall be of the magnetic trip type with an adjustable trip setting for selecting instantaneous trip points of fault protection (motor circuit protector). Field adjustment of the instantaneous trip shall be performed by the Electrical Contractor. Select the trip setting at approximately 10 times the motor nameplate full-load current. If the circuit breaker trips on starting, incrementally increase the settings. In no case shall the trip setting exceed 13 times the motor full-load current.

I. Overload heaters shall be furnished for all starters and shall be sized in range of 115 to 125 percent of full load current. The motor starters shall be shipped with the overload heaters inside the compartment but not installed. The Electrical Contractor shall verify the ratings of the heater coils based on the motor nameplate data before installing the overloads. The Contractor supplying the

starter shall replace any improperly selected heaters. For motors 50 HP and larger, provide sold state overloads.

J. A transformer shall be supplied in each starter unit for 120 volt control voltage. Transformer capacity shall be adequate to supply the holding coil requirements plus the solenoids, e-p switches, relays and other devices required to be controlled from the starter. A fuse shall be supplied in one secondary terminal of the control transformer. The other terminal shall be grounded to the housing of the starter. Fuses shall be also provided in the transformer primary leads per the National Electrical Code.

K. Any indoor enclosures shall be NEMA Type I sheet steel with hinged cover for general purpose indoor application, unless otherwise indicated. Enclosures shall be arranged for equipment or wall mounting. Weatherproof NEMA Type 4 enclosures shall be provided for all outdoor starters.

L. Each starters shall be clearly identified by engraved nameplates after installation. The nameplates shall be bakelite black plates with ½" high white letters and shall be securely fastened to starter with mounting screws made of non-corrosive metals.

M. All starters, except those furnished as an integral part of equipment and factory installed on the equipment, shall be of the same manufacturer.

N. Starters shall be as manufactured by Westinghouse, General Electric, Square D, Eaton/Cutler-Hammer, or Allen-Bradley.

O. Shop drawings shall be provided with dimensions, ratings, wiring diagrams and schedule of nameplates for approval prior to fabrication.

1.43 MOTOR CONTROLLERS

A. Motor controllers shall be defined as control devices such as pushbuttons, switches, etc. which are not mounted in starter cover, required for remote control of motors.

B. Unless otherwise noted, motor controllers shall be housed in NEMA Type 4 weatherproof enclosures. Provide nameplate to indicate the motor with which they are associated.

C. Provide reduced voltage starters for all motors 10 HP and larger, and provide time delay for restart.

D. The controllers to be installed in finished area shall be flush mounted.

E. The Electrical Contractor shall install and provide wiring for motor controllers. The contractor providing the motor shall furnish the controllers.

F. Unless otherwise noted, pushbuttons shall be of the normal duty, spring return momentary type.

G. Selector switches and pushbuttons shall be equipped with nameplates indicating the function of each of their positions as noted in the list of electric motors and motor controls or shown on the drawings.

H. Pilot light shall be transformer or series resistor type for operation at 120 V.

I. Pilot lights shall be equipped with nameplates indicating the operating conditions they annunciate as noted in the list of electric motors and motor controls or shown on the drawings.

1.44 SEMI-FINAL AND FINAL SITE VISITS FOR OBSERVATION

A. As the project approaches completion, the Engineer and Architect, at their discretion shall determine a period of time in which they shall perform a Semi-Final Site Visit to observe the Mechanical and Electrical installation. At the conclusion of this Semi-Final Site Visit, a Semi-Final Punchlist shall be issued to the appropriate Contractor for the deficiencies in the work of his trade. Complete all work and perform all corrective measures as required by the Semi-Final Punchlist. After this corrective and completion work has been accomplished, in writing, advise the Architect and the Engineer that every item on the Semi-Final Punchlist has been completed. After the Architect and Engineer make a Final Site Visit to observe the Mechanical and Electrical installation and make a Punchlist, a similar letter of Compliance shall be forwarded through channels.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION 15000

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SECTION 15100 - GENERAL PROVISIONS FOR PLUMBING AND FIRE STANDPIPE WORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This Section is coordinated with and complementary to the General Conditions and Special Conditions of the Work wherever applicable to Mechanical and Electrical Work.

B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 SCOPE OF WORK

A. Work Included

1. The work of this Contract consists of furnishing all labor, materials, equipment and appliances necessary and required to completely do all Plumbing and Fire Standpipe Work as indicated on the Drawings or described or referred to in the Specifications, including, but not limited to the following:

   a. Provide new gravity garage drainage systems in new parking structure with leaders and drains, and piping system conveying storm water drainage to the site storm water sewer within 5' of the building wall.

   b. Provide non-automatic dry fire standpipe system including fire department connections, piping, valves, hose stations and all required specialties.

   c. Drains, cleanouts and required plumbing specialties.

   d. Sleeves, hangers and supports.

   e. Excavation and backfill inside the building.

   f. Furnishing of access doors for installation by general Subcontractor

   g. Apply for, obtain and pay for all permits, certificates, inspections and approvals required in connection with all Plumbing Work.

   h. Shop drawings, samples and instructional manuals, tests and adjustments.

   i. Provide roughing (water supplies, soil, waste, and vent piping) for all fixtures and equipment by this Division and/or installed under other Divisions or Sections of these Specifications.

   j. Color coding and stenciling of all piping systems.

   k. Cutting and rough patching.

   l. Cap flashing and prime painting.

   m. Tests for all systems provided under this Section of the Specifications.

1.3 WORK INCLUDED UNDER OTHER SECTIONS OF THE SPECIFICATIONS

A. Site utilities.

B. Finish patching and finish painting.

C. Installation of access doors.

D. Base flashing for drains, and piping passing through roofs.

E. Temporary water supply, toilet facilities and fire protection.

1.4 LIST OF SHOP DRAWINGS

A. Submit shop drawings prior to installation covering the following items:

1. Valves, valve tags and valve charts.
2. All pumps and pump controls including vacuum pumps.
3. Vacuum breakers and shock absorbers.
4. Drains and specified plumbing specialties.
5. Fire standpipe system valves and specialties.
6. Sleeves, hangers and inserts.
7. Pipes, fittings, and valves, with description of intended uses.
8. Detailed piping layout including all services as specified, coordinated with all other trades.
9. Pipe identification.
10. Test certificates.

B. The above listed items are to be considered major equipment and do not limit the Subcontractor's responsibility from submitting shop drawings for all equipment and accessories which are to be provided under this Section of the Contract.

1.5 VISITING THE PREMISES

A. Before submitting his bid on the work the Contractor, shall visit the site and familiarize himself with all visible existing conditions. As a result of having visited the premises, the Subcontractor shall be responsible for the installation of the work as it relates to such visible existing conditions.

B. The submission of a bid will be considered an acknowledgement on the part of the bidder of his visitation to the site.

1.6 QUALITY ASSURANCE

A. Manufacturer's Instructions: In addition to the requirements of these Specifications, comply with the manufacturer's instructions and recommendations for all phases of the work.

B. Standards and Codes

1. New Jersey Uniform Construction Code
2. National Standard Plumbing Code, 2000
3. BOCA Building Code, 1996
4. NFPA - 14/93
5. ASTM American Society for Testing Material
6. ASME American Society of Mechanical Engineers
7. ANSI American National Standards Institute
8. OSHA Occupational Safety and Health Act
9. AWWA American Water Works Association
10. MSS Manufacturer's Standardization Society of Valve and Fitting Industry
11. FS Federal Specifications

C. All work and material not specifically described, but required for a complete and proper installation of the work of this Section, shall be provided by the Subcontractor and shall be new, first quality of their respective kinds, and subject to approval of the Architect.

D. Drawings are diagrammatic and indicate general arrangement. Before submitting proposal, Subcontractor shall verify all governing dimensions in the building, carefully examine existing conditions and coordinate all work to minimize interference with existing building and service.

1. Submission of proposal will be construed as evidence that required examination of field conditions and contract drawings has been made. Later claims for extra labor, equipment and materials required due to difficulties which could have been foreseen, will not be recognized.

1.7 *COOPERATION WITH OTHERS*

A. The Plumbing Subcontractor shall cooperate with other trades whose work is to be correlated with his work in order to avoid field interference, improper elevations, or inaccessibility to equipment. Any extra expense occasioned by lack of cooperation by this Subcontractor shall be borne by him.

END OF SECTION 15100
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SECTION 15110 - PIPING FOR PLUMBING AND FIRE STANDPIPE WORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section is coordinated with and complementary to the General Conditions and Special Conditions of the Work wherever applicable to Mechanical and Electrical Work.

B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

C. *Section 15100 - General Provisions for Plumbing and Fire Standpipe Work shall apply.*

1.2 SCOPE OF WORK

A. The work of this Contract includes the providing of all labor, materials, accessories, services and tests necessary to install, complete and make ready for operation by the Owner, all work as shown on the *Drawings and as specified herein.*

1.3 SPECIFIC REQUIREMENTS

A. Pipe and fittings shall conform to the latest USASI, ASTM, ANSI and/or F.S. Standards, and/or Cast Iron Soil Pipe Institute Standards No. 301 and 310.

B. All pipes, fittings, traps, materials and/or other devices used in the plumbing system shall have cast, stamped, or indelibly marked on it the maker's name or mark, weight, and quality of the product when such marking is required by the approved standard.

PART 2 - PRODUCTS

2.1 INTERIOR PIPING

A. Underground interior garage drainage, storm piping shall be standard weight, cast iron soil pipe and fittings with hub and spigot compression joints. Pipe and fittings shall conform to ASTM-74 and C-564 standards.

B. Interior garage drainage vent piping above ground shall be No-Hub, cast iron soil pipe and fittings or galvanized steel threaded pipe with galvanized cast iron recessed drainage fittings conforming to ASTM A126 Class B.

1. Service weight cast iron No-Hub pipe fittings shall be made up to comply with CISPI Standard 301 and ASTM A888. No-Hub coupling gaskets shall conform with ASTM C564. Each approved coupling shall be permanently marked on its external surface with manufacturer's name or trade mark, nominal pipe size and rated pressure in PSI.

C. Dry fire standpipe system pipe shall be Schedule 40 black steel pipe. Fittings shall be of a type specifically approved for use in fire standpipe systems.

1. Subject to approval, the Contractor has the option of using grooved end piping with grooved end fittings with mechanical type coupling for sizes 2½" and larger for the fire standpipe system. The Contractor shall state the materials in his bid that he intends to provide.

2. Grooved end fittings and couplings shall be dry grooved only of the following type and figure number as manufactured by Victaulic. Equal materials manufactured by Gustin-Bacon or Grinnell may be submitted for approval. All couplings and fittings shall be US made and shall be suitable for dry pipe system.

3. Grooved end fittings and couplings schedule:

Item	Victaulic Fig. #	To be used on:
Zero-Flex Coupling	07	All vertical risers
Flexible Coupling	75	All horizontal piping
Vic-Flange Adapter	741	For connection of flanged components into a grooved system.
Standpipe tee	27	On FSP risers
Elbows	10, 11, 12, 13	Throughout
Reducers	50, 52	Throughout
Tees	20	Throughout
Reducing tees	25, 29	Throughout
Cross	35	Throughout
Mechanical tee	920, 921	Throughout

4. Reducing coupling similar to Victaulic Fig. 750 will not be permitted.

5. Fittings and couplings for plain end pipe similar to Victaulic FIT type fittings and Roust-A-Bout and Plainlock coupling will not be permitted.

PART 3 - EXECUTION

3.1 INSTALLATION NOTES FOR INTERIOR PIPING

A. It is the intent that each part of the plumbing and fire standpipe systems shall be complete in all details and all lines provided with all control valves as indicated on Drawings, or as may be required for the proper control of the pipe lines under this Section so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the building.

B. The Contractor shall examine carefully the architectural plans and details and familiarize himself with all conditions relative to the installation of piping, particularly where same is concealed behind furring or in hung ceilings.

C. Piping shall be installed, whether indicated or not, so as to rise and/or drop to clear any and all conduits, lighting fixtures, ductwork and heating mains, in order to maintain the desired clear heights. The Contractor shall consult with the other trades and facilitate the erection of the equipment and piping.

D. Run piping straight and as direct as possible. In general, form right angles with or parallel to walls or other piping. Risers shall be erected plumb and true.

E. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.

F. No piping or work shall be concealed until all required tests have been satisfactorily completed and work has been approved by the Architect and all other authorities having jurisdiction.

G. Branch connections of the drainage systems shall be made with "Wye" and long "Tee-Wye" fittings. Short 1/4" bends, common offsets and double hubs will not be permitted. Short "Tee-Wye"" fittings are to be used in a vertical position only.

H. Cleanouts shall be provided at the base of all stacks, all changes of directions, at the ends of branch runs where shown, every 50'-0" and as required by Code, and shall be furnished as described under cleanouts.

I. The house drains must be run at a minimum grade of 1/8" per foot downward in the direction of flow. Wherever possible, a 1/4" per foot pitch shall be maintained. Branch connections to stacks from fixtures shall pitch 1/4" per foot where possible. Attention is again called to the necessity of maintaining the ceiling heights established.

3.2 NO-HUB PIPING - ADDITIONAL REQUIREMENTS

A. Pipe hanger shall be provided at each coupling for horizontal piping.

B. Stacks shall be supported at their bases and at each floor, by floor clamps.

C. Horizontal piping 5" and larger shall be braced at each branch and at every change in direction (including 3" and 4" branch piping at each change of direction).

D. Sway bracing shall be provided on horizontal piping that is suspended in excess of 18" below slab, at 30' intervals.

E. Horizontal drainage piping 5" and larger shall be braced at every coupling.

END OF SECTION 15110

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SECTION 15130 - HANGERS & SUPPORTS FOR PLUMBING AND FIRE STANDPIPE WORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section is coordinated with and complementary to the General Conditions and Special Conditions of the Work wherever applicable to Plumbing Work.

B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

C. Section 15100 - General Provisions for Plumbing and Fire Standpipe Work shall apply.

1.2 SCOPE OF WORK

A. The work of this Contract includes providing all labor, materials, accessories, services and tests necessary to install complete and make ready for operation by the Owner, all Hangers and Supports for Plumbing and Fire Standpipe Systems as specified hereinafter.

1.3 SPECIFIC REQUIREMENTS

A. Provide products which are USA made.

B. Provide pipe hangers and supports of which materials, design, and manufacture comply with ANSI/MSS SP-58.

C. Select and apply pipe hangers and supports, complying with MSS SP-69.

D. Fabricate and install pipe hangers and supports complying with MSS SP-89.

E. Assume the responsibility for the proper transfer of the loads of the piping system to the structure. No additional cost to the Owner should be expected for any corrective work during construction.

F. Supports and hangers shall be provided for all horizontal and vertical piping. The hanger design shall conform to the ASA Code for Pressure Piping. Hangers shall be kept outside of pipe insulation.

G. Bracket clamps and rod sizes indicated in these Specifications are minimum size only. The Subcontractor shall be responsible for structural integrity of all supports. All structural hanging material shall have a safety factor of five (5) built in.

PART 2 - PRODUCTS

2.1 HANGERS AND SUPPORTS

A. Pipe supports shall be of the following type and figure number, manufactured by Grinnell or approved equal.

B. Pipe Hanger Schedule

Item	Grinnell Fig. #	Piping Sizes
Beam Clamp w/locknut	94 or 133	All
Beam Clamp w/Retaining Clip	95 & 96	All
Adjustable Clevis Hanger	260	All
	300	For insulated
Adjustable Swivel Ring	69	2" & smaller
Pipe Saddle	264	4" and larger
	192	2", 2½", 3"
U-Bolt	137	All (At Engineer's approval)
Riser Clamp	261	All
Brackets	195, 199	All
Steel Washer Plates	60	All
Concrete Insert	281 or CB 282	All

C. Inserts for pipes 3" and smaller may be expansion shield type and shall be used with suitable existing concrete structure in coarsely aggregated concrete only, Hilti Model HDI.

D. Bracing for cast iron No-Hub vertical piping (all sizes) and horizontal 6" and larger shall be made up of two four bolt cast iron socket clamps Grinnell Fig. 595 with cast iron socket clamp washers, Grinnell Fig. 594.

E. Sway bracing for horizontal No-Hub cast iron piping shall be made up of double bolt riser clamp, Grinnell Fig. 261, galvanized steel 12" long shields, Grinnell Fig. 167 and 1" x ⅛" steel plate.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Provide necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations. In all cases where hangers are supported from concrete construction, care shall be taken not to weaken concrete or penetrate waterproofing. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction. Hangers in contact with copper or brass pipe shall be copper plated steel.

B. Except where otherwise noted, piping shall be supported from structural steel only. Provide supplementary steel where required.

C. Where additional steel is required for the support of hangers, it shall be provided subject to the approval of the Architect. Piping shall not be supported from the metal deck slab construction.

D. Piping shall not be hung from other piping, ducts, conduits or from equipment of other trades.

E. Piping located on walls shall be supported by means of hanger suspended from heavy angle iron wall brackets. No wall hooks will be permitted.

F. Lateral bracing of horizontal pipe shall be provided where required to prevent side sway or vibration. The lateral bracing shall be of a type approved by the Engineer and shall be installed where directed by the Engineer.

G. Concrete inserts shall be coordinated with other trades and shall be set in place before slabs are poured. Expansion anchors similar to Hilti HDI are permitted only on small branches (2" and less).

H. Intervals of supports shall be as follows:

1. Cast iron pipe, horizontal: five (5) feet
2. Cast iron pipe, vertical: every floor level; and so as to take the load off the base of the stack
3. Steel screwed pipe, horizontal: twelve (12) feet
4. Steel screwed pipe, vertical: every floor level; and so as to take the load off the base of the stack

I. The following is the procedure for above ground installation of hubless pipe, recommended by the Cast Iron Institute:

1. Horizontal piping shall be supported at every coupling & at every bond connection. A hanger shall be placed within 18" of each coupling.
2. Multiple joints within a four foot or less developed length shall be supported at every other or alternating coupling.
3. Vertical risers shall be supported at sufficiently close intervals to keep the pipe in alignment and carry weight of pipe and content.
4. Horizontal piping and fittings and especially pipe & fittings 5" and larger shall be suitably braced to prevent horizontal movements. For pipe & fittings 5" and larger this shall be done at every branch opening & at every change in direction by the use of braces & blocks, rodding or other suitable method to prevent movement (see attached details).
5. Terminal ends of all horizontal runs and branches shall be supported with an approved hanger.
6. Stacks shall be supported at their bases and at each floor, by floor clamps.

SECTION 15335 - DRY STANDPIPE SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of Dry Standpipe System Work is indicated on the Drawings and by the requirement of this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Plumbing and Fire Standpipe Piping ..... Section 15110

B. Hangers and Supports ..... Section 15150

C. Tests ..... Section 15380

D. Approved Manufacturers ..... Section 15390

PART 2 - PRODUCTS

2.1 VALVES

A. Check Valves: Check valves shall be UL listed flanged cast iron body, bronze mounted swing-type, 175 P.S.I. WWP, Stockham G-940, NIBCO F-908-W.

B. Control Valves

1. Riser control valves shall be O.S. & Y. gate valves with flanged cast iron body, bronze mounted, 175 P.S.I. WWP, Stockham G-634 or NIBCO F-607-0. They shall be sealed open by means of heavy chain and approved type heavy tumbler locks. Control valve location shall be clearly indicated with necessary signs and arrows.

2. Metal tag with number identifying control valve shall be as specified in Section 15431.

2.2 FIRE DEPARTMENT CONNECTIONS

A. Flush Type shall be of the size indicated on Drawings. It shall be polished brass with two individual drop clapper valves and cast iron plugs painted red with brass chain and with polished brass plate lettered "STANDPIPE". Flush type shall be Potter-Roemer Fig. **5020G Series**, or Croker Corp. Fig. 6030 Series. Threads shall conform to local Fire Department Specifications.

2.3 AUTOMATIC BALL DRIP

A. Automatic Ball Drip shall be 3/4" Potter-Roemer Fig. 5982 or Croker Corp. Fig. 6781.

2.4 FIRE DEPARTMENT HOSE VALVE AND CABINET

A. Hose valve shall be 2 1/2" angle valve, cast brass body, complete with wheel handle, with red enameled finish caps and chain. Valves shall be Potter-Roemer Fig. No. 4065 or Croker Corp. Fig. 5015. Cap with chain shall be Potter-Roemer 4625 or Croker Corp. Fig. 5713. Threads shall be to local Fire Department Specifications. Provide escutcheon plate Potter-Roemer No. 2751 or Croker Corp. Fig. 5735 for valve.

L. All piping which is to be enclosed in partitions or hung ceilings shall be tested and made tight when directed by the Construction Supervisor and in adequate time to permit the installation of partitions and ceilings. When necessary, the Subcontractor shall drain the piping and/or take over such precautions as required to prevent damage by freezing.

M. The Contractor shall also be responsible for the Work of other trades that may be damaged or disturbed by the tests, or the repair or replacement of his Work, and he shall, without extra charges, restore to its original condition any Work so damaged or disturbed.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 INTERIOR PLUMBING SYSTEMS

A. All plumbing systems shall be tested in accordance with National Standard Plumbing Code as described below.

B. Rough Piping Installations:

1. Building drainage piping shall be tested and proven watertight upon completion of the rough piping installation prior to covering or concealment.

2. A water pressure test shall be applied to the drainage and vent piping. Test pressure shall be equal to at least a 10' column of water at all points, except that the uppermost 10' of the system, measured downward from the highest roof vent terminal, need be subjected only to the pressure produced when water overflows from that terminal. The piping may be tested in sections when approved test fittings are provided at appropriate locations. Test pressure at any point in the system shall not be allowed to exceed the equivalent of a 100' column of water. This test shall be applied to all building drains except those for which a water flow test is specially permitted.

3. An air pressure test, at five pounds per square inch gauge pressure, may be applied instead of the water pressure test when special permission is granted by the enforcement officer.

3.2 FIRE STANDPIPE SYSTEM

A. Fire standpipe system shall be tested in accordance with Code Requirements.

END OF SECTION 15380

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SECTION 15390 - APPROVED MANUFACTURERS FOR PLUMBING AND FIRE STANDPIPE WORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section is coordinated with and complementary to the General Conditions and Special Conditions of the Work, wherever applicable to Plumbing Work.

B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

C. Section 15100 - General Provisions for Plumbing and Fire Standpipe Work shall apply.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. The manufacturers' names hereinafter specified represent a standard of materials, appearance, finishes, and performance.

B. The Plumbing Subcontractor has the option of submitting other manufacturers for approval in lieu of the manufacturers hereafter specified, provided their respective products conform in all respects to the manufacturers hereafter specified. This conformity must be shown by the Subcontractor on the submittals item by item.

C. The following is a list of approved manufacturers:

1. Hangers and Supports
   Grinnell
   Carpenter & Paterson, Inc.
   B-Line Systems

2. Drains and Plumbing Systems Specialties
   J.R. Smith
   Josam
   Zurn
   Wade

3. Gate and Check Valves
   Stockham
   Walworth Co.
   Jenkins Bros.
   Crane Co.
   Nibco

4. Piping and Fittings (Cast Iron)
   American Cast Iron Pipe Co.
   Alabama Pipe Co.
   Central Foundry Co.
   United States Pipe and Foundry

Tyler Soil Pipe

5. Pipe (Steel)
Youngstown Sheet and Tube Co.
Republic Steel Co.
Allied Pipe Co.

6. Fire Standpipe Equipment
Potter-Roemer
Larsen
Croker

END OF SECTION 15390

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SECTION 16000

GENERAL PROVISIONS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Drawings are diagrammatic and are a graphic representation of contract requirements to the best available standards at the scale required.

C. Light and power and miscellaneous systems riser diagrams, as well as schematic diagrams, generally indicate connections to be used for various systems and equipment. Systems conduit and wiring shall be as required for the actual systems installed on this Project. Provide all work shown on diagrams whether or not it is duplicated on the plans.

1.2 SCOPE OF WORK

A. The Specifications and the accompanying drawings are intended to secure the provisions of all material, labor, equipment, and services necessary to install complete, tested, and ready for operation the Electrical Systems in accordance with the Specifications and Drawings. All systems shall be complete with all necessary appurtenances and minor auxiliaries, including pull boxes, offsets to clear interferences, and supports which are not shown but are needed to make each system complete in every respect. All work described in the Specifications and not shown on the Drawings, or vice versa, shall be furnished in complete working order. If mention has been omitted of any item of work or material, necessary for completion of the system, then such items must be and are hereby included.

1. Power and light distribution system.
2. Transformers (indoor dry type).
3. Panelboards - lighting, power and distribution.
4. Fuses and/or circuit breakers.
5. Installation and wiring of individual controllers. Erecting starter racks where required.
6. Control devices, only where specifically called for.
7. Safety and disconnect switches, unless furnished with starters or on equipment. Weatherproof devices for outdoor equipment. Six (6) pole switches for two-speed, three-phase motors.
8. Motor power wiring.
9. Raceways and installation components.
10. Wire and Cable.
11. Electrical work in connection with equipment specified and furnished under other Sections of the Specifications, or furnished by the Owner under separate contracts or direct purchase.

12. Grounding system in conformance with applicable codes.

13. Wiring devices.

14. Lighting fixtures, including lamps, as described in these Specifications, and in accordance with Schedule on Drawings.

15. Emergency battery packs on garage decks.

16. Power and control wiring for unit and cabinet heaters.

17. Lightning protection system.

18. Furnishing and setting of all sleeves through the floors, roof and wall, where required including waterproofing and fireproof sealing and cap flashing.

19. Excavation and backfill (excavation in rock shall be included). All concrete work for pads (including housekeeping pads), bases for outdoor lighting fixtures, and conduit envelopment shall be included.

20. Hardware, such as inserts, bolts, etc., associated with concrete pads.

21. Cutting and core drilling associated with electrical work.

22. Prime painting, where required for electrical equipment and installation.

23. Provision for temporary light and power.

24. Paying all fees as required by governing agency and performing all testing as required by governing agency and adjusting and furnishing all certificates of approval, and those of Underwriters.

25. Communications, alarm and signaling systems, including the following:

    a. Addition of new devices as shown on drawings and existing fire system modification to accommodate them.

    b. Telephone empty conduit system.

    c. Data (processing/transmitting) empty conduit system.

    d. Empty raceways for CCTV and door security alarm system.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. The following items of materials and labor will be furnished under other Sections of the Specifications and shall be excluded from the work to the furnished by this Contractor:

1. Furnishing and setting of motors, adjusting thermal elements and replacing thermal overloads if necessary. Supplying of motor control centers and/or individual starters and control devices, unless specifically indicated otherwise. This Contractor shall ascertain that combination starters are obtained and installed where so identified on the Electrical Drawings.

2. Furnishing and installing telephone system cables and instruments.

3. Furnishing and installing data (processing/transmitting) cables, equipment and instruments.

4. Base flashing for conduits passing through roof.

5. Furnishing and installing of alarm and supervisory devices for Sprinkler Alarm System.

6. Rough and finish patching.

7. Finish painting of exposed conduits, boxes, hangers, apparatus, etc.

8. Openings for sleeves in foundation walls below grade and floor slabs when noted on Foundation Drawings or in Foundation Specifications.

9. Dewatering of trenches inside and outside of Building.

1.4 QUALITY ASSURANCE AND STANDARDS

A. The complete installation shall be in accordance with the applicable requirements and standards of National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), National Electrical Code (NEC), Institute of Electrical and Electronic Engineers (IEEE), American National Standard Institute (ANSI), Occupational Safety and Health Administration (OSHA), National Electrical Safety Code, Insulated Cable Engineers Association (ICEA), Underwriters' Laboratories (UL), Factory Mutual (FM), Factory Insurance Association (FIA), National Electrical Contractors Association (NECA) "Standard of Installation", Local Inspection Agency, Local Power Company.

B. All electrical equipment, materials and appliances shall have the listing of the Underwriters' Laboratories, Inc., and shall bear labels attesting to UL listing, and types approved by Municipal Departments having jurisdiction.

1.5 SUBMITTALS

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

B. The Contractor shall submit shop drawings with such promptness as to cause no delay in his own work or that of another contractor.

C. Submit shop drawings complete in every detail for items as described in the Contract Documents, or as may be required by the Architect.

D. Submit shop drawings as indicated in subsequent Sections of this Specification.

1.6 COORDINATION OF WORK WITH OTHER TRADES

A. The work of this Section shall be coordinated with the work of all other Contracts, the Utility Company and the Telephone Company, and shall be so arranged that there will be no delay in the proper installation and completion of any part or parts of each respective work wherein it may be

interrelated with that of this Contract so that generally all construction work can proceed in its natural sequence without unnecessary delay. All communications of a coordinating nature to the Architect shall be via the Construction Manager or General Contractor.

B. Examine all Architectural, Structural, Heating, Ventilating and Air Conditioning, Sprinkler and Plumbing Drawings relating to this Project, and verify all governing conditions at the site and become fully informed as to the extent and character of the work required and its relation to other work in the building. No consideration will be granted for any alleged misunderstanding of the materials to be furnished for work to be done.

C. Scaled and figured dimensions with respect to the items are approximate only; sizes of equipment have been taken from typical equipment items of the class indicated. Before proceeding with work, the Contractor shall care-fully check all dimensions and sizes and shall assume full responsibility for the fitting-in of equipment and materials to the building and to meet architectural and structural conditions.

D. Coordinate work with other disciplines. Confer with other contractors whose work might affect this installation; and arrange all parts of this work and equipment in proper relation to the work and equipment of others, with the building construction and with architectural finish so that this work will harmonize in service, appearance, and function.

E. Exposed piping shall be installed to provide the maximum amount of headroom but in no case shall piping be installed less than seven feet (8'-0") above the finished floor. Piping installed in areas where hung ceilings or other furred spaces are indicated shall be installed concealed.

F. The Contractor is referred to the Architectural Drawings for locations and types of hung ceilings and furred spaces.

1.7 INSPECTION AND TESTS

A. At the time of the final inspection and tests, all connections at the panels and all splices, etc., must have been completed. All fuses must be in place and the circuits continuous from service switches to all receptacles, outlets, motors, etc. Each entire wiring system must test free from short circuits and grounds. When wiring systems are "megger" tested, the insulation resistance between conductors and between conductors and grounds, based on maximum load, shall not be less than that required by National Electrical Code and local authorities having jurisdiction. A written record of all test data shall be supplied to the Architect (five copies). The tests shall cover but not be limited to the following:

1. Secondary service and distribution system.

2. Fire alarm, smoke detection and sprinkler alarm systems.

3. Power installations and motor controls.

4. Light installations and circuit switching.

5. Any part of the work called for in the Specifications, or Drawings and as designated by the Architect or Engineers.

B. Provide all necessary testing equipment, instruments, and skilled personnel for the tests. If in the opinion of the Architect, the results of such tests show that the work has not complied with the requirements of the Specifications or Drawings, the Contractor shall make all additions or changes necessary to put the system in proper working condition and shall pay for all the expenses and for all

subsequent tests which are necessary to determine whether the work is satisfactory. Any additional work or subsequent tests shall be carried out at the convenience of the Owner, prior to final payment.

1.8 PERMITS, CERTIFICATES AND FEES

A. Obtain and deliver a final Certificate of Approval from the applicable inspection authority having jurisdiction. Make delivery to the Architect for transmittal to the Owner upon completion of the work and before final payment. Pay all charges made by the inspection authority and include their cost in the bid.

B. This work shall include the procurement of and payment for all permits, certificates and fees for the performance of the electrical work in compliance with codes, applicable laws and municipal regulations including those from local utilities for services.

1.9 PROTECTION, MAINTENANCE AND PRODUCT HANDLING OF ELECTRICAL EQUIPMENT

A. Electrical equipment shall be delivered and stored at the site, properly packed and crated until finally installed. Store materials in spaces as designated by the General Contractor. Investigate each space through which equipment must be moved. If necessary, equipment shall be shipped from manufacturer in crated sections of size suitable for moving through restricted spaces.

B. Uninstalled and installed equipment and materials shall be adequately protected against loss or stealing; damage caused by water, paint, fire, plaster, moisture, acids, fumes, dust or other environmental conditions; or physical damage, during delivery, storage, installation and shutdown conditions. This Contractor shall replace any damage or stolen material without extra cost to the Owner.

C. Provide effective protection for all material and equipment against damage that may be caused by environmental conditions. Do no work when conditions of temperature in area or moisture on materials or substrates are not in accordance with material manufacturer's recommended conditions for installation.

D. This Contractor shall be responsible for the maintenance of all equipment and systems installed, until final acceptance by the Architect and the Owner. The Operation of the equipment by the Owner does not constitute an acceptance of the work. Work will be accepted only after the Contractor has adjusted his equipment, demonstrated that it fulfills the requirements of the Drawings and Specifications, and has furnished all required certificates.

E. This Contractor shall guarantee in writing to the Owner that all work installed by him shall be free of defects in workmanship and materials and that all apparatus will develop the capacities and characteristics as indicated, and that, if during a period of one year from date of final approval of work by the Architect, any defects in workmanship, materials or performance appear, he will remedy them without any cost to the Owner. Guarantee requirements shall consist of the aforestated and other requirements, as established under applicable Contract Documents.

F. Provide effective protection against damage for all material and equipment during shipment, and storage at the Project Site. Cover all stored equipment to exclude dust and moisture. Place stored conduit on dunnage with appropriate weather cover and caps on exposed ends.

G. After cabinets and boxes are installed, cover openings to prevent entrance of water and foreign materials. Close conduit openings with temporary metal or plastic caps, including those terminated in cabinets.

H. Protect all rough and finished floors and other finished surfaces from damage which may be caused by construction materials and methods. Protect floors with tarpaulins, chip pans and oil-proof floor covering. Protect finished surfaces from welding and cutting splatters with baffles and asbestos splatter blankets. Protect finished surfaces from paint droppings, adhesive and other marring agents with drop cloths. Protect other surfaces with appropriate protective measures.

I. Have materials delivered to site. Unload and store materials in designated location, and protect from damage. Deliver materials to their point of installation.

J. Deliver materials to Project site in manufacturer's original unopened containers with manufacturer's name and product identification clearly marked thereon.

1.10 DELIVERY AND RECEIVING

A. Owner-furnished equipment will be delivered, crated or otherwise packaged to the Site delivery point selected by the Construction Manager. This Contractor shall accept delivery of all Owner-furnished items which are under his trade jurisdiction and place them in their final location.

B. Where items cannot be immediately placed in their final position, this Contractor shall store and protect all Owner-furnished items until the time of their final installation. He shall be responsible for the care and protection of the items until acceptance by the Owner. Delivery of Utility Company furnished equipment shall be coordinated with the delivery policy of that company.

1.11 ACCESSIBILITY AND MEASUREMENTS

A. All work shall be installed so as to be readily accessible for operation, maintenance and repair. Minor deviations from the plans may be made to accomplish this, subject to the approval or the Architect or Engineers.

B. Before ordering any material or doing any work, the Contractor shall verify all measurements at the Building, and shall be responsible for the correctness of same as related to the work under this Contract.

1.12 TEMPORARY LIGHT AND POWER

A. Electric services for temporary light and power shall be obtained from the nearest existing switchboard and extended as required. Consult the Owner prior to making any connections to existing services.

B. The Electrical Contractor shall furnish, install and maintain the temporary lighting and power system for all Contractors. The use of electricity shall be kept to a minimum.

C. The Owner or Owner's Representative will pay for all energy required by the temporary lighting and power system.

D. Provide all wiring, supports, lamp sockets, receptacle sockets and any other materials, supplies or equipment necessary for temporary light and power system.

E. Ground fault protection required by OSHA for temporary receptacle circuits shall be accomplished by providing branch circuit panels containing ground fault protection branch circuit breakers.

F. Provide a grounding conductor connection to each receptacle grounding terminal. Minimum size branch circuit and grounding conductors shall be No. 12 AWG.

G. Install separate stringer circuits for lighting and receptacles. Provide one lamp socket and one duplex receptacle (or two single receptacles) for every 400 square feet of new general construction area. (Approximately 20 feet on centers). Furthermore, provide one lamp socket and one duplex receptacle every 20 feet along the peripheral walls of the construction areas for temporary conditions. Each lamp socket shall be provided with a 100 watt lamp. Replace burned out lamps as required for as long as the temporary lighting system is maintained in operation.

H. Provide sufficient supplementary temporary lighting to permit proper execution of the work. This supplementary lighting shall consist of but not be limited to the following:

1. Construction hoist landings.

2. Stairways and stairway landings.

I. Provide power wiring to operate construction hoist. Provide fused disconnect switch at hoist location. Fuse size, wiring size and disconnect shall be as required.

J. Provide 10 trailer extension cords, each 25 feet long. Cords shall be 16-3, Type SJ. 25 of the trailer cord sets shall be receptacle type ITT No. 6112 and 25 of the trailer cord sets shall be trouble light type with receptacle ITT No. J-3270. Distribution of these cord sets to Mechanical and other contractors shall be as directed by the Owner's Representative.

K. Keep the temporary lighting and power system operational commencing fifteen (15) minutes before the established starting time of that trade which starts work earliest in the morning and ending fifteen (15) minutes after the established quitting time of that trade which stops work latest in the evening. This applies to all weekdays, Monday through Friday inclusive, which are established as regular working days for any trade engaged in the work, and shall continue until Final Acceptance of the work or until these services are ordered terminated by the Owner or the Owner's Representative.

1.13 NAMEPLATES

A. Furnish a nameplate for each separately installed feeder switch and circuit breaker, each individual panel, dry-type transformer, disconnect switch, starter push-button station and equipment enclosure.

B. Unless otherwise noted, nameplates shall be black laminate with white letters of uniform size consisting of reasonably large caps, easily visible.

C. Inscriptions shall consist of name and number of equipment as shown on the Drawings and as approved by the Architect.

1.14 NAMES AND TRADE NAMES

A. Where trade and manufacturers' names are specified or indicated on the Drawings, they are intended to indicate the standard of material or articles required. This shall not remove the responsibility of the Contractor from verifying the equipment's compliance with all rules and regulations governing the use of such equipment. No purchase of any equipment shall be done without written authorization, if such equipment will not abide with all rules and regulations, covering its intended use.

1.15 MATERIAL AND WORKMANSHIP

A. All material shall be new and of the best quality and shall have the Underwriters Laboratories label attached. The label shall be of the type for the intended application. The work throughout shall be executed in the best and most thorough manner under the direction of, and to the satisfaction of the

Architect who will interpret the meaning of the Drawings and Specifications. The Architect shall have the power to reject any work and materials which, in his opinion, is not in full accordance therewith.

B. If, after installation, operation of the equipment proves to be unsatisfactory to the Owner by reason of defects, errors or omissions, the Owner reserves the right to operate equipment until it can be removed from service for correction by Contractor. Contractor shall pay for damages to work of other trades caused by this defective equipment and its replacement.

1.16 OPERATING INSTRUCTIONS (SYSTEMS AND EQUIPMENT FURNISHED UNDER CONTRACT FOR ELECTRICAL WORK)

A. Two months prior to the completion of all work and the final inspection of the installation by the Owner, five copies of a complete Instruction Manual, bound in booklet form and suitably indexed, shall be submitted to the Architect for approval. All written material contained in the Manual shall be typewritten or printed.

B. The Manual shall contain the following items:

1. Table of Contents

2. Introduction - Explanation of manual and its use.

3. Description of system or equipment.

   a. Complete schematic drawings of all systems.
   b. Functional and sequential description of all systems.

4. Systems Operation

   a. Operation procedures.
   b. All posted instruction charts.

5. Maintenance

   a. Systems trouble-shooting charts
   b. Procedures for checking out functions.
   c. Recommended list of spare parts.

6. Listing of Manufacturers

7. Manufacturer's Data (where multiple model, type and size listings are included, clearly and conspicuously indicate those that are pertinent to this installation.

   a. Description - literature, drawings, illustrations, certified performance charts, technical data, etc.
   b. Operation
   c. Maintenance - including complete trouble-shooting charts
   d. Parts list
   e. Names, addresses and telephone numbers of recommended repair and service companies.
   f. Guarantee data.

END OF SECTION 16000
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SECTION 16111

RACEWAYS AND INSTALLATION COMPONENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The requirements of this section apply to raceway work required for the protection of electrical conductors. Raceways are required for all wiring unless otherwise specified.

B. The work includes the furnishing and installation of completely coordinated, effectively grounded raceway systems complete with boxes, fittings, flexible connections to vibrating equipment and other accessories, as required. Conduit or tubing sizes referred to in the Specifications and on the Drawings are nominal trade sizes.

1.3 QUALITY ASSURANCE

A. Manufacturers - Firm regularly engaged in manufacture of raceways and accessories of the types required and whose products have been in satisfactory use in similar service for not less than 5 years. Refer to PART 4 of this section for "Approved Manufacturers".

B. Raceways and installation components shall be listed and labeled by Underwriters Laboratories and comply with applicable sections of National Electrical Manufacturers Association standards.

C. All outdoor installations shall be weatherproof.

1.4 SUBMITTALS

A. Refer to Section 15000; Special Requirements for Mechanical and Electrical Work.

B. Submit a list of proposed manufacturers for all raceways and components.

C. Submit shop drawings for the following:

1.5 GUARANTEE

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Raceways

1. Metallic:

a. Wheatland Tube Co.
Allied Tube & Conduit Corp.
Triangle PWC, Inc.

2. PVC:

a. Carlon
Electri-Flex Co.
Thomas & Betts

3. Galv. PVC Coated Conduit to RN 1 Spec.

a. Perma Cute
Electriflex
Rob Roy

B. Raceway Fittings

1. O.Z. Electrical Mfg. Co., Inc.
Appleton Electric Co.
Crouse-Hinds Co.
Thomas and Betts Co.

C. Boxes

1. O.Z./Gedney
Crouse-Hinds Co.
Raco Inc.
Russell & Stoll Co.
Steel City Electric Co.

2.2 RACEWAYS AND FITTINGS

A. Raceways:

1. All conduit shall be ¾ inch minimum.

2. Rigid steel conduit: Shall be full weight steel pipe, hot dipped galvanized inside and outside, threaded.

3. Electric metallic tubing (EMT) shall be steel thin wall pipe, galvanized, threadless.

4. Flexible steel conduit (Greenfield): Shall be continuous single strip, galvanized.

5. Liquid-tight, flexible steel conduit: Shall be zinc coated and consist of flexible galvanized steel tubing over which is extruded a liquid-tight jacket of polyvinyl chloride (PVC).

B. Conduit Fittings:

1. Thread compounds shall be UL approved conductive type to insure low resistance ground continuity through conduit.

2. Metallic conduit fittings shall be corrosion resistant.

3. Bushings shall be of the metallic insulated type.

4. For weatherproof and dustight installations provide liquid-tight fittings with sealing rings and insulated throat.

5. Rigid steel conduit fittings:

   a. Fittings shall be standard threaded couplings, locknuts, bushings, and elbows.

   b. Sealing fittings shall be of the threaded cast iron type. Sealing fittings used to prevent passage of water vapor shall be of the continuous drain type. In concealed work, each fitting shall be installed in a flush steel box with blank coverplate having the same finish as that of other electrical plates in the room.

6. Electrical metallic tubing fittings:

   a. Couplings and connectors shall be steel body-malleable iron nut, "concrete tight". They shall be compression type, afford raintight integrity, and provide positive ground. Connectors shall have insulated throats.

7. Flexible steel conduit (Greenfield) fittings:

   a. Shall be pressure clamp type with insulated throat and UL approved for ground continuity.

8. Liquid-tight flexible metal conduit fittings:

   a. Shall be of a type incorporating a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats. Shall be UL approved for ground continuity.

9. Expansion and deflection couplings:

   a. Shall accommodate 0.75 inch deflection, expansion, or contraction in any direction and allow 30 degree angular deflections. Couplings shall comply with UL 467 and 514 and shall qualify seismically.

   b. Shall include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC tables for ground conductors.

2.3 INSTALLATION COMPONENTS

A. Sleeves:

1. Provide and assume responsibility for locating and maintaining in proper position all sleeves required for the work. See Section 15000 - General Requirements for Mechanical and Electrical Work for sleeves specification.

2. For raceways through sleeves, provide seals of compression neoprene or O.Z. Type WSC compound on both sides.

3. For cables in raceways through sleeves, provide seals similar to O.Z. Type WSC compound or Type C series terminators.

4. Through floors, exterior masonry walls and roof sleeves shall be schedule 40 galvanized steel pipe. For other areas, sleeves shall be 18 gauge galvanized sheet steel.

B. Fire sealants:

1. Openings through floors and walls in which cables, conduits, or pipe pass shall be sealed by U.L. classified smoke and fire stop fittings, and have an hourly rating equal to the fire rating of the floor or wall. Fittings shall be similar to O.Z. Gedney Type "CFS" or CAFS".

2. Penetrations through fire-rated floors in which wiring for floor service outlets in routed shall be sealed by U.L. classified smoke and fire-stop fittings, and shall have an hourly rating equal to the floor rating. Fittings shall be similar to O.Z. Gedney Type "PTFS".

2.4 SUPPORTS

A. Conduit Supports:

1. All parts and hardware shall be zinc-coated or have equivalent corrosion protection.

2. Individual conduit hangers, shall be designed for the purpose, have pre-assembled closure bolt and nut, and provisions for receiving hanger rod.

3. Multiple conduit (trapeze) hangers shall be not less than 1½" by 1½", 12 gauge steel, cold formed, lipped channels. Hanger rods shall be not less than ⅜" diameter steel.

4. Solid masonry and concrete anchors shall be a type approved for the purpose.

B. Fasteners:

1. Furnish all fasteners and hardware compatible with the materials and methods required for attachment of supporting devices.

a. Slotted-Type Concrete Inserts: Galvanized pressured steel plate complying with ASTM A 283; box-typed welded construction with slot designed to receive steel nut and with knockout cover; hot-dipped galvanized in compliance with ASTM A 386.

b. Masonry Anchorage Devices: Expansion shields complying with Federal Specification FF-S-325, as follows:

(1) Furnish lead expansion shields for machine screws and bolts ¼" and smaller; head-out embedded nut type, single unit class, Group I, Type 1, Class 1.

(2) Furnish lead expansion shields for machine screws and bolts larger than ¼" in size; head-out embedded nut type, multiple unit class, Group I, Type 1, Class 2.

(3) Furnish bolt anchor expansion shields for lag bolts, zinc alloy, long-shield anchors class, Group II, Type 1, Class 1.

(4) Furnish bolt anchor expansion shields for bolts, closed-end bottom bearing class, Group II, Type 2, Class I.

c. Toggle Bolts:

(1) Tumble-wing type, complying with Federal Specification FF-B-588, type, class and style as required.

d. Nuts, Bolts, Screws, Washers:

(1) General: Furnish zinc-coated fasteners, with galvanized complying with ASTM A 153 for exterior use or where built into exterior walls. Furnish fasteners for the type, grade and class required for the particular installation.

(2) Standard Nuts and Bolts: Regular hexagon head type, complying with ASTM A 307, Grade A.

(3) Lag Bolts: Square head type, complying with Federal Specification FF-B-561.

(4) Machine Screws: Cadmium plated steel, complying with Federal Specification FF-S-92.

(5) Wood Screws: Flat head carbon steel, complying with Federal Specification FF-W-92.

(6) Plain Washers: Round, general assembly grade carbon steel, complying with Federal Specification FF-W-92.

(7) Lock Washers: Helical spring type carbon steel, complying with Federal Specification FF-W-84.

C. "C" Beam Clamps:

a. For 1" Conduit Maximum: Caddy Fastener Div./Erico Products Inc. BC-8P and BC-8PSM Series, HIT Spring Steel Fasteners, Inc. CH Series.

b. For 3" Conduit Maximum: Gedney Electric Co. IS-500 Series bean clamp with H50WB Series hangers; Kindorf Elec. Prod. Div. 500 Series hanger; Appleton Electric Co. BH-500 Series beam clamp with H50W/B Series hanger.

c. For 4" Conduit Maximum: Kindorf Elec. Prod. Div. E-231 beam clamp and E-234 anchor clip and C-149 Series lay-in hanger; Unistrut Corp. P2676 beam clamp and P-1659 Series anchor clip with J1-205 Series lay-in hanger.

d. For Threaded Rods (100 lbs. load max.): Caddy Fastner Div./ Erico Products Inc. Cat. No. BC-4A; HIT Spring Steel Fasteners Inc. master clamp MC.

e. For Threaded Rods (200 lbs. load max.): Kindorf Elec. Prod. Div./Midland Ross Corp. 500 Series; Gedney Electric Co. IS-500 Series; Appleton Electric Co. BH-500 Series.

f. For Threaded Rods (300 lbs. load max.): Kindorf Elec. Prod. Div./Midland Ross Corp. E-231 beam clamp and E-234 anchor clip; Unistrut Corp. P2676 beam clamp and P-1659A Series anchor clip.

D. Pipe Straps:

1. Two hole steel conduit straps with Galv-Krom finish, Kindorf Elec. Prod. Div./Midland Ross Corp. C-144 or C-280 Series.

E. Pipe Clamps:

1. One hole malleable iron type clamps, Gedney Electric Co., 14-50 Series; Kindorf Elec. Prod. Div./ Midland Ross Corp. HS-400 Series.

F. Deck Clamps:

1. Caddy Fasteners Div./Erico Products Inc. DH-4-T1 Series. HIT Spring Steel Fasteners, Inc. RD Series.

G. Fixture Stud and Strap:

1. Steel Electrical Products Div. FE-431; Gedney Electric Co. SL-134.

H. Channel Support System and Accessories:

1. Furnish 12 gauge galvanized steel channel and accessories as manufactured by:

a. Kindorf Elec. Prod. Div./Midland Ross Corp.; B-9000 (1½" x 1½"), B-901 (1½" x 1⅞"), B-902 (1½" x 3").

b. Unistrut Corp.; P-3000 (1⅜" x 1⅝"), P-5500 (1⅝" x $2^{7}/_{16}$"), P-5500 (1⅝" x 3¼").

c. B-Line Division - The Brinkley Co.; B-22 (1⅝" x 1⅝"), B-12 (1⅝" x $2^{7}/_{16}$"), B-11 (1⅝" x 3¼").

d. Versabar Corp.; VA-1 (1⅝" x 1⅝"), VA-3 (1⅝" x 2½").

I. Support Fittings for Exposed Conduit System:

1. Ball Hanger: Crouse-Hinds Co. ALC, Appleton Electric Co. AL Series.

2. Flexible Fixture Hanger: Crouse-Hinds Co. UNJ115, Appleton Electric Co. UNJ-50 or UNJ-75, Oz Gedney ECHF-50 or ECHF-75.

3. Flexible (Hook Type) Fixture Hanger: Crouse-Hinds Co. UNH-1, Appleton Electric Co. FHHF.

4. Eyelet: Steel City Electrical Products Div. H-263, Unistrut Corp. M2250.

5. Eyelet with Stud: Steel City Electrical Products Div. H262, Unistrut M2250.

6. Conduit Hook: Crouse-Hinds Co. UNH-13, Appleton Electric Co. FHSN.

2.5 BOXES

A. Outlet boxes:

1. Outlet boxes for concealed work shall be galvanized steel, 4 in. square or octagonal, or as required by construction, devices or wiring, and shall conform to UL's "Standard for Outlet Boxes and Fittings." Outlet boxes shall be provided with a galvanized steel cover or extension ring depth as required. As a minimum, boxes shall be of the following depths and as described for specific applications hereinafter:

Above ceiling	1½" deep.
In ceiling or slab	3" deep.
In wall for fixture	2¾" deep.
In wall for receptacles and switches	1½" deep.
Receiving 1¼" conduit	2½" deep min.

2. Ceiling fixture outlet boxes, except as noted, shall be 4" octagonal and 1⅝" deep and with ⅜" fixture stud. Where cast in slab, boxes shall be open back concrete type.

3. Wall bracket outlets shall be 4" square and 1⅝" deep with cover having 2⅞" round openings and except for lampholders shall be furnished with fixture stud.

4. All outlet boxes for concealed convenience receptacles or local switches shall be 4" square and 1⅝" deep with regular deep switch extension cover, except where installed on columns they shall be of sufficient depth so that conduits may be installed into these boxes in back of fireproofing. Outlet boxes for gang receptacles and switches shall suit space conditions.

5. Outlet boxes for exposed work shall be galvanized cast iron or aluminum with threaded hubs. Except as otherwise required by construction, devices or wiring, the outlet boxes shall be 4 in. round x 2 in. deep for mounting on ceilings and 4 in. square x 2 in. deep for mounting on walls.

6. Boxes shall be of the cast type for switches and receptacles when installed on the exterior of the project. Such boxes shall be aluminum or malleable iron of the threaded hub type, with covers without projecting edges or corners and with openings suitable for the devices to be contained therein. Outlet boxes and covers shall be galvanized or anodized and shall be gasketed.

7. Outlet boxes located outdoors and damp locations shall be weatherproof.

8. Outlet boxes without fixture or device, shall have blank cover.

9. Extension rings shall be provided as required to suit various conditions.

10. Grounding screw and cable wiring connector shall be provided as required by wiring method.

11. Boxes for use with surface mounted raceways shall be of the same construction and manufacture as the raceway.

12. Except where special outlets are required, wall outlets for signaling systems shall be 4" square with single gang raised cover and bushed plate.

13. Junction outlets shall be the same as bracket outlets but without stud, furnished with covers to suit each condition and as directed. Where number of conductors exceed capacity of standard box, provide special size box.

B. Junction and Pull Boxes:

1. Junction and pull boxes shall be made of galvanized sheet steel and with screw-on covers, except as noted, and will include insulated supports for cables.

2. Provide junction and/or pull boxes as noted or as required. all junction and pull boxes shall be accessible.

3. Junction and pull boxes located outdoors and in damp locations shall be galvanized cast iron with threaded hubs and gaskets.

a. Provide barriers in junction boxes or pull boxes between:

(1) 277/480 volt wiring energized from separate services.
(2) 120/208 volt and 277/480 volt wiring.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine locations where raceways and installation components are to be installed, determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Raceways:

1. Install raceways in accordance with applicable requirements of NEC and National Electrical Contractors Association's "Standard of Installation", and in accordance with recognized industry practices.

2. The routing and location of conduit runs are generally not dimensional on the drawings but shall be determined in the field to suit the locations of equipment, to conform to structural features and to avoid interferences. Where exposed conduits are dimensional on drawings, they shall be installed to a tolerance of ½". Coordinate with equipment configuration and exact location prior to connection.

3. Support by means of ceiling trapeze, strap hangers, or wall brackets, structural steel angles or channels. Secure raceways to supports with pipe straps or U-bolts. Spacing of support shall be as per NEC.. Provide U-bolts at each floor level for riser raceways and connect to acceptable supports.

4. Mount supports to structure with toggle bolts on hollow masonry, expansion shields or inserts on concrete and brick, machine screws on metal, wood screws on wood.

5. Keep raceways clear of motor foundations and from underside of boilers. Also, install raceway so that they will not obstruct headroom, doorways, or walkways.

6. Exposed raceways shall be run parallel with or at right angles to walls. In walls, run raceways vertically only.

7. Mechanically join all metal raceways, enclosures and junction boxes to form a continuous electrical conductor. Connect all electrical boxes, fittings and cabinets so as to provide effective electrical continuity and firm mechanical assembly. Maintain grounding continuity of interrupted metallic raceways with ground conductor, sized in accordance with the NEC.

8. Provide long radius bends for empty raceway system where required to satisfy the system cabling requirements.

9. Install complete conduit runs before pulling in wire or cable. Install raceways so that required conductors may be drawn in without injury or excessive strain to raceway or cable. Where raceway size is not indicated, follow applicable code.

10. Do not cross pipe shafts or ventilation duct openings. Route raceway to avoid present or future openings in floor, wall or ceiling construction, when so indicated on the drawings.

11. Keep end of raceways plugged or capped during construction.

12. For empty raceways over 10 ft. long, provide fish or pull wire. Pull wire shall consist of nylon or polypropylene cord.

13. Concrete encased conduits run exposed inside the building shall have Class I concrete encasement. They shall be marked (stenciled) 10 ft. on centers, including in hung ceiling, with the notations, "Danger, High Voltage".

14. Damaged or deformed raceway shall be removed and replaced.

15. Branch circuit conduits shall not be supported by lighting fixtures, piping, etc.

16. For conduits cable entering the building, perform the following:

    a. Plug all empty raceways.

17. Work with extreme care near existing ducts, conduits, cables and other utilities to avoid damaging them.

18. For conduit installation in or under concrete.

a. Where located in slabs, the maximum outside diameter of the conduit shall be ⅓ the slab thickness. When locating in the slab, place conduits in a manner so as not to interfere with the placement of reinforcing bars or cause damage to structural members or structural support.

b. Where located in concrete fill, the conduit shall have a minimum of 1 in. cover.

c. Where located under the building, conduit shall be concrete encased or PVC coated rigid steel.

19. Permitted Uses:

a. Rigid Galvanized Steel Conduit (RGS):

(1) RGS shall be used under slab, for underground installation (PVC coated galv. conduit if direct burial), for exposed runs throughout and in concrete slabs.

b. Flexible steel conduit:

(1) Flexible steel conduit "Greenfield", shall be used for the following applications: for short connections where rigid conduit or tubing is impracticable, from outlet box to recessed lighting fixture with minimum length of 4 ft. and a maximum length of 6 ft., and for final connections to vibrating equipment other than motors and transformers in dry locations only.

(2) For final connections to motor terminal boxes, transformers and other vibrating equipment, the flexible steel conduit shall have polyvinyl sheathing "Sealtite" and a ground conductor. The minimum length of the flexible conduit shall be 18 in. with slack. Connect the ground conductor to the enclosure or raceway at each end.

20. Provide expansion-deflection fittings with bonding jumper at expansion joints and on length of runs in accordance with manufacturer's recommendations.

21. Provide sealing fittings, to prevent passage of water vapors, where conduits pass from warm to cold locations.

B. Sleeves:

1. Sleeves shall be provided in accordance with the following guidelines:

a. Set required sleeves and inserts in place during progress of construction to avoid cutting of completed work.

b. Provide sleeves for raceway passing through floors and foundations. Determine exact location of sleeves in field to avoid interference with structural members or equipment of other trades.

C. Fire-Stops:

1. Where wiring, conduits, cable trays, wireways, and other electrical raceways pass through fire partitions, fire walls, or floors, install an approved fire-stop that provides an effective barrier against the spread of fire, smoke and gases. Firestop material (Heat activated putty and a high temperature fiber material) shall be packed tight and shall completely fill clearances between raceways and openings. It shall be applied concurrently with the installation of the wiring. The fire stop fittings shall have a U.L. classified hourly rating equal to the fire rating of the floor or wall.

2. Floor, exterior wall, and roof seals shall also be made watertight. Mineral wood, oakum, grout or duct seal stuffed into or around penetrations shall not be used.

D. Outlet Boxes:

1. Set boxes square and true with the building finish. Boxes shall be secured to the building structure by adjustable strap irons.

2. Verify outlet locations in finished spaces with Architectural Drawings of interior details and finishes. In locating outlets, allow for overhead pipes, ducts, and variations in arrangement, thickness in finish, window trim and other architectural construction details. Correct any inaccuracy resulting from failure to do so without any additional expense to the Owner.

3. Refer to Architect any condition that would place an outlet box in an unsuitable location, such as a molding, break glass in wall finish, or behind a radiator.

4. Mount outlet boxes for similar equipment at uniform heights. Where mounting height or location of outlets is not shown or specified, mount outlet as best suited for equipment connected thereto, or as directed.

5. Close all unused openings in outlet boxes with knockout closers manufactured for this purpose. Provide blank plates on outlet boxes in which no device is installed or device installed does not provide a suitable cover.

6. Provide barriers between switches connected to different phases for voltages exceeding 150 volts to ground.

7. Securely fasten exposed outlet boxes by attaching to permanent inserts or lead anchors with machine screws. Adequately support all boxes during construction to prevent movement.

E. Panelboard, Junction and Pull Boxes:

1. Panelboard, junction and pull boxes shall be located clear of other trades equipment, accessible, supported from the building structure, and independent of the conduits.

2. Conceal junction and pull boxes in finished spaces.

3. Coordinate size of motor terminal boxes with motor branch circuit conduit and wiring.

END OF SECTION 16111

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SECTION 16117

DUCTBANKS AND MANHOLES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The requirements of this Section apply to electrical underground ductbanks and manholes work required for the protection of electrical feeder lines.

B. The work includes the providing of completely coordinated grounded underground ductbank systems complete with conduit, manholes, handholes, fittings and accessories, as specified and as required for a complete system. Conduit sizes referred to in the Specifications and on the Drawings are nominal internal diameters.

1.3 QUALITY ASSURANCE

A. Manufacturers - Firm regularly engaged in manufacture of ductbanks and manholes of types and capacities required and whose products have been in satisfactory use in similar service for not less than 5 years. Refer to PART 4 of this Section for "APPROVED MANUFACTURERS".

B. Provide ductbanks and manholes which have been listed and labeled by Underwriters Laboratories and comply with applicable portions of National Electrical Manufacturers Association standards.

1.4 SUBMITTALS

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work, and submit shop drawings.

1.5 GUARANTEE

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Raceways

1. Metallic:

a. Wheatland Tube Co.
Triangle Conduit and Cable Co.
Allied Tube & Conduit

2. PVC:

a. Carlon
Queens City
National

3. Precast Concrete Conduit:

a. Concrete Conduit Co.

B. Raceway Fittings

1. O.Z. Electrical Mfg. Co., Inc.
The Thomas and Betts Co.
Appleton Electric Co.

2.2 CONDUIT

A. Rigid steel conduit: Shall be full weight steel pipe, hot dipped galvanized inside and outside, threaded.

B. Intermediate metal conduit: Shall be intermediate steel pipe, hot dipped galvanized, threaded.

C. Conduit for exterior direct burial shall be galvanized rigid steel with PVC jacket. Conform to RN-1. Follow manufacturers recommended installation procedures to maintain continuous integrity of PVC jacket over couplings, etc. Plug ground integrity.

2.3 CONDUIT FITTINGS

A. Couplings and connections in concrete shall be watertight. Thread compounds shall be UL approved conductive type to insure low resistance ground continuity through conduit.

B. Metallic conduit fittings shall be corrosion resistant.

C. Bushings shall be of the metallic insulated type.

D. For weatherproof and dustight installations provide liquid-tight fittings with sealing rings and insulated throat.

E. Material for setting shall be steel or malleable iron only.

F. Rigid steel conduit fittings:

1. Fittings shall be standard threaded couplings, locknuts, bushings, and elbows.

2. Sealing fittings shall be of the threaded cast iron type. Sealing fittings used to prevent passage of water vapor shall be of the continuous drain type.

2.4 HANDHOLES

A. Handhole cover shall consist of a bolted ⅜" checkered steel plate with neoprene gasket.

B. Seal openings watertight and paint exterior with two coats of asphaltic compound.

C. Warning Tape

1. Provide plastic ribbon designed for direct burial in earth; yellow background with black warning letters.

PART 3 - EXECUTION

3.1 DUCTBANKS

A. Handhole Installation:

1. Handholes shall be at locations as directed by Utility Company, Owner or as required by the ductbank routing in correlation with the existing location of other utilities, grades, and paving.

2. The top of frames and covers for handholes shall be flush with the finished surface of pavements, and flush with finished grade in unpaved areas.

3. Frames and covers in roadways and paved areas shall be traffic type. In unpaved areas, frames and covers may be non-traffic type.

4. Ground Rods and Grounding:

a. Drive a ground rod into the earth, before the floor is poured, at a convenient point close to the handhole wall. Ground rods shall protrude approximately four inches above the handhole.

b. Install ground wires around the inside perimeter of the handhole and anchor them to the walls. Connect the wires to the ground rods by the exothermic welding process to form solid metal joints, and bond the ground wires to the exposed non-current carrying metal parts of racks, etc., in the manholes. Also bond the wires to duct bank bare equipment grounding conductors.

B. Duct Line Installation:

1. Duct lines shall be in accordance with the NEC, as shown on the Drawings, and as herein specified.

2. Ducts shall be sloped to drain towards manholes and handholes, and away from building and equipment entrances. Pitch shall be not less than four inches in 100 feet. Curved sections in duct lines shall consist of long sweep bends with a minimum radius of 50 feet in the horizontal and vertical directions. The use of manufactured bends is limited to building entrances and stub-ups to equipment.

3. Underground conduit stub-ups to equipment inside of buildings shall be galvanized rigid steel, and shall extend a minimum of 10 feet clear of foundations. Stub-ups to equipment, mounted on outdoor concrete slabs, shall be galvanized rigid steel, and shall extend a minimum of five feet away from edge of slab. Install insulated grounding bushings on the terminations. Steel conduits shall be coupled to the ducts with suitable adapters, and the whole encased with three inches of concrete.

4. Upon completion of the duct bank installation, a standard flexible mandrel shall be pulled through each duct to loosen particles of earth, sand, or foreign material left in the line. The

mandrel shall be not less than 12 inches long, and shall have a diameter ½" less than the inside diameter of the duct. A brush with stiff bristles shall then be pulled through each duct to remove the loosened particles. The diameter of the brush shall be the same as, or slightly larger than, the diameter of the duct.

5. Seal the ducts and conduits at building entrances, and at outdoor terminations for equipment, with a suitable non-hardening compound to prevent the entrance of moisture and gases.

6. Install concrete encased ducts for both high and low voltage systems, unless otherwise shown on the Drawings.

7. Duct lines shall consist of single or multiple duct assemblies encased in concrete installed with top of duct bank not less than 30 inches below established grade. Ducts shall be uniform in size and material throughout the installation, unless otherwise shown or specified.

8. Provide plastic spaces to maintain the following clearances between individual ducts:

   a. For like services: Not less than three inches.

   b. For power and signal services: Not less than six inches.

9. Couple the ducts with proper couplings. Couplings shall be staggered in rows and layers to insure maximum strength and rigidity of the duct bank.

10. The concrete envelope encasing the ducts shall extend not less than three inches beyond the outside walls of the outer ducts and conduits.

11. Within five feet of building, handhole wall penetrations, install reinforcing steel bars within the top and bottom of each concrete envelope to provide protection against vertical shearing. Where shown on the Drawings, incorporate steel reinforcing in the duct envelopes.

12. Ducts shall be kept clean of earth, sand, or gravel during construction, and sealed with tapered plugs upon completion of each portion of the work.

C. Work with extreme care near existing ducts, conduits, cables and other utilities to avoid damaging them.

D. Inspection

1. Contractor shall examine locations where raceways and installation components are to be installed, determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.

2. Do not proceed with the work until unsatisfactory conditions have been corrected.

E. Installation

1. Install ductbanks and manholes in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that the installation complies with requirements and serves intended purposes.

2. Coordinate with other work as necessary to interface underground installation with other components of systems.

3. Before installing warning tape, backfill trench to within 12 inches of finished grade. Install tape continuously along entire length of trench, and complete backfill operation.

END OF SECTION 16117

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SECTION 16123

WIRE AND CABLE (600 VOLTS)

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The requirements of this Section apply to wire and cable work specified elsewhere in these Specifications.

B. The work includes providing wire and cable complete with all accessories in accordance with Drawings and Specifications and as required for a complete system. Wiring size referenced in this Section shall be AWG, except as noted. For special wiring for individual systems refer to respective Sections of these Specifications.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in the manufacture of wire and cable of specified types and ratings, whose products have been in satisfactory use in similar service for not less than 5 years. Refer to PART 4 of this Section for "APPROVED MANUFACTURERS".

B. Provide wire and cable which has been listed and labeled by Underwriters' Laboratories, and comply with applicable portions of National Electrical Manufacturers Association Standards.

C. Comply with National Electrical Code (NFPA No. 70) and local electrical codes which apply for construction and installation of wire and cable. Where discrepancies arise between codes, the most restrictive code shall apply.

1.4 SUBMITTALS

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work, and submit shop drawings.

1.5 GUARANTEE

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Wire and Cable under 600 Volts

1. For Wire and Cable:

a. BICC Co.
b. Pirelli Cable Corp.
c. Okonite

2. For Wire and Cable Termination and Connections:

a. Thomas and Betts Corp.
b. Burndy Corp.
c. Elastimold
d. G&W Electric Co.

2.2 600 VOLT WIRE AND CABLE

A. Conductors:

1. All conductors shall be copper.

2. No. 10 and smaller conductors shall be ASTM Standard, solid, copper. No. 8 and larger conductors shall be ASTM standard, stranded copper.

3. Communications and signal wiring shall conform to the recommendations of the system manufacturers and shall be as specified in respective Sections of these Specifications.

B. Insulation:

1. Rubber and thermoplastic insulation shall comply with ASTM and IPCEA standards.

2. Minimum insulation shall be UL rated for 90°C. Types THWN, USE, RH, RHW.

3. Insulation rated 90°C may be used in lieu of the above. Types FEP, MI, PFA, THHN, XHHW.

4. Conductor ampacity rating shall be based on 75°C insulation.

5. Types and application:

a. DHN or XTHW shall be used for interior branch circuit and feeder wiring.

b. THWN and THHN may be provided for rewiring in existing conduit.

c. Conductors with insulation rated 90°C shall be provided in high ambient temperature areas and for branch circuit wiring connecting the fluorescent fixtures.

d. Bare conductors shall be permitted for grounding where so indicated in GROUNDING Section of Specifications.

C. Wire Sizes

1. For General Use:

   a. No. 12 minimum copper wire shall be used for lighting and power.

   b. No. 10 minimum copper wire shall be used for 20 Ampere circuit, at 120 Volts, over 60 ft. in length.

   c. No. 10 minimum copper wire shall be used for 20 Ampere circuits, at 265 Volts, over 175 ft. in length.

2. For Control and Alarm Wiring, unless otherwise noted:

   a. No. 14 minimum copper wire.

   b. No. 12 minimum copper wire for 120 Volt circuits over 60 ft. in length.

3. For Other Voltages and Phases and for Longer Circuit Lengths:

   a. Size wire as required to maintain NEC permissible voltage drop.

4. Raceways:

   a. Increase raceway sizes for larger wire sizes in conformance with NEC requirements.

D. Color Coding

1. Phase wires shall be color-coded as follows:

   a. 120/208 Volt system:
      Black - A phase
      Red - B phase
      Blue - C phase

   b. 277/480 Volt system:
      Brown - A phase
      Yellow - B phase
      Orange -C phase

2. Neutral conductors shall be white for 120/208 Volts and white with gray stripe for 277/480 Volts.

3. Equipment ground wire shall have a green outer covering throughout.

4. Where color-coded cable is not available, certify in writing and request permission for overlap color taping conductors (minimum length 6 in.) in accessible locations.

5. Conductors for control circuits and signal systems shall also be consistently color coded to avoid confusion and permit easy identification of conductors. The IPCEA color code shall be used wherever possible. No two wires in the same raceway shall be the same color, unless provided with flameproof linen identification tags on each end.

PART 3 - EXECUTION

3.1 GENERAL

A. Install wire and cable in accordance with the NYCEC, The National Electrical Contractors Association's "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended functions.

B. 600 Volt Wire and Cable:

1. Wire and cable shall not be drawn into conduit and raceways until all conduit work is complete, joints made up tightly and the entire run secured in place.

2. The inside of conduits and raceways shall be dry and clean before conductors are pulled.

3. Care shall be exercised in pulling to avoid damage to the wire or cable. Lubricants shall be used for pulling wire or cable if the character of the pull might otherwise damage the conductors, insulation or jacket. No thermoplastic wires shall be pulled at temperatures lower than 0°C.

4. Cables shall be supported at the upper end of all risers and at intermediate points as required by the NEC. Supports shall be O.Z. Type "R", insulation wedges or Kellens grips, or approved equal.

5. Seal conduit with a non hardening compound approved for the purpose, where cable or wire enter building from underground.

6. Cable spacers shall be installed where required. Spacers shall consists of galvanized or cadmium plates, steel or malleable iron threaded conduit and fittings and insets of non-metallic insulating material with openings adequate to accommodate cables being spaces. Cable spaces shall be O.Z. Mfg. Co., Inc. Type E or Type EL, with grounding lug, or approved equal.

7. Not more than 3 lighting or convenience receptacle circuits shall be installed in one (1) conduit, unless otherwise indicated on Drawings.

8. Separate raceways shall be provided for conductors of 120/208 Volt and 277/480 Volt systems, except for 480 Volt motor branch circuit wiring and related 120 Volt control wiring which may be installed in common raceway.

9. Provide individual raceways for two pole ungrounded circuits.

10. In certain systems, equipment furnished by an approved manufacturer may require a different number and arrangement of conductors from those indicated on the Drawings. In such cases, the Contractor for the work under this Division shall comply with such requirements at no additional cost to the Owner.

11. In the event the Contractor for the work under this Division or Section chooses to furnish and install a system or item of equipment of different arrangement from that shown or specified, he shall furnish and install any additional wiring and conduit required by the system at no additional cost to the Owner.

12. In wireways and large pull boxes, lace and tie off conductors in groups of 3 phases and neutral (if used) to limit conductor unbalanced loading. Conductor group shall be as installed in conduit.

13. Tag all feeders and risers in all pull boxes and in all gutter spaces through which they pass. Tags shall be engraved white core nameplates identifying feeders as shown on the Drawings or the circuit protective device from which they originate.

14. Leave all wires with sufficient slack at terminals ends for convenient connections and fixtures and for convenient servicing. Stow loose ends neatly in outlet box.

C. Terminations, Splices and Connections:

1. Splices and taps shall be made in accessible boxes, panelboard fittings, gutters, terminal panels, etc. only. Materials shall be compatible with the conductors, insulations and protective jackets on the cables and wires.

2. All copper conductors No. 8 & larger shall be terminated, spliced, and tapped with color-keyed compression connectors, as manufactured by Thomas & Betts Co., Series 54000, Ideal Industries Series 87000, or approved equal. The manufacturers recommended tooling shall be used. Mechanical type connectors shall not be used.

3. All copper conductors No. 10 AWG & smaller shall be terminated and spliced with Ideal Industries wing-nut wire connectors, or approved equal compression connectors. The flame-retardant, thermoplastic insulated type shall be used to isolate the terminal from other metal parts and equipment.

4. Splices and joints shall be insulated with materials approved for the particular use, location, voltage, and temperature. Insulation shall be not less than that of the conductors being joined.

5. Plastic electrical insulating tape shall be flame retardant, cold and weather resistant.

D. Cable Tying:

1. All circuit and control wiring in cabinets, panels, pullboxes, wireways, and junction boxes shall be tied and held with nylon Ty-Rap cable ties as manufactured by Thomas & Betts Co., or approved equal.

2. Wire identification ties fastened to conductors at the point of attachment to terminal blocks and equipment components shall be nylon, self-locking Ty-Raps as manufactured by Thomas & Betts Co., and Ideal Industries Series Ty-51M, 53M, or approved equal.

E. Tags:

1. Cables shall be tagged in all wireways, pull boxes, wireways and wiring gutters of panels. Where two or more circuits run to or through a control device, outlet box or junction box, each circuit shall be tagged as a guide in making connections.

2. Tags for feeders shall indicate feeder number, size, phase, voltage, origin and termination. Feeder tags shall identify all phases individually.

3. Tags for control and alarm wiring shall indicate type of control or alarm, size of wire and origin and termination.

4. Tags shall be Thomas Betts Co., Ideal Industries, wire-marker dispenser type, self laminated wire markers.

F. Lubrication:

1. Wire lubricating compound shall be suitable for the wire insulation and conduit with which it is used, and shall not harden or become adhesive. Lubricating compound shall be Ideal Industries Yellow 77 Type, or approved equal. Lubricating compound shall not be used on wire for isolated type electrical power systems.

G. Inspection:

1. Contractor shall examine the areas and conditions under which wire and cable are to be installed, and notify Architect in writing of conditions detrimental to proper and timely completion of the work.

2. Do not proceed with the work until unsatisfactory conditions have been corrected.

H. Installation:

1. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.

3.2 FIELD QUALITY CONTROL

A. Visual and Mechanical Inspection:

1. Inspect for physical damage and proper connection in accordance with single line diagram.

2. Cable connections shall be tightened using a calibrated torque wrench.

B. Electrical Test:

1. Megger conductors phase-to-phase and phase-to-ground for continuity and insulation tests before connection to utilization devices for the following:

a. 100 percent of feeders
b. 100 percent of branch circuits
c. 100 percent of 3-phase motor branch circuits.

2. Verify phase rotation for all 3-phase motor circuits.

C. Perform tests prior to connecting equipment and in presence of authorized representatives.

D. Exercise suitable and adequate safety measures prior to, during, and after the high potential tests, including placing warning signals and preventing people and equipment from being exposed to the test voltages.

E. Submit certified written report of test results to Architect.

F. Correct installation of or replace cable testing below manufacturer's standards.

G. Subsequent to wire hook-ups, energize circuit and demonstrate functioning in accordance with requirements.

END OF SECTION 16123

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SECTION 16141

WIRING DEVICES AND INSTALLATION COMPONENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1. Generally, the location of devices and outlet boxes in finished rooms or spaces shall be where indicated. In the case of special rooms and areas, e.g., operating rooms, locations shall be obtained from Architect and from his scaled drawings of interior details and finish. All local switches near doors shall be located at strike side of door as finally hung, whether so indicated on the plans or not, unless specifically indicated otherwise.

2. Except as otherwise indicated or where shown on Architect's details, the following dimensions from finish floor to center of outlet shall be established.

a.	Bracket outlets in stairs	7'-6" in stairs
b.	Receptacle outlets, unless otherwise noted	1'-6"
c.	Receptacle outlets in mechanical spaces	3'-6"
d.	Wall switch outlet	3'-6"
e.	Wall push button	3'-6"
f.	Fire alarm station	3'-6"
g.	Fire alarm horn/strobes.	6'-8"
h.	Fire alarm strobes:	6'-8"
i.	Telephone outlet for wall phone	4'-0", or as required
j.	Motor controllers	5'-0"
k.	Safety and disconnect switches	5'-0"
l.	Panelboards (lighting and power)	6'-6" above finished floor to top
m.	Exit lights, where wall mounted	2" above door bottom of light

C. Receptacles listed in this Section of the Specification shall be of the type indicated, or approved equal to the Manufacturers listed. Where furnished under this Section of the Specification, provide matching plugs for each receptacle.

D. Where indicated, switch and receptacle shall be combined.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all wiring devices in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of wiring devices and installation components, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Provide wiring devices and installation components produced by a manufacturer listed as an Approved Manufacturer in this Section.

C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include manual motor starters, multi-outlet systems, wireways, floor boxes, receptacles and local wall switches.

1.5 GUARANTEE

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Wiring Devices

1. General Electric Co.
2. Harvey Hubbell Incorporated
3. Bryant Electric Co.
4. Arrow Hart
5. Leviton
6. Pass & Seymour

B. Miscellaneous Installation Components

1. Refer to Respective Articles.

2.2 WIRING DEVICES

A. Local Wall Switches:

1. Switches shall be heavy duty, toggle, quiet type, fully enclosed in composition cases, with grounding screw.

2. Switches shall be rated 20 amp, 120/277 volt, AC.

3. Switches shall be as indicated below, or approved equal:

a. Single Pole: Hubbell No. 1221

B. Receptacles:

1. Receptacles shall be the grounding type, (except as otherwise noted) composition base, meeting NEMA standards, publication WD-1-1971.

2. Where it is not possible to set the outlet box flush into the wall, furnish raised edge plates. Convenience receptacle shall be mounted with ground pole up, except those mounted above counter levels.

3. Receptacles shall be as indicated below or approved equal:

a. Duplex Convenience Receptacles: 125 Volts, 2-Pole, 3-Wire, U ground slot type.

(1) 20 Amp. Hubbell No. 5362 (20 Amp circuits).

b. Single Receptacles: 20 Amp, 125 Volts, 2-Pole, 3-Wire, twist-lock type, Hubbell No. 2310.

c. Outdoor Receptacles: 20 Amps, 125 Volts, 2-Pole, 3-Wire, U ground slot type, duplex convenience receptacle, with weatherproof cover, Hubbell No. 5221.

d. Ground Fault Interrupter Duplex Receptacles, 20 Amp.: Hubbell No. GO-5262. Hubbell No. GO-5262-R when on emergency circuit.

C. Switch, Receptacle, and Signaling Outlet Plates:

1. Plates shall be stainless steel, chrome finish Type 302, .035" thick.

2. Surface mounted wiring devices and blank outlet plates shall be cadmium plated. Interior outlet plates shall be pressed steel. Outlets exposed to weather or corrosive conditions shall be of the cast-metal type.

3. Plates for weatherproof receptacles shall consist of cast-aluminum gasketed plate with spring-loaded lift covers providing access to the outlet. Lift cover to correspond to number of outlets to be gasketed. Plates for weatherproof switches shall consist of a cast plate with flexible bubble for activating a push type switch. Plates shall be for corrosion-resistant devices, as manufactured by Hubbell, Inc., or approved equal.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine location where wiring devices and installation components are to be installed, determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wiring devices and installation components where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that installation complies with requirements and serves intended purposes.

B. Coordinate with other work as necessary to interface installation of wiring devices and installation components.

C. Installation shall comply with the requirements of NEC and NECA, "Standard of Installation".

D. Provide recirculating motor shut-off switch for spas, hot water tubs, etc., not more than 5'-0" away, adjacent to and within sight.

E. Install devices only after wiring is completed.

F. Install receptacles and switches only in electrical outlet boxes which are clean, free from debris, excess building materials, etc.

G. At time of completion, replace items which have been damaged, including those burned and scorched by faulty plugs.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of wiring devices and installation components, and after connection to power source, test wiring devices and installation components to demonstrate compliance with requirements. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

B. Test wiring devices and installation components to ensure electrical continuity of grounding connections.

END OF SECTION 16141
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SECTION 16165

250 AND 600 VOLT FUSES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, the fuses as shown in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of fuses whose products have been in satisfactory use in similar service for not less than 5 years.

B. Provide fuses produced by a manufacturer listed as an Approved Manufacturer in this Section.

C. Provide equipment whose performance under specified conditions is certified by the manufacturer.

1.4 SUBMITTALS

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 GUARANTEE

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work. Shop drawings shall include cuts and time current curves.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. 250 and 600 Volt Fuses

1. Bussmann
2. Cefco
3. Shawmut

2.2 250 AND 600 VOLT FUSES

A. All fuses shall be of the same manufacturer. Fuses shall not be installed until equipment is to be energized. All fuses shall have a 200,000 ampere RMS symmetrical interrupting rating unless specified otherwise. Fuse symbols in parentheses are those of Bussmann.

B. Fuses: 601 to 6000 Amperes shall be UL Class L (KRP-C), with time-delay characteristics of 10 seconds or more,at 500% of current rating.

C. Fuses: Up to 600 Amperes shall be UL Class "J",(JKS fast acting), for non-inductive loads and UL Class "J" (LPJ time delay) for inductive loads.

D. Spare Fuses:

1. A complete set of spare fuses shall be purchased at the same time the initial fuses are purchased. Spare fuses shall consist of a standard carton for 0 to 60 amperes rating. For above 60 amperes rating provide 10% of each type and rating, or a set of three, whichever is greater.

2. Spare fuses shall be placed in one or more spare fuse cabinets as required. The spare fuse cabinet shall be 30 in. H x 24 in. W x 12 in. D with key lock door, center shelf and fuse index holder. Include one set of fuse bulletins in the fuse cabinet.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine location where fuses are to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fuses where shown or required, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that installation complies with requirements and serves intended purposes.

B. Installation shall comply with the requirements of NEC and applicable portions of NECA's "Standard of Installation".

C. Contractor shall install Class R fuse rejection kits on all heavy duty safety switches not already fitted for Class R fuses.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of fuses, test and inspect system to ensure compliance with requirements.

B. Final tests and inspections shall be made prior to energization of the equipment. This shall include a thorough cleaning, tightening and review of all electrical connections and inspection of all grounding conductors.

END OF SECTION 16165

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SECTION 16170

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all grounding in accordance with Drawings and Specifications and as required for a complete system.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of the type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 10 years. Refer to Approved Manufacturers in this Section.

B. Provide equipment whose performance under specified conditions is certified by the manufacturer and comply with applicable publications of NFPA and UL.

C. Grounding shall comply with National Electrical Code (NFPA 70) for construction and installation.

D. For patient care area electrical power systems, grounding shall conform to Article 517 of the NEC.

1.4 SUBMITTALS

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include manufacturer's catalog cuts of splice kits, ground rods and ground wire.

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Ground Rods

1. Carolina Galvanizing
2. Weaver Electric

2.2 GROUNDING

A. Ground rods shall be copper clad steel not less than 3/4 inch diameter and 10 foot long.

B. Ground clamps shall be bronze, solderless type with bronze screws suitable for receiving required or specified conductors.

C. Grounding conductors shall be UL and NEC approved types, copper, with insulation color identified green, except where otherwise shown on the Drawings, or specified.

D. Ground bushings shall be hot-dipped galvanized fitting with a molded phenolic fitting and shall have a tin-plated copper lay-in-lug 150°C insulation on phenolic fitting.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine locations where grounding is to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of work.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. The complete electrical installation shall be permanently and effectively grounded ahead (street side) of the cold water meter in accordance with all code requirements, whether or not such connections are specifically shown or specified. Measured resistance to ground shall be 5 ohms, maximum.

B. Parts of the electrical installation to be grounded shall include, but not be limited to, the following: underground distribution; outdoor substation service equipment, electric service system neutral, raceway system for light and power distribution systems, cabinets, housings and neutrals of transformers, motor frames, housings of ALL communications, alarm, and control panels and associated devices and conduits, lighting fixtures, lightning protection system, individual starters, convenience power receptacles, wall lighting switches, and other non-current carrying metal parts of electrical equipment. The interconnecting of the service ground, system neutral, and equipment ground conductors shall be made within the service equipment assembly.

C. All copper bars for grounding shall be medium hard drawn. After installation, the copper bar shall be painted with one coat of an approved lacquer.

D. Ground conductors shall be of sizes and material in accordance with the requirements of the National Electrical Code. Cable for grounding connections shall be bare in accordance with the latest revisions of ASTM Designations B3 and B8. All open bare grounding cable shall be secured in place with cast one hole malleable clamps and clamp backs, and 1/4 inch bolts.

E. Ground wires shall be continuous without splices. There shall be no soldered joints in any ground connection. Connectors, clamps, etc. shall be solderless type.

F. Unless otherwise shown or required, conduit shall provide grounding for motors and electrical equipment.

G. Ground outdoor electrical equipment to driven ground rods.

H. Ground interrupted metallic raceways with ground conductors connected to metallic raceway at each end.

I. Ground rods shall be vertically driven with tops below grade. Where required to obtain the specified ground resistance, install multiple rods.

J. Separately ground center taps of wye connected transformers. Provide bonding connection to the nearest metallic water piping in accordance with National Electrical Code (NFPA 70).

K. Bond all conductive piping systems in the buildings to the electrical system ground. Bonding connections shall be made as close as practical to the water pipe or service equipment ground bay.

L. Bond the lightning protection system to the electrical system grounding electrode.

Steel columns may be used in lieu of ground rods provided the columns are extended minimum 10' below grade and their concrete encasement has direct contact with earth.

M. Where ground connections will be permanently concealed, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connections.

N. Where rock prevents the driving of vertical ground rods, install grounding electrodes in horizontal trenches to achieve the specified resistance.

O. Services at power company interface points shall comply with the power company ground resistance requirements.

P. Connect lightning arrestor grounds to the equipment ground bus, or ground rods as applicable.

Q. For duct banks and handholes provide a bare equipment grounding conductor in each duct bank containing medium or high voltage cables. Connect the grounding conductor to the switchboard ground bus, to all the handhole hardware, to the cable shielding of medium or high voltage cable splices and terminations, and equipment enclosures.

3.3 FIELD QUALITY CONTROL

A. Upon completion of grounding system, test system for continuity and resistance to demonstrate compliance with requirements and submit certification to Architect that material and installation has been properly installed.

B. Inspect all connections prior to concealing same.

END OF SECTION 16170
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SECTION 16180

POWER, CONTROL AND ALARM WIRING SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all power wiring from service equipment to distribution and utilization equipment, and control and alarm wiring for equipment and systems within the building, except as noted, in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

A. Power, control, and alarm wiring systems (NFPA 70) for construction and installation.

1.4 SUBMITTALS

A. Refer to Section 15010 - Special Requirements for Mechanical and Electrical Work, and submit shop drawings.

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. Raceways and installation components shall be as specified in Section Raceway and Installation Components.

2.2 CONDUCTORS

A. Conductors shall be as specified in Section Wire and Cable.

2.3 DISCONNECT SWITCHES AND MANUAL MOTOR STARTERS

A. Disconnect switches and manual motor starters shall be as specified in another Section of the Specification.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine locations where power, control and alarm wiring is to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wiring, in accordance with manufacturer's written instructions, and with recognized industry practice to ensure that equipment complies with requirements and serves intended purpose.

B. Coordinate with other work as necessary to coordinate installation of wiring with other components of system.

C. Installation shall comply with the requirements of NEC and applicable portions of NECA's "Standard of Installations".

D. Install distribution system for light and power.

1. Furnish and install all necessary conduit and wire, fittings, apparatus, etc., from the service locations to each and every outlet as herein detailed, or shown on the Drawings. The entire system shall be left ready for operation.

2. The interior distribution system, in general, shall consist of 3-Phase, 4-Wire mains at 277/480 Volts or 120/208 Volts, for mains and feeders of each distribution system respectively. The load on all feeders shall be balanced as nearly as possible on the three phases.

3. Pull and Splice Boxes

   a. Pull and splice boxes shall be constructed of code gauge galvanized steel, or aluminum, reinforced, where required, and with removable covers fastened with brass machine screws. Where size of box is not indicated, it shall be of sufficient size to pull, rack and splice the conductors to be contained therein. Box dimensions shall conform to requirements of NEC.

   b. Pull and/or splice boxes shall be accessible and located where indicated on the Drawings or required to facilitate pulling of conductors or in raceway runs that have more than four (4) 90-degree turns.

   c. Boxes shall have a prime coat of zinc chromate paint and a finish coat of gray enamel. Surfaces to be field painted shall be finished in flat gray.

4. Distribution of Feeders and Branch Circuits

   a. Branch circuits shall be concentrated at the panelboards indicated and the circuits must be so connected that the load on each side of the system will balance within ten percent with all lamps operating.

   b. The sizes of all cables and wires and the minimum size of conduit in which they shall be pulled shall in all cases conform to NEC as a minimum requirement.

c. The general arrangement of feeders and mains is shown on the Light and Power Riser Diagrams and associated panel Schedules on the Drawings.

d. The Contractor, in providing this installation, shall balance all loads as evenly as possible on all phases at each panel, if necessary, he shall reconnect branch circuits as required to provide equal phase balance. As-built drawings and panel schedules shall reflect circuiting as actually connected to each panel.

5. Cable Support Boxes

a. Cable support boxes shall be installed at locations and of dimensions as required by the NEC. These boxes shall be built of steel, or aluminum, with removable cover secured by brass machine screws and shall be stiffened with heavy angle irons. Cable supports shall be OZ type "S". Boxes must in all ways be satisfactory to the Architect and subject to his approval. Provide ground lug in box, secured by welding or brazing. Submit shop drawings for approval.

6. Painting

a. Panel boxes, support boxes and pull boxes not hot dip galvanized shall be given two shop coats of gray enamel both inside and out. Similarly, concealed iron work shall be given two coats of asphaltum paint. All finish painting of exposed work will be done under another Section of the Specifications.

7. Submit for approval, working drawings showing section and elevation of horizontal and vertical runs of the riser shaft at foot of shaft and at each critical location at which a support box occurs on a scale of 3 inches to the foot, and showing routing of all conduits, cable support boxes, pull boxes, hangers, panelboards and supports. These drawings shall be prepared from dimensions obtained at the building.

E. For Motor Power Wiring

1. Run all power feeds and connections from power panels to all motor starters or control panel locations. Where shown on Drawings connect the motor starting devices for motors, supplying and installing all necessary connections between starters and control devices and motors, in conduit, and leave motors ready to start. The power supply leads to the motors from the starters or control panels shall be of the same size and number of the other leads required for the proper operation of each motor.

2. Examine motors for presence of moisture prior to installation. Install, properly align and check rotation of motors that are not part of a completely assembled unit. Lubricate all motors according to the manufacturer's instructions prior to being placed into service.

3. Check motor nameplates for full-load current rating and allowable temperature rise to determine overload heater elements. Install correct heater element in the corresponding starter.

4. Furnish motor safety disconnect switches for all motors, except where such switches are specified to be furnished under other Sections, or are included in the equipment control panel. Install all motor safety disconnect switches furnished under this Section or Section 15000 of the Specification. Provide (6) wires from starters to two speed, three-phase motors. Switches shall be as specified elsewhere in these Specifications. Install manually-operated devices, such as push-buttons and manual starters to permit convenient operation and be readily accessible.

5. Under no circumstances install rigid conduit terminated in or fastened to motor frame or base, and connecting conduits shall not be used to support starters or control enclosures. Install flexible conduit, Anaconda "Sealtite", at all motor connections to prevent transmission of noise or vibration. Length and radius of flexible conduit shall be sufficient to permit bending of feeder cables without damaging the conductor or its insulation. Allow sufficient slack for movement of the motor over the entire slide rail length.

6. The starters will be furnished to the site under Section 15000 and shall be received and erected under this Section. Where indicated on plan, starters shall be individually or group mounted, plumb and level, on free-standing angle iron frames, supplied under this Section. Frame shall be set as close to the motors as possible. Where indicated mounted on walls or columns, this Contractor shall install flat or angle iron supports for the starters.

7. Provide manual motor starters for all fractional horsepower motors as shown on the Drawings, or otherwise required.

8. Electrical contractor shall provide motor suppliers with the minimum size of motor terminal blocks required for the wiring of the motors.

F. For Elevator Motors Power Rating

1. Provide power feeders and disconnect switches for elevators located in the Elevator Machine Room. Power feeder shall consist of cable in conduit to the disconnect and from the disconnect to elevator control panel. Leave sufficient slack cable at elevator control panel for terminal connections by the Contractor for Elevator Work.

2. Provide separate branch circuit wiring and junction boxes for light, telephone and alarm trail cables located at midpoint of elevator shaft or in Elevator Machine Room. Exact location and type of junction box will be determined by the Contractor for Elevator Work.

3. Connection to elevator control panel and all wiring and Electrical Work beyond elevator control panel and junction boxes will be done under another Section of the Specification, except for connection of elevator recall wiring to fire alarm control panel.

G. For Lighting Control Wiring

1. All control conductors shall be copper, minimum #14 AWG type THN, 600 volt insulated, installed in conduit. All conductors shall be tagged with brass or aluminum tags, permanently attached, giving the system designation and terminal number, or other such designation as approved.

2. Control wiring shall be based on schematic control diagrams shown on Drawings, or on control diagrams submitted by Equipment Manufacturers.

3. Actual wiring between equipment and devices shall be done from point-to-point wiring diagrams showing the terminal connections on each piece of equipment. Obtain the individual equipment wiring diagrams from the vendor who supplies the system and equipment to be wired, and prepare neat point-to-point diagrams showing the actual wire and conduit and interconnections between the various equipment and control devices. After installation, correct these diagrams to show the "As-Installed" conditions for the Record.

3.3 FIELD QUALITY CONTROL

A. Upon completion of power, control and alarm wiring, and after associated systems have been energized, test power, control and alarm wiring to demonstrate compliance with requirements. Field correct or replace defective wiring, and retest.

END OF SECTION 16180

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SECTION 16421

UTILITY SERVICE ENTRANCE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, electric service as shown on the Drawings and hereinafter specified.

B. Equipment and wiring shall be provided and installed in part by GPU referred to as Utility Company and in part under this contract.

1.3 QUALITY ASSURANCE

A. All work shall be performed in accordance with all rules, regulations, and standards of Utility Company, and all applicable codes.

B. Where deemed necessary, perform all work under the supervision of the Utility Company representative.

1.4 SUBMITTALS

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 ELECTRIC SERVICE

A. The following work shall be performed by the Utility Company:

1. Service wiring as noted

B. The following work shall be performed by the Contractor.

1. Arrange with the Utility Company for service facilities and pay all charges.

2. Extend service from Utility Company termination.

3. Provide sleeves for service entrance raceways.

4. Obtain Utility Company approval for all electric service work and service equipment shop drawings.

5. Provide all associate installation components and accessories.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine location where electric service equipment and raceways are to be installed, determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.

3.2 INSTALLATION

A. Install equipment and components where shown or as directed, in accordance with Utility Company's instructions (where applicable), and with recognized industry practices, to ensure that installation complies with requirements and serves intended purposes.

B. Coordinate with other work as necessary to coordinate installation of equipment with other components of systems.

END OF SECTION 16421
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SECTION 16440

SAFETY AND DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all safety and disconnect switches (fused and unfused) in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of the type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Safety and disconnect switches shall comply with applicable standards of NEMA and shall be listed and labeled by Underwriters' Laboratories, Inc. Switches shall be approved for service where required, (and approved for use in New York City in accordance with NYCEC).

C. Comply with NEC (NFPA 70) for construction and installation of safety and disconnect switches.

D. Provide safety and disconnect switches produced by a manufacturer listed as an Approved Manufacturer in this Section.

E. Provide equipment whose performance under specified conditions is certified by the Manufacturer.

1.4 SUBMITTALS

A. Refer to Section 15000 Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include switch dimensions, ratings and NEMA enclosure types.

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Safety and Disconnect Switches

1. Square D

2. Westinghouse
3. General Electric

2.2 SWITCH INTERIOR

A. All switches shall have switch blades which are fully visible in the OFF position when the door is open. Switches shall have removable arc suppressors, where necessary to permit easy access to line-side lugs. Lugs shall be UL listed for aluminum and/or copper cables and front removable. All current carrying parts shall be plated. 30A thru 100A switches shall have provisions for field installed fuse pullers. Switches shall include solid neutral where required.

2.3 SWITCH MECHANISM

A. Switches shall have a quick-make and quick-break operating handle and mechanism which shall be an integral part of the box, not the cover. Switches shall have a defeatable dual cover interlock to prevent inadvertent opening of the switch door in the ON position or closing of the switch mechanism with the door open. Handle position shall indicate if switch is ON or OFF. Handle shall have provision for padlock.

2.4 ENCLOSURES

A. Enclosures shall be NEMA 1 enclosure except as otherwise noted or required with multiple knockouts on all sides and back, hinged door, and cover interlock which prevents door from opening when switch is in ON position. Enclosure shall have provisions for positive padlocking in ON and OFF positions.

B. For exterior installations, the enclosures shall be NEMA 3R (raintight).

C. All enclosures shall be the NEMA types which are most suitable for the environmental conditions of the area.

2.5 RATINGS

A. Switches shall be rated for voltage, poles, amperes, and horsepower, as required or shown on Drawings. All switches shall be rated for maximum available fault current as required and/or as noted.

2.6 FUSES

A. Fused safety and disconnect switches shall be provided with fuses of class, type, and rating as required or shown on Drawings.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine locations where safety and disconnect switches are to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of work.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install safety and disconnect switches as required by all applicable codes and as shown on Drawings. Install safety and disconnect switches in accordance with manufacturer's written instructions, the applicable requirements of NEC, recognized industry practices, and applicable portions of NECA's "Standard of Installation".

B. Coordinate with other work as necessary to interface installation of safety and disconnect switches with other equipment in the area.

C. Coordinate safety and disconnect switch installation work with electrical raceway and cable work as necessary for proper interface.

D. Install disconnect switches within sight of motor-driven appliances, and motors and controllers, unless otherwise indicated.

E. Provide nameplate on switch, indicating equipment served.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of safety and disconnect switches, test and inspect system to ensure compliance with requirements. When possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment which cannot be satisfactorily corrected.

B. Close all switches to check for proper energization of all loads.

END OF SECTION 16440

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SECTION 16461

DRY-TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all dry type transformers in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

A. "Manufacturer": Firms regularly engaged in manufacture of this equipment with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 10 years. See Approved Manufacturers in this Section.

B. Provide dry type transformers whose performance under specified conditions is certified by the manufacturer.

C. Transformers shall be listed and labeled by Underwriters Laboratories, and shall comply with standards of NEMA and NEC (NFPA 70) for construction and installation.

1.4 SUBMITTALS

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work, and submit shop drawings. Shop drawings shall include cuts and location drawings.

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Dry-type Transformers

1. Square D
2. Westinghouse
3. General Electric
4. Hevi Duty

2.2 STEP-DOWN DRY TYPE TRANSFORMERS

A. Furnish and install, where indicated on the Drawings, dry-type transformers of rating and type shown on Drawings and as described below.

B. Three phase transformers shall be 480 volt delta primary 208Y/120 Volt, 3-Phase, 4-Wire secondary, 150°C temperature rise above 40°C ambient.

C. Transformer coils shall be of the continuous wire wound construction and shall be impregnated with non-hygroscopic, thermosetting varnish. Each layer shall have end fillers, or tie downs, to provide maximum mechanical strength. Materials used shall have a minimum of one year of proven field usage. Insulation system shall be component recognized by Underwriter's Laboratories. The coils shall also have a final wrap of electrical insulating material to prevent mechanical injury to the wire as well as increasing the electrical breakdown strength. Coils with exposed wire will not be acceptable.

D. All cores shall be constructed of high grade, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point.

E. The core laminations shall be clamped together with structural steel angles. The completed core and coil shall then be bolted to the base of the enclosure by isolator from the base of the enclosure by means of rubber vibration-absorbing mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure. The vibration isolation system shall be designed to provide a permanent fastening of the core and coil to the enclosure. Sound isolating systems requiring the complete removal of all fastening devices will not be acceptable.

F. The entire transformer enclosure shall be degreased, cleaned, phosphatized, primed, and finished with a grey baked enamel.

G. The maximum temperature of the top of the enclosure shall not exceed 35°C rise above a 40°C ambient.

H. The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable NEMA and NEC Standards.

I. Sound levels shall be guaranteed by the manufacturer not to exceed 45 DB.

J. The transformer shall be listed by Underwriter's Laboratories for the specified temperature rise.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine location where this equipment is to be installed, determine space conditions and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment complies with requirements and serves intended purposes. Install the transformers with adequate air circulation for removal of the heat produced by transformers.

B. Coordinate with other work as necessary to harmonize installation of transformers with other equipment in the area.

C. Installation shall comply with the requirements of NEC and applicable portions of NECA's "Standard of Installation".

D. Coordinate installation of transformers with cable and raceways installation work.

E. Anchor mounting hardware firmly to walls, floors, or ceilings to ensure enclosures are permanently and mechanically secured. Provide all hardware and accessories for proper mounting including vibration mounts designed to suppress transformer noise and vibration.

F. Use flexible metal conduit to contain the conductors from the transformer to the raceway system.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of transformers and after transformers have been energized, test equipment to demonstrate compliance with requirements. Field correct or replace defective equipment, and retest.

END OF SECTION 16461
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SECTION 16470

PANELBOARDS - LIGHTING AND DISTRIBUTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Sections 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all panelboards in accordance with the Specifications and Drawings.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of panelboards and enclosures whose products have been in satisfactory use in similar service for not less than 5 years. Refer to list of Approved Manufacturers in this Section.

B. Panelboards, enclosures and accessories shall be listed and labeled by Underwriters' Laboratories, and shall comply with standards of NEMA and NEC (NFPA 70) for construction and installation.

1.4 SUBMITTALS

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include panelboard dimensions, schedules with all pertinent manufacturer's data; molded case circuit breakers and/or fuses with all appropriate ratings; and cabinets.

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Panelboards - Lighting and Distribution

1. Square D
2. Cutler-Hammer
3. General Electric
4. Siemens

2.2 PANELBOARDS

A. Construction:

1. Electrical panels shall be dead-front type construction equipped with overcurrent protective devices as scheduled on the Drawings. They shall be complete with cabinet, trim, hinged door, lock directory and such additional features and components as herein specified or shown on the Drawings. Construction of panelboards shall be in all respects satisfactory to the Architect and/or Engineer and subject to his approval.

2. Design panels for 3-Phase, 4-Wire, 120/208 Volt, or 277/480 Volt, service as scheduled on the Drawings.

3. Panel interior shall be factory-assembled complete with overcurrent protective devices as shown on the Drawings. Interiors shall be designed and assembled so that any individual overcurrent protective device can be replaced without disturbing adjacent units or removing main bus. No additional drilling or tapping of bus work shall be required to change or add branch circuit overcurrent devices. Spaces scheduled on the Drawings shall have all required busing provided for the installation of future circuit breakers.

4. Branch circuits shall be arranged using double row construction except when narrow column panels are indicated. A nameplate shall be provided listing panel designation, type, and ratings.

5. Unless otherwise noted, full size insulated neutral bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices. The Electrical Contractor shall balance the load on all three phases. Neutral bussing shall have a suitable lug for each outgoing feeder requiring a neutral connection. A ground bus shall be included in all panels.

6. In multi-section panels install a power distribution block in the enclosure of one of the sections to permit the termination of the incoming feeder conductors as well as the extension of jumpers to the lugs of each main circuit breaker. Wire size of jumpers shall match that of the incoming feeder size. In the case of multiple- conductor feeders, reduce the size of jumpers in compliance with the NEC tap rules.

7. Panelboards shall be multi-section panels where required to comply with NEC Article 384, whether or not indicated on the drawings.

B. Bus:

1. All main bus bars shall be copper sized in accordance with UL standards to limit the temperature rise on any current carrying part to a maximum of 50°C above an ambient of 40°C maximum.

C. Circuit Breakers:

1. Panel circuit breaker overcurrent protective devices shall be as scheduled on the Drawings and as specified. All breakers shall be bolted-on thermal magnetic type unless otherwise indicated, carrying the Underwriters' Laboratories label. Plug-in breakers are not acceptable. Each breaker shall have the following features:

   a. Magnetic blow-out or other approved arc- quenching devices.

b. Two and three-pole breakers shall have non- conductive barriers between poles with separate tripping element in each leg, and with common trip operation.

c. A single-operating handle shall open all poles. Two and three pole breakers with handle ties are not acceptable. All handles shall have clearly marked "ON" and "OFF" positions. It shall be impossible to maintain breakers in closed position under overload condition.

2. Where called for in Schedules on Drawings, provide combination circuit breakers and ground fault interrupters. Such units shall be single-pole, 120V molded case breakers with UL label or listing.

3. Where circuit breakers are used as switches for 120-volt and 277-volt fluorescent lighting circuits, circuit breakers shall be approved for switching duty and shall be marked SWD.

4. Panel circuit breakers shall be bolted-type rated for 10,000 RMS symmetrical amperes minimum interrupting rating at 120/208 volts and for 14,000 RMS symmetrical amperes minimum interrupting rating at 277/480 volts. Provide higher interrupting ratings where scheduled on the Drawings. For these breakers, provide higher rated frame to meet the duty indicated.

5. Panelboards shall be provided with a main circuit breaker, wherever panel feeder exceeds 200 amperes or more than one panel is served by the same feeder. All multi-section panels shall be provided with a main circuit breaker for each section.

6. Tandem circuit breakers shall not be utilized.

D. Cabinets:

1. Cabinets shall be flush or surface-mounted, as shown or scheduled on the Drawings. Back box shall be of sufficient size to provide minimum gutter space in accordance with National Electrical Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.

2. The rigidity and gauge of steel shall be as specified by Underwriters' Laboratories.

3. Trim shall be fabricated of code gauge steel, hot- dip galvanized with hinged door, lock and catch and directory pocket covered with clear plastic shield over directory. Metal shall be chemically cleaned, prime-painted, and finish-coat painted with the manufacturer's standard paint for the application. Trim shall be of single-door flush construction. All locks shall be common-keyed. Provide two keys per lock.

4. A directory shall be provided inside each cabinet door. Furnish and install a typewritten circuit directory, not less than 5" x 8" with metal retainer and glass or substantial plastic cover. Ink, pencil, or handwritten directory will not be accepted. Note on each directory, the panel number or designation, the panel feeder size, and the following data for each circuit: Description of load, fuse or breaker size, conduit size and wire size.

5. Align, level and secure panelboards to the building structure. Provide framework of galvanized structural iron when required for installation or indicated on Drawings. Mounting height shall be in accordance with National Electrical Code or as shown on the Drawings.

2.3 CIRCUIT BREAKER DISTRIBUTION PANELS

A. These panels shall be provided with molded case circuit breakers tested and UL labeled per UL 489.

B. Breakers 100 ampere through 400 ampere frame sizes shall be thermal-magnetic trip with inverse time current characteristics, unless otherwise noted. As a minimum circuit breaker types shall be equivalent to Square "D" Type FA, KA, LA, MA, or approved equal.

C. For motor feeder protective devices above 100 ampere provide adjustable instantaneous trip.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine location where this equipment is to be installed, determine space conditions and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of the Work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install equipment where shown in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that equipment complies with requirements and serves intended purposes.

B. Coordinate with other work as necessary to interface installation of panelboard with other equipment in the area.

C. Installation shall comply with the requirements of the NEC and applicable portion of NECA's "Standard of Installation".

D. Coordinate installation of panelboards and enclosures with cable and raceways installation work.

E. Anchor panels and enclosures firmly to walls and structural surfaces, ensuring panels and enclosures are permanently and mechanically secured. Provide all angle unit and accessories for proper mountings.

F. Complete typewritten circuit directory card upon completion of work.

G. For all recessed panelboards, provide two (2) one-inch conduits stubbed up and capped 6 inches above ceiling.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of panelboards, and after connection to power source, test equipment to demonstrate compliance with requirements. When possible, field-correct malfunctioning equipment then retest to demonstrate compliance. Replace equipment which cannot be satisfactorily corrected.

B. Close all breakers to check for proper energization of all loads.

END OF SECTION 16470
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SECTION 16510

LIGHTING FIXTURES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the furnishing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all lighting fixtures in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

A. Manufacturers - Firms regularly engaged in manufacturer of lighting fixtures whose products have been in satisfactory use in similar service for not less than 5 years.

B. Lighting fixtures shall be listed and labeled by Underwriters Laboratories, Inc. and shall comply with standards of NEMA, ANSI, OSHA, and National Electrical Code (NFPA 70) for construction and installation.

C. Ballasts shall comply with Certified Ballasts Manufacturers Association standards and shall carry the CBM mark on the label.

D. Provide lighting fixtures whose performance under specified conditions is certified by the manufacturer.

E. Provide lighting fixtures, ballasts, and lamps produced by a manufacturer listed as an Approved Manufacturers in this Section, or as scheduled on the Drawings.

F. Alternate or substitute manufacturers may be included with the bid with separate adds or deducts from the base bid for each fixture type, subject to approval by the Architect. Substitute manufacturers must be identified by name and may not be changed by the bidder after the bids are submitted.

G. Special designs and/or unique applications of standard units may require samples and mock-ups and other developmental work which, is to be specifically provided for in the Contractors bid.

1.4 SUBMITTALS

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work, and submit shop drawings. Shop drawings for each lighting fixture type shall include:

1. Details of construction and finishes.

2. Drawings to scale.

3. Catalog cuts (without required details not acceptable).

4. Electrical ratings, mounting, ballasts, lenses, and lamps.

5. Certified photometric data, where noted.

6. Clear indication of assigned fixture type.

7. Installation instruction where required.

8. Air conditioning data

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Lighting Fixtures

1. For lighting fixtures

a. As indicated in Lighting Fixture Schedule on Drawings.

2. For ballasts

a. Power Lighting Products
b. Advance Transformer Company
c. Electronic Ballast Co.
d. Magnetek Universal Manufacturing
e. Daewang Lighting

3. For lamps

a. General Electric Company
b. Osram Corporation
c. Philips Lighting Company
d. Sylvania Electric Products

Remark: The above listed lamp manufacturers are acceptable unless specified otherwise in the Lighting Fixture Schedule on Drawings.

2.2 LIGHTING FIXTURES - GENERAL

A. Furnish, install and connect interior and exterior lighting fixtures as scheduled on the Drawings, and as required for a complete and satisfactory operating system.

B. Actual location of fixtures shall be as shown on the architectural reflected ceiling plans, or as directed by the Architect. Spaces for fixture insertion will be provided under the Section that covers the ceiling installation. Plaster and other frames shall be turned over to the Section for General Construction for setting and installation. Contractor shall be responsible for obtaining the latest architectural plans, and field verification. The Contractor's attention is directed to the requirements of the acoustical ceiling,

particularly to the need for close coordination between the ceiling construction details and lighting fixture design. The Electrical Contractor shall be responsible for coordinating mounting hardware to match ceiling type.

C. Lighting fixture catalog numbers shall be considered only as a guide. All fixtures must incorporate the general and particular requirements included in the Contract Documents. It may be necessary to modify the manufacturer's standard fixture corresponding to the designated type or catalog number.

D. All methods of construction and details of workmanship, where not specifically described or shown on the Drawings, shall be satisfactory to the Architect and shall be subject to his approval.

2.3 LIGHTING FIXTURES - FABRICATION

A. Provide required thickness of metal, plastic and composite materials so that all fixtures are rigid, stable, and will resist deflection, twisting, warping under normal installation, and relamping procedures.

1. All luminaire housings minimum 20 gauge cold rolled steel, unless a heavier gauge is specified or required by NEC or Local Codes.

2. All aluminum extrusion housing minimum 3/16" thick.

3. All spun, hydroformed, or sheet aluminum reflectors fabricated from #12 aluminum sheets minimum, 15 gauge (.057") or heavier.

4. All acrylic & polycarbonate lenses and/or diffusers minimum 1/8" thick.

5. All glass lenses and diffusers, unless specifically noted otherwise, shall be water white borosilicate or Corning Pyrex #7740 finished as described in the Lighting Fixtures Schedule on Drawings. Greenish tint lenses and diffusers are not acceptable.

B. Provide positive, durable, means of connection at all joints as required. No hollow rivets, unless specifically approved, are acceptable.

C. Provide neoprene, silicone, rubber, or other appropriate gasketing, stops, and barriers where required to prevent light leak, control sound and vibration, prevent water leaks and, if pertinent, water vapor penetration.

D. Provide finished product with the following minimum qualities:

1. Ground and/or burr free metal edges.
2. Tight fitting connections, hinges and closures.
3. Clean neat corners, edges, trims and frames.

E. All cast parts, including die-cast members, shall be of uniform quality; free from blow holes, pores, hard spots, shrinkage defects, cracks or other imperfections that affect strength and appearance, or are indicative of inferior metals or alloys.

2.4 FINISHES

A. Fixture finishes shall be applied in a manner that will assure a durable wear resistant surface.

1. Prior to finishing, all surfaces must be free from foreign materials such as dirt, rust, oil, polishing compounds and mold release agents.

2. Where necessary surface cleaned by accepted chemical means shall receive corrosion inhibiting (phosphating) treatment assuring positive paint adhesion.

3. All castings and extrusions machined, sanded or similarly treated, and given minimum one coat of baked-on clear methacrylate lacquer, unless a painted finish is specified.

4. Aluminum surfaces exposed to weather (other than anodized reflectors covered elsewhere) shall receive a duronodic or polyester powder paint finish as specified for corrosion resistance.

5. Sheet steel fixture housings, iron and steel parts, which have not received phosphating treatment ("Bonderizing" or similar process) or are to be utilized in exterior applications, shall be made corrosion resistant by zinc or cadmium plating or hot-dip galvanizing.

6. All exterior (visible) finishes must be approved by the Architect.

2.5 FIXTURE TRIMS

A. Fixtures shall have finish trim designed as specified in the Lighting Fixture Specifications.

B. Provide trim details as shown on the Drawings or as specified. The trim finish and dimensions are subject to the approval by the Architect.

1. Mitered corners shall be smoothed before shop finish is applied. No lapping of trim metal for all flush mounted ceiling trims for rectangular or square recessed fixtures.

2. All exposed ceiling trim and inside reveals on all fixtures shall be painted in a color to match the Architect's sample.

2.6 MARKING OF FIXTURES

A. Fixtures designed for voltages other than 110-125 volt circuits shall be clearly marked. The furnishing of lighting fixtures with the appropriate ballast voltage shall remain the Contractors responsibility.

B. Fixtures equipped with ballasts, etc., for operation of rapid start lamps shall be plainly marked "Use Rapid Start Lamps Only". Similarly, fixtures equipped with ballasts, etc. for operation of instant start or other type lamps shall also be plainly marked. Markings must be clear and shall be located to be readily visible to service personnel but invisible from normal viewing angles when lamps are in place.

2.7 LAMPHOLDERS

A. Screw base sockets for incandescent and high intensity discharge lamps shall be of heavy duty heat resistant porcelain with spring center contacts and plated screw shells. Incandescent base sockets shall be rated 600 Watts at 250 Volts.

B. Fluorescent lamp sockets operating with an open circuit voltage in excess of 300 volts shall be of the safety type, that open the supply circuit when the lamp is removed from the sockets.

2.8 LAMPS

A. Provide new lamps for all luminaries specified and shown in Light Fixture Schedule on the Drawings.

B. Fluorescent lamps shall have a correlated color temperature of 3500 degree K (Intermediate), and a minimum CRI of 75 and initial lumen output per watt input of 90. Lamps shall have a T8 bulb and medium bipin bases. Fluorescent lamps shall be energy saving, similar to Sylvania Octron FO32/35K, or approved equal, for 48" long lamps, and of equivalent performance for lamps of other standard lengths.

C. Incandescent lamps shall be rated at 130 volts, unless otherwise specified in Lighting Fixture Schedule.

2.9 H.I.D. LAMP BALLASTS

A. All high intensity discharge lamp ballasts shall be energy saving and high power factor (over 90%), HID ballasts shall be autotransformer, constant wattage type, and conform to the following standards:

1. U.L. and ANSI specifications with labels and/or symbols of approval by the U.L. and of certification by the C.B.M./E.T.L., Federal and State Efficiency Standards.

2. Fixture design, fabrication and assembly shall be designed to prevent overheating or cycling of lamps and ballasts under all conditions.

3. Provide the lowest sound-rating available for the lamps specified and clearly show their respective sound ratings. Ballasts found by the Architect or Engineer to be unduly noisy shall be replaced without additional cost prior to acceptance of the installation.

4. Ballasts intended for outdoor uses shall be capable of lamp-starting under any temperature down to
-20°F. At conclusion of the work, deliver to Owner a written certificate guaranteeing all HID lamp ballasts for a full two (2) years after acceptance date. Guarantee shall also cover all material and installation costs of replacing the defective ballast with new.

2.10 ELECTRONIC BALLASTS (FOR FLUORESCENT LAMPS)

A. Fluorescent lamp ballasts shall be high frequency electronic type, 10% THD, operating lamps at a frequency of 20 KHZ or higher with no detectable flicker. They shall conform to the following:

1. Ballasts shall be approved and listed by Underwriters Laboratories, Inc., shall comply with all applicable state and federal efficiency standards and with FCC and NEMA limits governing electromagnetic and radio frequency interference and shall not interfere with operation of other normal electrical equipment. Ballasts shall meet all applicable ANSI and IEEE standards regarding harmonic distortion and surge protection and shall not be affected by lamp failure and shall yield normal lamp life. Lamp current crest factor shall not exceed 1.6.

2. Ballasts shall operate at an input frequency of 60 HZ and an input voltage of 108 to 132 (120V units) or 249 to 305 (277V units) and shall have power factor above 90%. Ballasts must be compatible with the fluorescent lamps used.

3. Ballasts that operate as parallel circuits shall allow remaining lamp(s) to maintain full output if companion lamp(s) fail.

4. Ballasts shall carry three-year warranty, including labor allowance.

5. Ballasts for three-lamp operation are acceptable where no dual switching is required.

2.11 EMERGENCY BATTERY PACKS

A. Fluorescent fixtures designated for emergency use shall be equipped with self-contained emergency battery packs designed to light one lamp upon loss of normal power for 90 minutes. Batteries shall be sealed, maintenance-free nickel cadmium. Pack shall include fully automatic solid state charger, test switch and pilot light for remote mounting. Pack shall be suitable for outdoor installation.

2.12 WIRING

A. All wiring shall comply with the following standards:

1. All wiring within lighting fixtures, or from the connection to the building wiring system, shall be as specified under Section 16123, "WIRE AND CABLE".

2. Wire leads to the receptacle or connector of any side prong incandescent lamp or any "cool-beam" lamp, or any lamp 200 watts and over shall be SF-2 (silicone rubber insulated) stranded wire.

3. Wiring within fixture housing is to be concealed, except where the fixture design or mounting dictates otherwise.

4. Wiring channels and wireways shall be free from projections and rough or sharp edges throughout, and at points or edges over which conductors must pass and may be subject to injury or wear.

5. Insulated bushings shall be installed at points of entrance and exit of flexible wiring.

6. All joints between fixture wiring shall be made with Buchanan #2008S or Thomas and Betts solderless connectors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide and install all lighting equipment described in the Contract Documents and/or as modified by approved shop drawings. Installation shall be carried out in accordance with N.E.C. requirements, manufacturer's instructions, and with recognized industry practices. Comply with NEMA standards and with applicable portions of NEMCA's "Standard of Installation".

1. Verify fixture locations with architectural plans, reflected ceiling plans and other references prior to installation.

2. Check for adequate headroom and non-interference with other equipment, such as ducts, pipes, openings, etc.

3. Notify Architect in writing of conditions detrimental to proper and timely completion of the work.

B. Provide reinforcement for all exterior pole mounted luminaires in accordance with manufacturer's recommendations. Reinforcement shall be designed to prevent overturning or permanent deflection in winds up to 100 mi./hr. or in winds equal to local maximum annual wind velocity, whichever is greater. Existing soil conditions should be taken into account. Include in submissions details of all pole reinforcements for approval by Structural Engineer.

C. Housing installed directly in concrete shall be fabricated of hot dip galvanized steel or cast aluminum. Where cast aluminum housings are used, give two coats of asphaltum paint prior to installation. To prevent direct contact of housing to concrete, 1/8" thick x 2" diameter solid neoprene grommets shall be furnished at every point light fixture surfaces are mounted to concrete structure.

3.2 SUPPORTS

A. The fixtures shall be supported from the building structural system and/or the concrete floor or concrete roof deck.

B. Where necessary to meet Code requirements, enclosure housing shall be constructed to provide a one-hour fire rating.

C. Provide pendant or surface mounted fixtures with required mounting devices and accessories. Coordinate locations of fixtures with the Architect. Provide mounting stems on pendant fixtures of the correct length to uniformly maintain the fixture heights shown on the Drawings, or established in the field.

3.3 ADJUSTMENT

A. After the installation of lighting fixtures is completed, fixtures so requiring (both interior and exterior units) shall be adjusted after dark under supervision of the Architect and/or Owner.

3.4 CLEANING

A. Lighting fixture mounting frames, plaster rings, etc. are required to be installed prior to the finishing assembly which shall not be installed until the project is "broom clean". When the fixture location or construction cannot permit sequential installation, the Contractor shall carefully protect all reflectors, lenses, flanges, and other visible surfaces.

B. Before final acceptance by the Architect, all protective (strippable) coatings, dust, finger marks, paint spots and any other materials deleterious to the appearance or functioning of the lighting fixtures must be removed. Abrasive cleaners are not permitted.

3.5 INSPECTION

A. Contractor shall examine location where the lighting fixtures are to be installed, determine space conditions and notify Architect/ Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

C. Upon completion of the installation, lighting equipment must be in first class operating order and free from defects in condition and finish.

1. At time of final inspection, all fixtures and equipment must be installed and lamped with new lamps and side panels, louvers or other necessary components.

2. Fixtures shall be completely clean and free from finger marks, dust, plaster or paint spots.

3. Any reflectors, lenses, diffusers, side panels or other parts damaged prior to the final inspection shall be replaced at no expense to the Owner.

4. Exterior poles, bollards, bases and other exterior fixtures shall be painted to match factory color where finish is scratched or damaged.

5. Housings shall be rigidly installed and adjusted to a neat flush fit with the ceiling.

6. No light leaks shall be permitted at the ceiling line or from any visible part or joints.

3.6 FIELD QUALITY CONTROL

A. Upon completion of installation of lighting fixtures, and after energization, test system to demonstrate compliance with the contract requirements. When possible, correct malfunctioning units at the site and retest. Otherwise, remove and replace with new units.

END OF SECTION 16510

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SECTION 16670

LIGHTNING PROTECTION SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, a lightning protection system in accordance with Specifications. The lightning protection system shall include, but not be limited to air terminals, loops, ground rods, connections, and wiring.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of the type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 10 years and are members of the Lightning Protection Institute. Refer to "APPROVED MANUFACTURERS" in this Section.

B. A system of lightning protection shall be provided and installed in compliance with the provisions of NFPA 78, NEC and the latest "Code for Protection Against Lightning" for buildings as adopted by the National Fire Protection Association and the Underwriters' Laboratories, Inc. for a Master Label System.

C. The lightning protection system shall be installed by a lightning protection contractor who specializes in this field.

1.4 SUBMITTALS

A. Refer to Section 15000 Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include a dimensioned drawing of lightning protection system layout with conductor routings on Architectural background drawings, descriptive data on all equipment, air terminals, air terminal bases, cable fasteners, splicer fittings, ground clamps, and cables.

1.5 GUARANTEE

A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All material shall comply in weight, size and composition with the requirements of Underwriters' Laboratories, Inc. and the National Fire Protection Association Code relating to this type of structure.

2.2 AIR TERMINALS

A. Air terminals shall be 1/2" x 18" solid copper and shall extend at least 18 inches above the object to be protected. All air terminal bases shall be cast bronze with stainless steel bolt-pressure cable connectors. The air terminals should be spaced so as not to exceed 20' apart around the outside perimeter of the roof or the ridge and not over 50 square feet apart through the center of flat roof areas. The air terminals in the center roof area shall be 1/2" x 48" solid copper with a proper brace. All air terminal bases for flat roof areas shall be of the adhesive type.

2.3 CONDUCTORS

A. Conductors shall consist of U.L. listed 28 strands of 14 gauge copper wire weighing 375 lbs. per 1,000 feet and installed in accordance with the U.L. Code. A perimeter cable shall be installed around the entire main roof, and all penthouses and cooling towers. Each perimeter cable shall be connected to at least (2) down leads, providing a two way path to ground from each air terminal. All center roof air terminals shall be interconnected with conductors to the outside perimeter cable. Conductors on the flat roof areas may be run exposed. Ground connections shall be made around the perimeters of each roof and to the main down conductor at a maximum of 100'-0" on centers.

2.4 CONCEALED CONDUCTORS

A. All concealed conductors shall be installed in Schedule 40 1" P.V.C. Conduit. Conduit to be furnished and installed by the Electrical Contractor.

2.5 FASTENERS

A. Conductor fasteners shall be an approved type of non-corrosive metal, have ample strength to support conductors and shall be spaced not to exceed 3'-0" centers. Masonry type cable fasteners spaced every 3'-9" on masonry. Adhesive type cable fasteners spaced every 3'-0" on flat roofs.

2.6 ROOF PENETRATION

A. Wherever the conduit penetrates the roof, copper pitch pans shall be furnished by the Lightning Protection Contractor and installed by the Roofing Contractor. Wood nailing blocks will be furnished and installed by the General Contractor. All patching and masonry work will be furnished and installed by the General Contractor.

2.7 DOWN CONDUCTORS

A. Buildings that are of reinforced concrete or wall bearing structures, the concealed down conductors shall be installed in Schedule 40 1" P.V.C. Conduit. Each perimeter roof cable shall be connected to at least 2 down leads. The average distance between down leads shall not exceed 100', from upper roof to lower roof, or from roof to ground terminals. Irregularly shaped structures may require extra down conductors to provide a two-way path to ground from each air terminal.

2.8 CABLE CONNECTORS

A. All cable connectors shall be cast bronze with screw pressure type stainless steel bolts and nuts.

2.9 INTERCONNECTION OF METALS

A. All metal bodies within 6' of the conductor shall be bonded to the system with approved fittings and conductor. Connections between dissimilar metals shall be made with approved bimetallic connections.

1. Bonding of all metallic objects and systems at roof levels and elsewhere on the structure shall be complete. Primary bonds for metal bodies of conductance shall be bonded with appropriate fittings and full-size conductor; and shall consist of, but not be limited to the following: Roof exhaust fans, HVAC units with related piping and ductwork, exhaust vents and any other roof piping systems, cooling towers, rails systems, window washing tracks, antenna mast for T.V., radio or microwave, flag poles, roof handrails and/or decorative screens, roof ladders, skylights, metal plumbing stacks, etc. Exterior architectural metal fascia and/or curtain walls or mullions, which extend the full height of the structure shall also be bonded, if not inherently bonded through the building frame.

2. Metal bodies of inductance located within six feet of a conductor or object with secondary bonds, shall be bonded with secondary cable and fittings. Typical of these are: roof flashings, parapet coping caps, gravel guards, isolated metal building panels or siding, roof drains, down spouts, roof insulation vents and any other sizeable miscellaneous metals, etc.

2.10 GROUNDING

A. Ground terminals shall be located at the base of the structure. Ground connections shall be made around the perimeter of the structure and in no case shall average over 100'-0" apart. Ground terminals shall be 3/4" in diameter and shall be driven to a minimum depth of 10' and more if necessary to reach permanent moisture. One ground shall have connection to the water system where the water supply enters the building in addition to artificial ground. In case of rock ledge or other conditions making it impossible to comply with the above, trenching or a copper ground plate will be permitted, providing it will meet with the Underwriters' Laboratories, Inc. requirements.

2.11 COMMON GROUNDING

A. Provide necessary common grounds between the lightning protection system and the electric and telephone service entrance wires, TV and radio antenna grounds.

2.12 SURGE ARRESTOR

A. Surge arrestors on electric service shall be supplied and installed by the Electrical Contractor.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine locations where grounding is to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of work.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Excavating: All services involving excavating, trenching, backfilling, tamping of ground for ground rods, test wells, and ground loops shall be furnished and completed by the Electrical Contractor and meet the Architect's and Engineer's requirements.

B. Install lightning protection system in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment complies with requirements and serves intended purpose.

C. Coordinate with other work including electrical wiring, excavating, and roofing work, as necessary to interface installation of lightning protection system with other equipment.

D. Installation shall comply with the requirements of the NEC, NFPA No. 78, applicable UL installation requirements, UL Master Label requirements, and the applicable portions of NECA's "Standard of Installation".

E. Install conductors with direct paths from air terminals to ground connections avoiding sharp bends and narrow loops. All conductor drops to earth shall be concealed in building structure.

3.3 FIELD QUALITY CONTROL

A. Upon completion of lightning protection system, test system to demonstrate compliance with requirements. When possible, field-correct defective equipment, then retest to demonstrate compliance. Replace equipment which cannot be satisfactorily corrected.

B. Inspect all connections prior to concealing same.

C. Check continuity of entire system.

D. Provide Master Label inspection verification.

E. Underwriters' Laboratories, Inc. Master Label shall be furnished as evidence that the installation has met with UL 96A Code requirements.

F. Upon completion of installation of lightning protection system, test ground resistance with a megger ground tester. Where tests show resistance to ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms or less by driving additional ground rods and/or treating soil around ground rod with sodium chloride (salt), calcium chloride, copper sulphate, or magnesium; then retest to demonstrate compliance.

PART 4 - APPROVED MANUFACTURERS

4.1 LIGHTNING PROTECTION SYSTEMS

A. Heary Brothers
B. Warren Lightning Rod Co.

END OF SECTION 16670

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SECTION 16741

EMPTY RACEWAY SYSTEM (TELEPHONE AND COMPUTER DATA)

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes providing of all labor, materials, equipment, accessories, services, and tests necessary to complete and make ready for operation by the Owner, the telephone and computer data raceway systems in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Provide equipment whose performance under specified conditions is certified by the Manufacturer.

1.4 SUBMITTALS

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 GUARANTEE

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Telephone and Computer Data Raceways Systems

1. Approved manufacturers shall be as listed in other Section of this Specification as reference herein.

2.2 TELEPHONE RACEWAY SYSTEMS

A. Raceways and installation components shall be as specified in Section, Raceway and Installation Components, unless otherwise noted.

B. Telephone and computer data wall outlets shall be 4-11/16 inch, square boxes, as specified in Section Raceways and Installation Components.

C. Telephone and data floor outlets shall be floor boxes as specified in Section Raceways and Installation Components, and shall be fully adjustable, both before and after cement pour.

D. Cover plates for telephone and computer data outlets shall have a ½ inch insulated bushed hole and shall have provisions for mounting on outlet box. Gauge and finish of plates shall match switch and receptacle plates within the same area.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine location where raceway systems are to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install telephone and computer data raceway systems, where shown, in accordance with recognized industry practices, to ensure that the installation complies with requirements and serves intended purposes.

B. Coordinate with other work as necessary to harmonize installation of telephone and computer data raceway systems with other equipment in the area.

C. Installation shall comply with the requirements of NEC and applicable portions of NECA's "Standard of Installation".

D. The telephone and computer data raceway systems shall consist of empty accessible raceways connecting telephone and computer data outlets to the telephone closets and plywood backboards, (except above suspended ceilings not used as an air plenum, where branch telephone and data cable may be run exposed). Conduit shall be provided for all main runs.

E. All work relating to the interior telephone and computer data raceway systems shall conform to the requirements of the vendors of the telephone and data systems. Contractor shall review scope of work with both vendors prior to installation and make changes required. Workmanship shall conform to the applicable requirements of the various sub-sections as herein specified.

F. A 1/C #12 bare non-ferrous dragwire shall be provided in all empty telephone and data raceways for use by the system suppliers.

G. Ground the telephone and computer data raceway systems in accordance with NEC, and provide additional grounding in accordance with the system suppliers' requirements.

H. Where telephone and computer data cables are to be run in an air plenum, the cables shall be a type approved for the purpose or installed in a raceway system in accordance with the NEC.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of telephone and data raceway systems, test and inspect systems to ensure compliance with requirements.

END OF SECTION 16741

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SECTION 16902

ELECTRIC CONTROLS AND RELAYS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

B. Section 16000 - General Provisions for Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

A. The work includes providing of all labor, materials, equipment, accessories, services, and tests necessary to complete and make ready for operation by the Owner, control equipment as required, as shown on the Drawings, and hereinafter specified.

B. The work includes, but is not limited to, remote control switches, contactors, relays, low voltage control power transformers, timers, photocells, and breakglass switches.

1.3 QUALITY ASSURANCE

A. "Manufacturers" - Firms regularly engaged in manufacture of type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Provide equipment whose performance under specified conditions is certified by the Manufacturer.

C. Control equipment shall comply with applicable standards of NEMA, and shall be listed and labeled by Underwriters Laboratories.

D. Comply with NEC (NFPA 70) for construction and installation of remote control equipment.

E. Provide remote control equipment produced by a manufacturer listed as an approved Manufacturer in this Section.

1.4 SUBMITTALS

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 GUARANTEE

A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Photocells:

1. Tork Time Controls, Inc.

2. Paragon Electric Co.
3. Intermatic

2.2 RELAYS

A. Relays, unless otherwise noted or required, shall be magnetically held, A.C. solenoid type, with operating voltage 120V., 60 Hz.

B. Contacts shall be double-break, total enclosed, silver alloy, rated 20 amp. at 600 V.A.C. and capable of easy conversion or replacement in field to normally open or normally close. Number of contacts as shown on Drawings, and as required.

C. Enclosures shall be indoors, NEMA 1A; outdoors, NEMA 4, with black and white laminated nameplates screwed to enclosure with engraved identification.

D. Fusing, low voltage transformers, and additional accessories shall be provided as required for relays to perform their intended function, and in accordance with the NEC.

2.3 LOW VOLTAGE CONTROL POWER TRANSFORMER

A. Provide transformers as required for low voltage power used to actuate remote control equipment. Transformers shall be rated as required for voltage, momentary volt-amp. load, continuous volt-amp. load, and shall be suitable for the intended application.

B. Provide primary and secondary overcurrent protection with fused switches in accordance with the NEC.

2.4 PHOTOCELLS

A. Furnish single pole, 15 amp. 125 VAC rated photocells for control of lighting as indicated on Drawings and as required.

PART 3 - EXECUTION

3.1 INSPECTION

A. Contractor shall examine location where control equipment is to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install control equipment as shown on Drawings or otherwise required, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that the installation complies with requirements and serve intended purposes.

B. Coordinate with other work as necessary to harmonize installation of remote control equipment with other equipment in the area.

C. Installation shall comply with the requirements of NEC, applicable portions of NECA's "Standard of Installation", and NEMA standards.

D. All components shall be mounted in cabinets suitable for installation with all necessary bus bars and terminal strips. Steel barrier shall separate low and high voltage sections, in accordance with NEC.

E. Installation shall comply with NEMA standards, the requirements of NEC, and applicable portions of NECA's "Standard of Installation".

F. This Contractor shall provide all accessories, wiring, and conduit, required to provide a complete system. Accessories shall include, but not be limited to, terminal strips, rectifiers, switches, and fuses, for systems to perform their intended function, and in accordance with the NEC.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of control equipment and after control equipment has been energized, test equipment to demonstrate compliance with requirements. When possible, correct malfunctioning equipment at the site, then retest to demonstrate compliance; otherwise, remove and replace with new equipment and proceed with retesting.

END OF SECTION 16902

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