

ARCHITECT
WALLACE ARCHITECTS, L.L.C.

**120 South Limit Avenue
Sedalia, Missouri 65301
660-826-7000**

**302 Campusview Drive, Suite 208
Columbia, Missouri 65201
573-256-7200**

SIGNATURE AREA

ARCHITECT: WALLACE ARCHITECTS, L.L.C

By: _____ Title: _____ Date: _____

OWNER: MRE BLYTHEVILLE HOUSING PARTNERS 1, LP

By: _____ Title: _____ Date: _____

CONTRACTOR: DCI CONSTRUCTION, L.L.C.

By: _____ Title: _____ Date: _____

BONDING COMPANY OR BUILDING INSPECTOR:

By: _____ Title: _____ Date: _____

ADFA REPRESENTATIVE:

By: _____ Title: _____ Date: _____

Job No. 2772

Set No. _____

September 10, 2012

**DOGWOOD COTTAGES
BLYTHEVILLE, AR**



AIA[®] Document G710[™] – 1992

Architect's Supplemental Instructions

PROJECT *(Name and address):*

Dogwood Cottages
Blytheville, AR

**ARCHITECT'S SUPPLEMENTAL
INSTRUCTION NO:** 005OWNER: ☒ARCHITECT: ☒CONSULTANT: ☐CONTRACTOR: ☒FIELD: ☐ADFA: ☐**OWNER** *(Name and address):*

Dogwood Cottages Estates, L.P.
8901 State Line Road, Suite 250
Kansas City, MO 64114

DATE OF ISSUANCE: October 31, 2013**CONTRACT FOR:** General Construction**FROM ARCHITECT** *(Name and address):*

Wallace Architects, LLC
120 South Limit Avenue
Sedalia, MO 65301

CONTRACT DATE: August 31, 2012**TO CONTRACTOR** *(Name and address):*

DCI Construction, LLC
1354-C East Kingsley
Springfield, MO 65807

ARCHITECT'S PROJECT NUMBER:
2772

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

NOTE: The Contract sum and/or Contract Time changes related to the items below may be addressed in a future Change Order.

1. At typical units, tub/shower blocking is not required for future grab bars. Duplex units need not comply with Fair Housing requirements. Additionally, tub/shower blocking for future grab bars is not required per AUSH, Level 1 Visitability guidelines as adopted by ADFA.

ATTACHMENTS:

(Here insert listing of documents that support description.)

1. None

ISSUED BY THE ARCHITECT:


(Signature)

Mike Kleffner, Project Manager
(Printed name and title)

**AIA**[®]**Document G710[™] – 1992*****Architect's Supplemental Instructions*****PROJECT** *(Name and address):*Dogwood Cottages
Blytheville, AR**ARCHITECT'S SUPPLEMENTAL****INSTRUCTION NO:** 004**OWNER:** ☒**ARCHITECT:** ☒**CONSULTANT:** ☐**CONTRACTOR:** ☒**FIELD:** ☐**ADFA:** ☐**OWNER** *(Name and address):*Dogwood Cottages Estates, L.P.
8901 State Line Road, Suite 250
Kansas City, MO 64114**DATE OF ISSUANCE:** February 13, 2013**CONTRACT FOR:** General Construction**FROM ARCHITECT** *(Name and address):*Wallace Architects, LLC
120 South Limit Avenue
Sedalia, MO 65301**CONTRACT DATE:** August 31, 2012**TO CONTRACTOR** *(Name and address):*DCI Construction, LLC
1354-C East Kingsley
Springfield, MO 65807**ARCHITECT'S PROJECT NUMBER:**

2772

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

NOTE: The Contract sum and/or Contract Time changes related to the items below may be addressed in a future Change Order.

1. Clarification on Truss Type C on Duplex Roof Framing Plans A, B, and C on Details 3/A2.0Da4, 3/A2.1Da4, and 3/A2.2Da4.
2. Lavatory elevation 5/A7.0Da4 may be double door front with pair of false drawers above in lieu of side by side door and drawers profile originally shown. Lavatory elevation 6/A7.0Da4 may have the drop in bowl centered on pair of cabinet doors in lieu of centering the bowl on the entire length of cabinet/drawers as originally shown.

ATTACHMENTS:

(Here insert listing of documents that support description.)

1. The attached Architectural 8.5x11 drawing sketch prepared by Wallace Architects is being issued: (labeled as ASI #4, Attachment #1, and bearing a latest revision date of February 11, 2013)

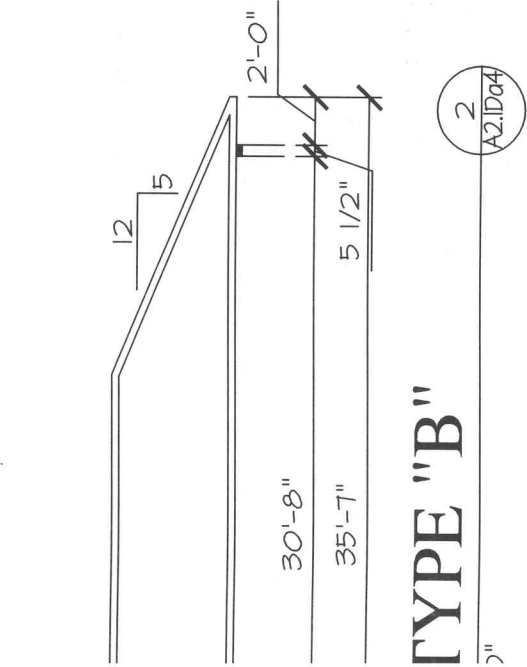
ISSUED BY THE ARCHITECT:

Michael J. Kleffner

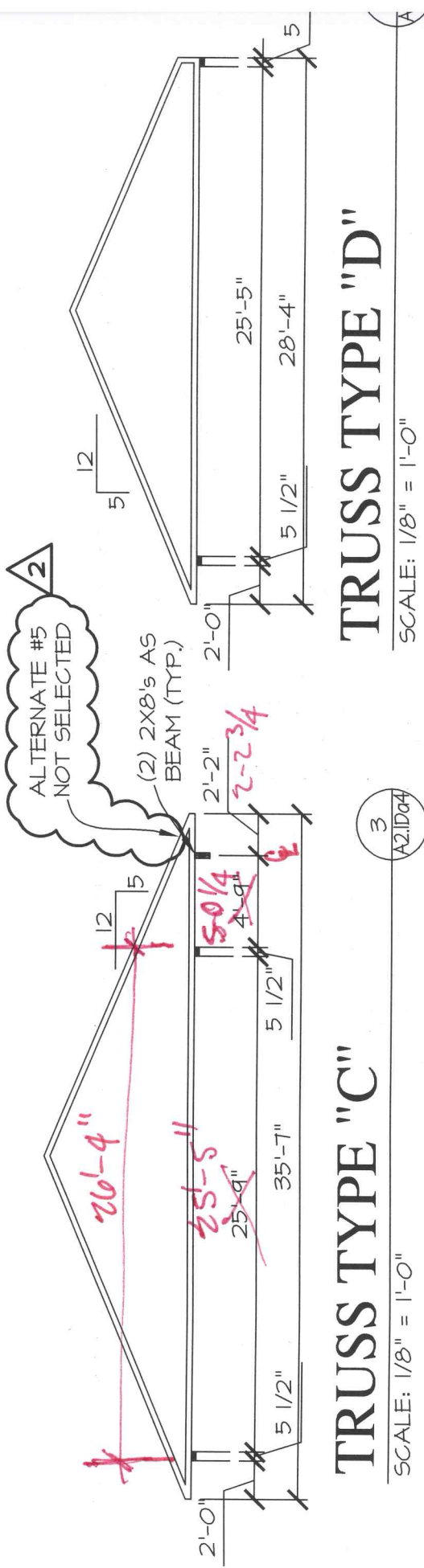
(Signature)

Mike Kleffner, Project Manager

(Printed name and title)

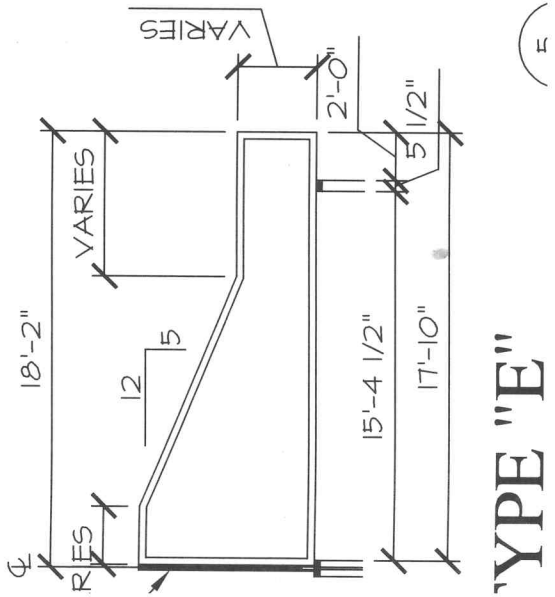


TYPE "B"

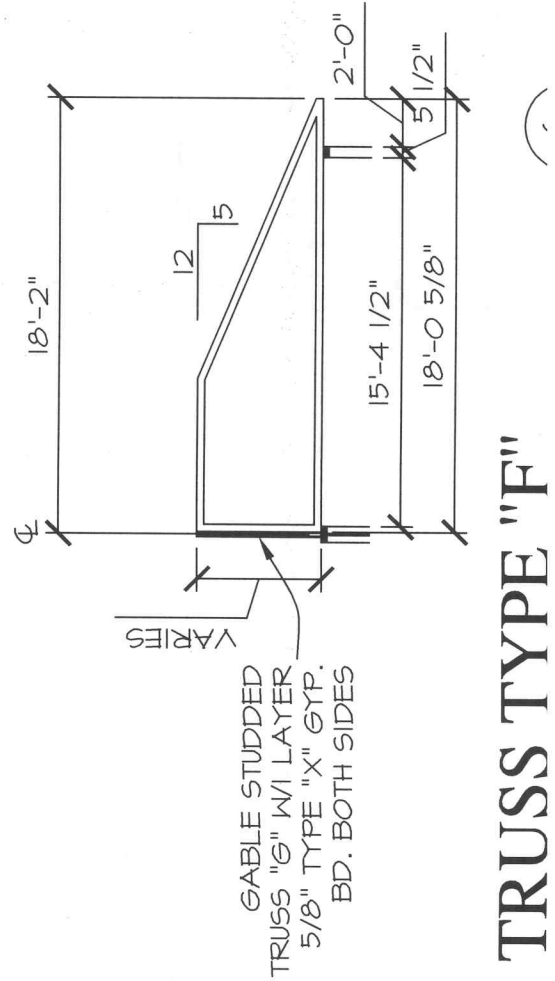


TRUSS TYPE "C"

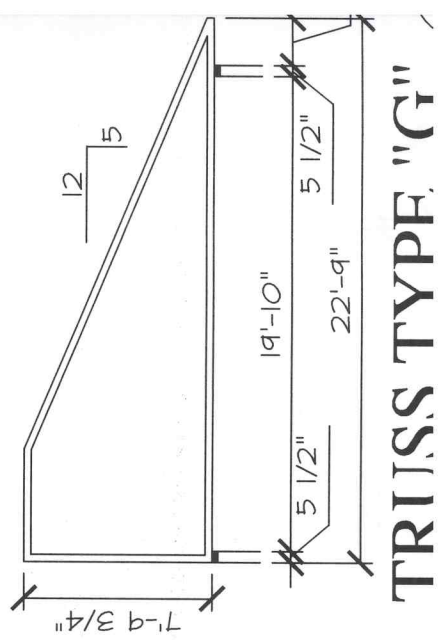
SCALE: 1/8" = 1'-0"



TYPE "E"



TRUSS TYPE "F"



TRUSS TYPE "G"

TRUSS TYPE "D"

SCALE: 1/8" = 1'-0"

AIA[®] Document G710[™] – 1992

Architect's Supplemental Instructions

PROJECT *(Name and address):*

Dogwood Cottages
Blytheville, AR

**ARCHITECT'S SUPPLEMENTAL
INSTRUCTION NO:** 003OWNER: ☒ARCHITECT: ☒CONSULTANT: ☐CONTRACTOR: ☒FIELD: ☐ADFA: ☐**OWNER** *(Name and address):*

Dogwood Cottages Estates, L.P.
8901 State Line Road, Suite 250
Kansas City, MO 64114

DATE OF ISSUANCE: January 29, 2013**CONTRACT FOR:** General Construction**FROM ARCHITECT** *(Name and address):*

Wallace Architects, LLC
120 South Limit Avenue
Sedalia, MO 65301

CONTRACT DATE: August 31, 2012**TO CONTRACTOR** *(Name and address):*

DCI Construction, LLC
1354-C East Kingsley
Springfield, MO 65807

ARCHITECT'S PROJECT NUMBER:
2772

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

NOTE: The Contract sum and/or Contract Time changes related to the items below may be addressed in a future Change Order.

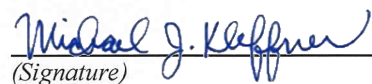
1. 4" exterior vinyl/metal unit numbering may be used at each duplex unit in lieu of address placards originally designed (detail 6/AS1.0)

ATTACHMENTS:

(Here insert listing of documents that support description.)

1. None

ISSUED BY THE ARCHITECT:


(Signature)

Mike Kleffner, Project Manager
(Printed name and title)



AIA® Document G710™ – 1992

Architect's Supplemental Instructions

PROJECT *(Name and address):*

Dogwood Cottages
Blytheville, AR

ARCHITECT'S SUPPLEMENTAL

INSTRUCTION NO: 002

OWNER: ☒

ARCHITECT: ☒

CONSULTANT: ☐

CONTRACTOR: ☒

FIELD: ☐

ADFA: ☒

OWNER *(Name and address):*

Dogwood Cottages Estates, L.P.
8901 State Line Road, Suite 250
Kansas City, MO 64114

DATE OF ISSUANCE: January 25, 2013

CONTRACT FOR: General Construction

FROM ARCHITECT *(Name and address):*

Wallace Architects, LLC
120 South Limit Avenue
Sedalia, MO 65301

CONTRACT DATE: August 31, 2012

TO CONTRACTOR *(Name and address):*

DCI Construction, LLC
1354-C East Kingsley
Springfield, MO 65807

ARCHITECT'S PROJECT NUMBER:

2772

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

NOTE: The Contract sum and/or Contract Time changes related to the items below may be addressed in a future Change Order.

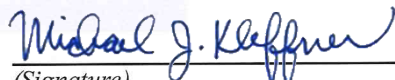
1. At hall bath, use double 2x4 framed wall in lieu of single 2x6 framed wall originally specified behind vanity and at the location of the passive radon pipe. Note the 5'-0" clearance requirement from the vanity wing wall to the opposite wall at the (3) accessible unit bathrooms.

ATTACHMENTS:

(Here insert listing of documents that support description.)

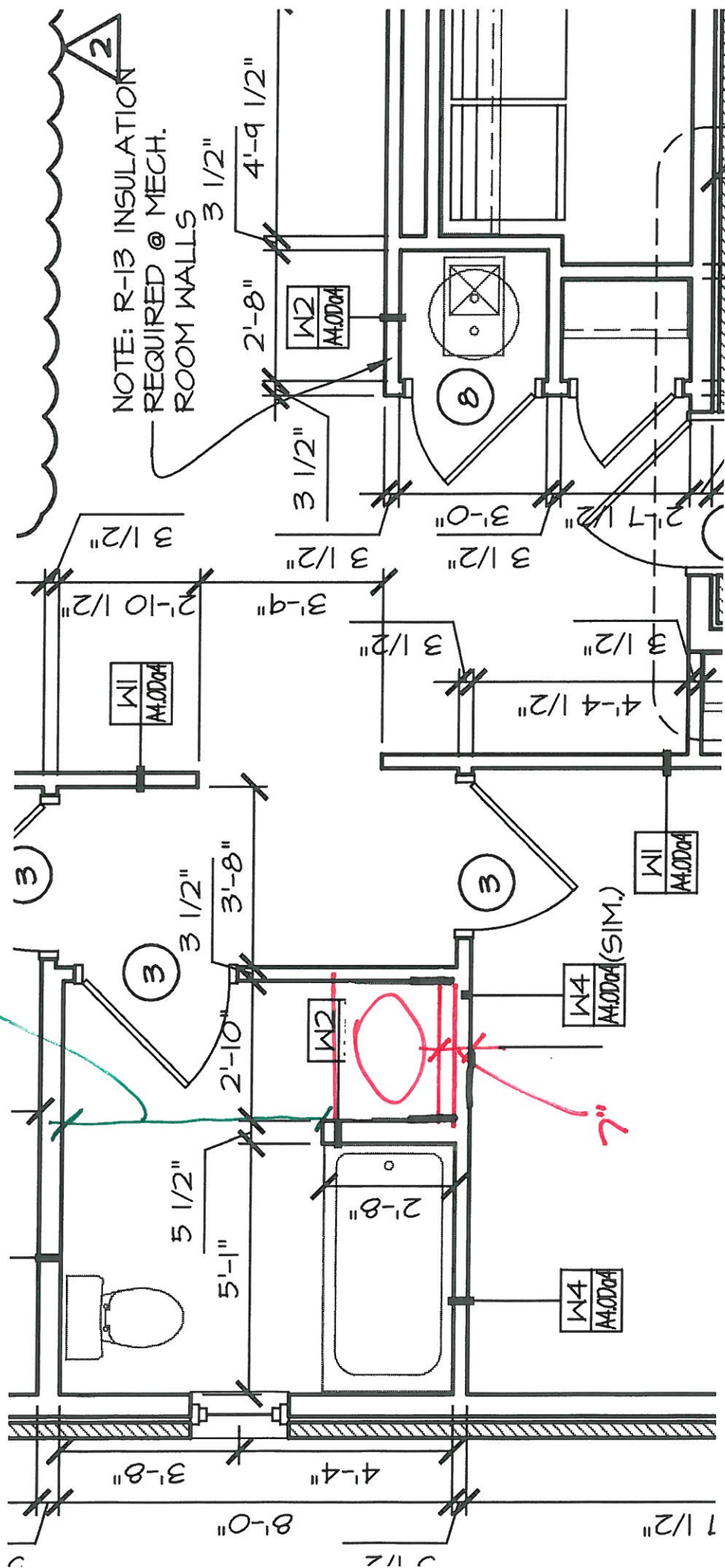
1. The attached Architectural 8.5x11 drawing sketch prepared by Wallace Architects is being issued: (labeled as ASI #2 and bearing a latest revision date of January 25, 2013).

ISSUED BY THE ARCHITECT:


(Signature)

Mike Kleffner, Project Manager

(Printed name and title)



Dogwood Cottages
Blytheville, AR
ASL #2 1/25/13

Architect's Supplemental Instructions

PROJECT *(Name and address):*

Dogwood Cottages
Blytheville, AR

ARCHITECT'S SUPPLEMENTAL

INSTRUCTION NO: 001

OWNER: ☒

ARCHITECT: ☒

CONSULTANT: ☐

CONTRACTOR: ☒

FIELD: ☐

ADFA: ☒

OWNER *(Name and address):*

Dogwood Cottages Estates, L.P.
8901 State Line Road, Suite 250
Kansas City, MO 64114

DATE OF ISSUANCE: December 18, 2012

CONTRACT FOR: General Construction

FROM ARCHITECT *(Name and address):*

Wallace Architects, LLC
120 South Limit Avenue
Sedalia, MO 65301

CONTRACT DATE: August 31, 2012

TO CONTRACTOR *(Name and address):*

DCI Construction, LLC
1354-C East Kingsley
Springfield, MO 65807

ARCHITECT'S PROJECT NUMBER:

2772

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

Per Geotechnical Engineer, Chris Koehler of Koehler Engineering:

1. Regarding narrowing the foundations to 12 inches in width.

This is also acceptable; however, it will impose a more stringent field review requirement. When the foundations are excavated, the foundations should be probed to ensure that there are no weak sections that would be prone to settlement or a punching failure. If areas of this nature are noted, they should be remediated by removal of the weak material and replacement of the material with flowable fill or rock fill.

2. Regarding slope stability adjacent to the proposed borrow pit location.

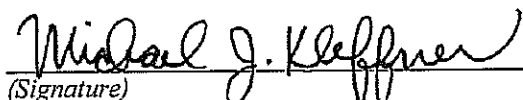
I do not see a problem with the stability of the slopes relative to the building with the borrow pit; however, the Contractor should be aware that they will be excavating very near the water table. The water table can and does vary seasonally, and is typically higher during the winter and spring months, so that may also inhibit their operations.

ATTACHMENTS:

(Here insert listing of documents that support description.)

None

ISSUED BY THE ARCHITECT:


(Signature)

Mike Kleffner, Project Manager

(Printed name and title)



120 South Limit Avenue
Sedalia, MO 65301
660-826-7000

302 Campusview Drive, Suite 208
Columbia, MO 65201
573-256-7200



Addendum #2

**Dogwood Cottages
Blytheville, Arkansas
Wallace Job #2772**

September 27, 2012

The following are deletions, additions and/or clarifications to the plans and specifications and shall be considered as if originally contained therein:

Drawing Clarifications (Drawings Unattached)

Architectural

AS1.0

1. The Audio/Visual (A/V) unit shall be identified as the unit closest to the community building on the south side of Blossom Boulevard.

Plumbing

P1.0D, P1.1D, P1.0Da4, and P1.1Da4 (Revisions following are based on the conditional approval of the plumbing plans by the Arkansas State Health department, dated September 12, 2012.)

1. The drainage stack (into which the washer box connects) and the under slab branch drain from the drainage stack within dwelling units shall be increased from 2" to 3". Installation shall comply with IPC Section 406.3.
2. As a matter of clarification, the dwelling unit water heater TPR valve discharge line shall discharge via an air gap located directly above (within 6" or less) the floor drain. Installation shall comply with IPC Section 504.6, and specifically with Sections 504.6.1, 504.6.2, 504.6.5, 504.6.7, and 504.6.10.

P1.0CB (Revisions 1 and 2 following are based on the conditional approval of the plumbing plans by the Arkansas State Health department, dated September 12, 2012.)

1. Back to back water closets in the Community Building shall not be connected to a drain having a double sanitary tee configuration unless the horizontal developed length between the water closet outlets and the connection to the double sanitary tee is 18" or greater. Installation shall comply with IPC Section 706.3.
2. The drainage stack (into which the washer box connects) and the under slab branch drain from the drainage stack within the Community Building shall be increased from 2" to 3". Installation shall comply with IPC Section 406.3.

3. As a matter of clarification, the Community Building water heater TPR valve discharge line shall discharge via an air gap located directly above (within 6" or less) the floor drain. Installation shall comply with IPC Section 504.6, and specifically with Sections 504.6.1, 504.6.2, 504.6.5, 504.6.7, and 504.6.10.
4. The water heater in the Community Building shall be increased in size from 40 gallons to 60 gallons.

Specifications

1. Section 08000 – DOORS AND WINDOWS
Approved acceptable window manufacturer to be MariTech 45 Series Vinyl Windows. All other window manufacturers meeting the original window and glazing performance specifications are acceptable.

Drawing Clarifications (Drawings Attached)

Civil

Civil Specifications - Plan Sheet CE5

1. In the absence of waterline specifications from Dogwood Water, waterline installation shall conform to the following specifications provided by City Water and Light of Jonesboro, Arkansas, revision date of October 12, 2007 (22 pages), with the exception of the material types as classifications when specifically noted on the plans (i.e. Class 200 waterline pipe instead of C-900).
2. The waterline plan as attached has been revised to clarify the PVC waterline type. It was listed as C-200 and has been revised to say "Class 200".

Attachments:

1. Conditional Approval letter by the Arkansas Department of Health, Project ID #82621, dated September 12, 2012 (3 pages)
2. Civil plan sheets Cover and CE5 prepared by Crockett Engineering Consultants and bearing a latest revision date of September 27, 2012.
3. Waterline specifications provided by City Water and Light of Jonesboro, Arkansas, revision date of October 12, 2007 (22 pages).

END OF ADDENDUM #2

RECEIVED SEP 24 2012



Arkansas Department of Health

4815 West Markham Street • Little Rock, Arkansas 72205-3867 • Telephone (501) 661-2000

Governor Mike Beebe

Paul K. Halverson, DrPH, FACHE, Director and State Health Officer

September 12, 2012

Mike Kleffner
Wallace Architects LLC
120 S. Limit Avenue
Sedalia, MO 65301
(573) 256-7200

RE: Project ID 82621 – PD# 12-1364
Dogwood Cottages
Hwy. 61 & Dogwood Road
Blytheville, AR

Dear Mr. Mike Kleffner:

The plans and specifications for the above referenced project have been reviewed and approved by the Plumbing and Natural Gas Section of the Arkansas Department of Health. No deviations from the accepted plans, specifications, and/or addenda will be permitted during construction except by prior written acceptance. This approval is valid for one (1) year from the date on this letter or this acceptance must be re-validated by contacting this office referring to the above referenced file numbers. **Note:** Plans & specifications will be discarded after completion of the review and in no case be retained for more than a six (6) month period.

This approval letter is for the plumbing portion of this project only. The architect, engineer, designer, or agent of the owner shall provide all contractors a copy of this letter. Swimming pools, public water/sewer extensions, fire protection systems, sewage disposal systems, and water wells are regulated by other sections of the Arkansas Department of Health, and are subject to plan review approval before construction begins; and furthermore, this letter shall serve as a provisional approval for food service until an official review is completed, if applicable. For more information for food service requirements, please contact Environmental Health Protection at (501) 661-2171.

All plumbing and gas work shall meet minimum state plumbing code standards and be performed by a duly licensed master plumber. Please refer to any attached comments with this letter regarding required changes or the need for additional plumbing.

For more information regarding this approval, please contact us at (501) 661-2642.

Sincerely,

George Penning, Plumbing Plans Examiner
Plumbing & Natural Gas Section
Protective Health Codes

CC: Matt Meyers, State Plumbing Inspector (870) 933-8734
Environmental Health Specialist, Mississippi County
Municipal Plumbing Inspector

Project Comments and / or Needed Corrections

Project ID 82621
Dogwood Cottages

PD # 12-1364

1. Duplex and Duplex Alternates, Washer Box shall conform to section 406.3 of the State Plumbing Code connection to a stack or branch minimum of 3".
2. Duplex and Duplex Alternates, Water Heater Discharge shall comply with section 504.6.1 and 504.6.2 T&P Valve. Shall discharge to an approved location.
3. Community Building Back to Back water closet shall conform to Arkansas State Plumbing Code Section 706.3 to protect from pumping action.
4. Community Building Washer Box shall conform to section 406.3 of the State Plumbing Code connection to a stack or branch minimum of 3".

Fiscal Year

*N/A



ARKANSAS DEPARTMENT OF HEALTH

Plan Review (Regular)

4815 W Markham St, Slot 29

Little Rock, AR 72205

Permit No. 1422080

Receipt No. 18495098

Date 9/18/2012

Amount \$500.00

Check No. 003262

ESTABLISHMENT
COUNTY:

PLAN REVIEW (A)

EXPIRES

Lifetime

RECEIPT FOR PAYMENT

Gardner Development LLC
1414 E Primrose St Ste 100

Springfield

MO 65804

Gardner Development LLC
1414 E Primrose St Ste 100

Springfield

MO 65804

SPECIFICATIONS
WATER AND SEWER CONSTRUCTION

CITY WATER AND LIGHT

JONESBORO, ARKANSAS

Date of Last Revision: October 12, 2007

SECTION 1 – PLANS, CONTRACTS, & GENERAL INFORMATION

1-01. Refunding:

When extending a water or sewer main across other property owners, a refunding contract can be requested. The developer's engineer should make available for review a refunding drawing showing the appropriate footage. CWL's Engineering Department will publish the per foot cost each calendar year.

1-02. Profiles:

All profiles must be drawn from an actual ground survey, not from a topographic map. The survey notes should accompany the submittal.

1-03. **Plans must have MAPC approval before final acceptance of system.**

SECTION 2 – OVERALL SITE WORK

2-01. **Description:**

- (a) Final clean-up of the site shall include the removal and disposal off-site of all construction debris, temporary plant, and surplus materials.
- (b) This section covers the items that follow:
 - (1) Intermittent clean-up
 - (2) Clearing right-of-way
 - (3) Existing storm drainage pipes
 - (4) Private driveways and gravel roads outside city limits
 - (5) Roadways inside city limits
 - (6) Roadways inside new subdivisions
 - (7) Location of new water and sewer mains

2-02. **Intermittent Clean-up:**

From time to time, all litter and debris shall be removed from the site and disposed of off-site, such that the site presents a neat appearance and the progress of work is not impeded.

2-03. **Clearing Right-of -Way:**

All natural or man-made obstructions shall be removed, including the cutting of existing surfacing, as necessary to permit the new construction. As soon as possible, each manmade obstruction shall be restored to the original condition within reasonable economic limits.

2-04. **Existing Storm Drainage Pipe:**

- (a) Obstructing drainage pipes, shall be removed. If in sound, undamaged condition, they may be cleaned and re-laid. If unsound or damaged, they shall be replaced with pipes in kind.
- (b) When the angle between center lines of a drainage pipe and water main will permit, the water main may be installed by tunneling, provided the drainage pipe is not damaged and the water main is laid properly. As an alternative in the case of corrugated metal pipe, a section may be cut from the drainage pipe, and restoration accomplished with new pipe and coupling bands.

2-05. **Private Driveways and Gravel Roads Outside City Limits:**

Existing gravel roads outside city limits shall be filled with $\frac{3}{4}$ " minus crushed stone and tamped, with all debris removed to be disposed of off site. **This includes all existing private drives.**

Percent By Weight Passing

<u>Size Sleeve</u>	<u>Gravel</u>	<u>Crushed Stone</u>
1-1/2"	100	-----
1"	85-100	100
$\frac{3}{4}$ "	60-90	50 – 90
$\frac{3}{8}$ "	40-80	-----
No. 4	30-60	25 – 50
No. 10	20-45	-----
No. 40	10-35	10 – 30
No. 100	3-12	3 – 10

2-06. Roadways Inside City Limits:

(a) Excavations to be Restored with Flowable Fill:

All material excavated for the street cut shall be removed and disposed of by the person, firm, or corporation performing said excavation. All excavations shall be restored with flowable fill to within 2" of the surrounding bituminous riding surface.* The mix design for the flowable fill will be prepared by the Applicant. The mixture will be proportioned to produce a flowable mixture without segregation, material for one cubic yard, absolute volume, and shall be as follows:

Cement	80-100 lbs.
Fly Ash	220-300 lbs.
Sand	Variable to equal 1 cubic yard
Water	Approximately 65 gallons

The minimum flow shall be 8". The unit weight shall be a minimum of 110 lbs/ft³.

* If the surrounding riding surface is concrete, flowable fill shall be placed to within 6" of the riding surface.

The flow test shall consist of filling a 3" diameter x 6" high open-ended cylinder to the top with the flowable material mixture. If necessary, the top of the mixture will be struck off level. The cylinder will then be pulled straight up and the flow will be measured by the approximate diameter of the mixture.

Placing of either bituminous hot mix for asphalt surfaces or concrete for concrete surfaces over the flowable fill may begin after the flowable material has taken its initial set, is stable, and does not displace under equipment. A tack coat of liquid asphalt shall be applied to the cut face of the surrounding asphalt pavement before final hot mix surface is placed. Steel plates shall be used to maintain traffic over cuts before flowable fill is placed if necessary and also during the curing time of the flowable fill. These steel plates shall be provided by the City of Jonesboro Street Department. All pavement restoration shall be made by the City of Jonesboro Street Department.

In the event a cut is to be restored during a time when hot asphalt plant mix is not available, cold plant mix may be used as a temporary surface until a time hot plant mix is available. It shall be the applicants responsibility to maintain the cold mix patch until replaced with hot plant mix. The initial deposit will not be released until hot plant mix is in place and a final inspection has been made.

(b) Limits of Excavations:

The limits of cuts to be restored shall be as follows:

- (1) All longitudinal cuts within 5' of the edge of the paved surface.
- (2) All transverse cuts to a distance of 3' beyond the edge of a paved surface.
- (3) When the excavation is not within a gravel surface or concrete or bituminous surface the flowable fill shall be placed to within 6" of the surrounding ground. The remaining 6" shall be filled with topsoil and seeded. No cuts shall be made within 200' of a signalized intersection until the City of Jonesboro Engineering Department has been notified to locate traffic detection loops
- (4) All asphalt and concrete surfaces must be cut with a saw or air chisel.

2-07. Roadways Inside New Subdivision:

In a proposed area, (new subdivisions) all street cuts shall be back-filled with fill sand and tamped.

2-08. **Location of New Water or Sewer Mains:**

- (a) Water and sewer lines should be placed on City, County, or State Right of Way or on an easement parallel and adjacent to the Right of Way.
- (b) Water and sewer lines should be placed on opposite sides of the Right of Way. If an exception is required, Water and Sewer lines must have a minimum of 10 feet horizontal separation and a minimum of 18 inches vertical separation.
- (c) Easements should be 20 feet in width. Where other utilities are present, additional width may be required.
- (d) Water and sewer lines shall be a minimum of 10 feet from permanent structures.
- (e) Wyes or manhole stubouts shall be installed at the low elevation of each lot.
- (f) CWL Engineering Dept. must approve any water or sewer lines that will be installed closer than 5' parallel with edge of paved street surface.

SECTION 3 – EXCAVATION, BACKFILL, AND FILLS

3-01. **Description:**

This section covers excavation and backfill in construction installations and operations as follows:

- (a) The trench excavation for the water and sewer pipe.
- (b) Bedding
- (c) The back-filling of pipe lines and all other installations for which excavations are made.

3-02. **Proximity To Existing Utilities:**

- (a) At many locations, the new lines are very close to existing utilities, and in many instances, pass beneath the existing utility. In all such cases the existing utilities shall be protected from damage.
- (b) Before doing any excavating it shall be requested that the utility companies locate their underground utilities.
- (c) In the event of a damaged utility line during excavation, the particular utility will be contacted immediately so as to expedite the line's repair.

3-03. **Trench Excavation For Water and Sewer Force Main:**

The width of the trench shall be ample to permit the pipe to be laid and jointed properly, and the backfill to be properly replaced. Trenches shall be of such extra width, when required, as will permit the convenient placing of trench boxes for the protection of laborers, the work, and adjoining property. Trench depth will be such as to allow a minimum cover of 42" over water main. The width of the trench shall be a minimum of 24" when installing electric conduit and water mains in the same trench with conduit always on curb side, and minimum separation of 6 inches between conduit and water main.

3-04. **Bedding Materials:**

- (a) All backfill material shall be free from cinder, ashes, refuse, vegetable or organic material, boulders, rock or stones, or other material which is unsuitable.
- (b) When the type of backfill material is not indicated, excavated material may be used, provided that such material consists of loam, clay, sand, gravel, or other materials which are suitable for back-filling.
- (c) All trenches shall be back-filled by hand, from the bottom of the trench to the centerline of the pipe with approved material placed in layers of three (3) inches and compacted by tamping. Back-filling material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously.
- (d) Should rock be encountered, trench will be back-filled with suitable bedding material a minimum of 6" over said rock.
- (e) Bedding material for PVC water mains shall have no angular particles larger than 1" and no rounded particles larger than 1½".

3-05. **Disposition of Excavated Materials:**

To the extent suitable and needed, excavated materials shall be used in the formation of backfill. Materials not used for the formation of backfill shall be disposed of off-site.

SECTION 4 – WATER PIPE AND FITTINGS

4-01. **Description:**

This section covers the installation of all water pipe and fittings. Water lines will be constructed of Class 350 ductile iron pipe or PVC pipe with ductile iron or cast iron fittings.

4-02. **Materials:**

- (a) Ductile iron pipe shall be thickness Class 350 and shall be lined with cement mortar.
- (b) PVC pipe shall have a Pressure Rating (PR) of 200 (SDR 21) conforming to ASTM D2241 and ASTM D3139 or better for pipe sizes up to 3 inches.
- (c) For 4" through 12" pipe, PVC pipe shall be AWWA C-900 Pressure Pipe DR18 (Pressure Class 150) meeting ANSI/AWWA C-900 standard for pressure pipe or better.
- (d) Fittings shall conform to the specifications of 4-01 above.
- (e) Joints shall be compression-type resilient joints, or flanged. Lubricant for push-on type joints shall be that recommended by the manufacturer of the pipe.

4-03. **Trench Excavation and Backfill:**

Trench excavation and backfill shall be in accordance with the requirements of SECTION 3 – EXCAVATION, BACKFILL, AND FILLS.

4-04. **Equipment:**

All equipment necessary and required for the proper construction of the line shall be in first class working condition.

4-05. **Laying Pipe:**

- (a) All soil and other foreign matter shall be removed from the inside of the pipe and fittings before they are lowered into the trench. They shall be kept clean during and after laying; care shall be taken to keep soil out of the jointing space. At the end of each day's work, pipe shall be closed with a water tight plug.
- (b) All pipe and fittings shall be lowered carefully into the trench in such manner as to prevent damage to pipe, fittings, or linings. Neither pipe nor fittings shall be dropped or dumped into the trench.
- (c) Cutting of pipe, where needed, shall be done in a neat and workmanlike manner without damage to pipe or pipe lining.
- (d) Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. For lines on an appreciable slope, bells shall, at the engineer's direction, face upgrade. Wherever necessary to avoid obstruction, or for other allowable reasons, the degree of deflection at any joint shall not be greater than that which will provide adequate gasket space entirely around the spigot end of pipe. The joint opening shall be approximately 1/8 inch. Maximum allowable deflections shall be as limited by the pipe manufacturer's recommendations.
- (e) Pipe shall not be laid in water, when the trench condition is unsuitable, or the weather is unsuitable for such work.
- (f) All pipe shall be laid at a sufficient depth to maintain 42" minimum cover, measured from the top of the pipe to the existing grade of the surrounding undisturbed soil. The only exception to this requirement will be for channel crossings greater than 5 feet which is detailed in 6-04 CHANNEL CROSSINGS.
- (g) Stranded 16 gauge locator wire shall be installed with markers every 750 feet, unless the water line is in a common trench with an electric line.

4-06. **Installation of Slip-Type Joints:**

- (a) Prior to jointing, the bell and spigot ends of the pipes, and bells of fittings shall be cleaned thoroughly with soapy water and cloth, or by whatever means are necessary to remove all foreign matter and attain the required cleanliness. A wire brush shall be used if necessary. Particular care shall be exercised to clean the gasket seat. The gland also shall be cleaned in like manner.

- (b) Joints shall be made in strict accord with the recommendations of the pipe manufacturer. The rubber gasket shall be cleaned with soapy water and/or cloth and inserted in the gasket seat within the bell. The spigot end of the pipe shall be inserted into the bell of the pipe to which connection is being made, and forced to a firm contact with the shoulder of the bell. When this initial insertion is made, the alignment of the added pipe shall deviate from true alignment not more than the amount recommended by the manufacturer.
- (c) Following the initial insertion, the bell end of the added pipe shall be moved sideways or up a distance of approximately 8 inches to move the spigot end slightly away from the shoulder of the connecting bell, thus providing for expansion and flexibility in the completed line. The added pipe shall be placed in true alignment at intended grade.
- (d) Radius of Curvature: bending of pipe around curves or in coves shall not exceed that of the recommendations of the pipe manufacturer or refer to the PVC pipe handbook.

4-07. **Installation of Mechanical Joints:**

- (a) The spigot end of pipe and the bell of fittings, and the rubber gasket, shall be cleaned thoroughly as specified for pipe joints in paragraph 4-06 (a) above. The gland also shall be cleaned in like manner.
- (b) After the gland and gasket are placed on the spigot end of the pipe a sufficient distance from the end to avoid fouling the bell, the spigot end shall be inserted in the bell to firm contact with the bell shoulder. The rubber gasket then shall be advanced into the bell and seated in the gasket seat. Care should be exercised to center the spigot end within the bell.
- (c) The gland shall be brought into contact with the gasket, all bolts entered, and all nuts hand tightened. Continued care shall be exercised to keep spigot centered in bell. The joint shall be made tight by turning the nuts with a wrench; first partially tightening a nut, then partially tightening the nut 180 degrees there from, and working thus around the pipe, with uniformly applied tension until the required torque is applied to all nuts. Required torque ranges and indicated wrench lengths for standard bolts are as follows:

<u>Diameter</u>	<u>Range of Torque</u>	<u>Length of Wrench</u>
(inches)	(foot – pounds)	(inches)
5/8"	40 – 60	8
3/4"	60 – 90	10
1"	70 – 100	12
1-1/4"	90 – 120	14

4-08. **Leakage Tests:**

- (a) Leakage tests shall be made on all contractor laid water lines.
- (b) Leakage tests shall be made prior to sterilization operations.
- (c) The test period shall be two (2) hours. Test pressure shall be 1.5 times the calculated working pressure of the main, but not less than 100 psi.
- (d) The line will not be accepted unless or until the total is less than that specified in AWWA C-600-93 for ductile iron and AWWA C-605-94 for PVC pipe.

Allowable leakage (L) shall be according to the following equation:

$$L = \{ [ND(P)^{1/2}] \div 7400 \}$$

where N = number of joints
D = diameter of pipe in inches
P = test pressure in psi
L = allowable leakage in gallons per hour (gph)

4-09. Sterilization:

- (a) All water lines shall be sterilized in accordance with AWWA C-651-94. Any new construction or repaired water main must be thoroughly cleaned (flushed), disinfected, and tested for bacteriological quality before it can be placed in service.
- (b) The manner in which the lines are sterilized shall be one that is approved for potable water systems by the Arkansas Department of Health.
- (c) Following a contact period of not less than 24 hours, the chlorinated water shall be flushed from the system, and the system filled with water of normal chlorine content. Samples of water then shall be taken on two consecutive days from the lines and delivered to the CWL – LABORATORY for bacterial analysis. This process shall be continued until the samples show the water is safe for domestic requirements. .
- (d) All valves in sections of lines being sterilized shall be opened and closed at least twice during the sterilization period.
- (e) Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. No flushing device shall be directly connected to any sewer.

Pipe Diameter	Flow Required to Produce 2.5 FPS Velocity (approx)
Inches	GPM
4	100
6	200
8	400
10	600
12	900
16	1600

4-10 Flushing Guidelines

- a. The contractor will be responsible for flushing the new water mains they install. The contractor will flush the mains under the supervision of the CWL inspector. (Flushing on special jobs will require advanced planning and coordination with customers and may require work after normal working hours to meet the needs of the water demand.)
- b. A flushing plan should be in the bid package that is given to contractors invited to bid on CWL water jobs. If the water extension is designed by a consulting engineer, a flushing plan will be required prior to review.
- c. The CWL Inspector will witness the flushing and transport bacteriological samples to the CWL lab for analysis. There will be no cost to the contractor from the CWL lab. If the contractor chooses, he can split the samples and independently analyze the water quality at another lab. The CWL lab results will control acceptance.
- d. Once the CWL lab certifies the water as safe, all valves except for normally closed valves, will be placed in the open position. The CWL Inspector will verify that all valves are in the proper position. (Generally valves will be closed after flushing and open after bacteriological tests have passed.)
- e. The CWL Inspector will send a flushing ticket to the Water Department if the line has set for a one month or longer before final acceptance.
- f. The CWL Inspector will fill out a Valve Operation Record after final acceptance and route to General Operations Associate for official transfer from Engineering to the Water Department.
- g. Each Fire Hydrant shall be flushed.

4-11 Repairs

- a. Repairs shall be made in accordance with AWWA.
- b. If valve is closed by the contractor without CWL's knowledge, the new section must be tested for water quality and flushed.
- c. The CWL Inspector will witness all repairs.

SECTION 5 – VALVES

5-01. Description:

This section covers:

- (a) Gate valves
- (b) Check valves
- (c) Butterfly valves
- (d) Tapping connections
- (e) Extensions to existing mains

5-02. Gate Valves:

- (a) Gate valves shall be set properly and joined to the pipe as specified for the making of joints in SECTION 4 – WATER PIPE AND FITTINGS.
- (b) Gate valves shall conform to American Water Works Association Standard Specifications for iron body, bronze mounted, non-rising stem gate valves. Valves shall be open left, double-disc, parallel seat type, for working water pressure of 200 psi.

5-03. Check Valves:

Well discharge check valves shall be iron body, bronze mounted, horizontal swing check valves with outside weight and lever and designed for 175 psi working pressure. Check valves shall conform to AWWA C-508.

5-04. Butterfly Valves:

- (a) Butterfly valves shall be installed in accordance with the requirements of subparagraph 5-02 above.
- (b) Buried butterfly valves shall be equal to Pratt “Groundhog” valves as manufactured by Henry Pratt Company, 401 S. Highland, Aurora, IL 60507.
- (c) All butterfly valves shall be rubber-seated, tight-closing type with the seat bonded and mechanically secured to the body in such manner as to serve as a flange gasket. Body and disc shall be heavy duty cast iron or cast steel, with straight-through shaft of stainless steel.
- (d) Butterfly valves shall meet the requirements of AWWA Standard C-504 for Rubber-Slated Butterfly Valves, current issue.

5-05. Tapping Connections:

- (a) Extensions of existing mains is covered in the paragraph that follows. This paragraph covers connections where taps are made.
- (b) Tapping connections shall consist of tapping sleeves and companion tapping valves. They shall be designed for working water pressure of 200 psi.
 - (1) Sleeves shall have mechanical joint ends encircling the main and the outlet openings shall be flanged for attachment of the inlet sides of the tapping valves.
 - (2) Tapping sleeves that are used on transite water mains must be full circle and stainless steel.
 - (3) Valves shall conform to the applicable specifications for gate valves set out in paragraph 5-02 above. The inlet openings shall be flanged and the outlet openings shall have mechanical joint ends.
- (c) Installation of Tapping Connections:
 - (1) Sleeves shall be fastened securely to the pipe to be tapped. Cleaning of pipe and sleeves, and attachment of sleeves, shall be in accordance with applicable stipulations of SECTION 4 – WATER PIPE AND FITTINGS. The sleeve shall be so positioned that the valve stem of the tapping valve will be plumb.
 - (2) Tapping valves shall be bolted securely to the flanges of the sleeves, and the tapping machine connected to the mechanical joint end. Cleaning of flanges, mechanical joints, and gaskets, and the connecting of sleeves, valves, and machine, shall be in accordance with applicable stipulations of SECTION 4 – WATER PIPE AND FITTINGS.
 - (3) All taps will be performed by CWL – for CWL or for developers for a said fee. These tapping valves shall be operated under the direction of a CWL representative only.
- (d) Installation of Tees:
 - (1) Tees installed for branch lines shall have a valve installed for each line.
 - (2) All valves shall be secured to tee with an anchor coupling.

5-06. Extensions of Existing Mains:

- (a) Where the existing main ends in a plugged pipe or with a washout, the extension will begin with the installation of a mechanical joint valve. In some circumstances, the extension (at CWL’s discretion) shall begin with a tapping valve so that the existing area is not valved off. Extensions shall be in accordance with applicable provisions of SECTION 4. Where new extensions end, and future extension is likely, it shall end with a wash-out or fire hydrant with proper size gate valve with concrete backing a minimum of 12’ before end of new line.
- (b) Washouts – where an extension of a new main ends with a wash-out and main size is an 8” diameter pipe, the wash-out installed shall be that of a 3” diameter pipe. An in line valve shall be installed in accordance with SECTION 5-06-a.
- (c) An extension of a new main size that is a 10” diameter pipe of greater shall end with a fire hydrant.

SECTION 6 – HIGHWAY, RAILROAD, AND CHANNEL CROSSINGS

6-01. Crossing Requirements:

- (a) Water pipe passing beneath highways and railroads shall be threaded through steel encasement pipe after the appropriate permits have been obtained.
- (b) For highway crossings, solid encasement pipe shall be used within the limits set by the Arkansas State Highway Department. Such limits presently are to be from Right-of-Way to Right-of-Way.
- (c) For railroad crossings, the limits of solid pipe shall be determined by the involved railroad company. Such limits are presently from Right-of-Way to Right-of-Way.
- (d) Excavation for the steel encasement pipe shall be by the dry bore method.

6-02. Encasement Pipe:

- (a) Solid encasement pipe shall be fabricated from plate conforming to current ASTM Designation A 36. Dimensions shall conform to the following, except when the State Highway Department or Railroad companies require a thicker wall.

<u>Nominal Carrier Diameter</u>	<u>Outside Diameter Encasement</u>	<u>Wall Thickness Thickness</u>
24"	36"	1/4"
20"	30"	1/4"
16"	24"	1/4"
12"	20"	1/4"
8"	16"	1/4"
6"	12"	1/4"
4"	12"	1/4"

6-03. Installing Pipe In Encasement:

Pipe for installation in encasement shall be ductile iron fastite or mechanical joint type. The pipe shall be threaded through the encasement in such manner that the joints will be in compression and none shall be under tension.

6-04. Channel Crossings:

- (a) Water pipe crossing ditches, streams, or canals will be installed as nearly perpendicular to the flowline of the channel as possible. Channels wider than 5 feet will be crossed by one of the following methods:
 - (1) Boring and installing a 12" steel casing under the channel;
 - (2) Dewatering the channel, excavating a trench, and installing 12" steel casing in the open trench;
 - (3) Dewatering and installing the water pipe directly in an open trench 3 pipe diameters wide and at least 36" below the flowline of the channel and encasing the pipe in concrete continuously across the channel to a distance of 5 feet outside the channel on each side.
- (b) In all 3 options in 6-04 (a), the carrier pipe will be ductile iron to a distance of 10 feet outside the ditch bank.
- (c) Options (1) and (2) in 6-04 (a) will require reinforced concrete collars to anchor both ends of the casing outside the ditch bank.
- (d) Ditches less than 5 feet wide will be dewatered and crossed as nearly perpendicular as possible by installing the water line below the flowline at least 42 inches.
- (e) Channels exceeding 40' in width shall have proper size gate valve installed on each side.

SECTION 7 – FIRE HYDRANTS

7-01. **Description: (revised 10-9-2006)**

Fire hydrants shall be Mueller Company type only – three spud hydrant #A-423, 5-1/4” main valve opening, 3 way, 2 – 2 1/2” hose nozzles, 1 – 4 1/2” pumper nozzle, 4’0” bury, 6” M.J. shoe, pentagon nut, open left, NST.

7-02. **Installation of Fire Hydrant:**

- (a) The hydrant shall be cleaned thoroughly before being set; all dirt and foreign matter shall be removed from barrel and bottom section, and the waste outlet freed of any obstruction. After cleaning, the main valve shall be checked for freedom of movement and proper seating, and the valve left in the closed position.
- (b) The hydrant shall stand plumb with nozzles at proper elevations above finished ground surface. Unless otherwise directed, the face of the pumper nozzle shall be parallel to the street.
- (c) The shoe or bottom of the hydrant shall be supported firmly upon a pre-cast flat concrete block. The back of hydrant and back of tee shall have poured concrete backing
- (d) Hydrant lead must be a minimum of six inches in diameter. A 6” valve shall be installed on all hydrant leads, 18” anchor couplings shall be used between tee and valve and between valve and hydrant. Hydrant shall be back-filled up to and minimum 6” above weep holes with clean #67 rock and rock covered with 8 mm plastic before back-filling to prevent dirt infiltration.
- (e) Hydrants and fittings installed inside Jonesboro City Limits will be provided by CWL.
- (f) Hydrants installed outside Jonesboro City Limits will be the responsibility of the Developer. These must meet the specifications of CWL. After a period of one year CWL will number, maintain, and repair the fire hydrants.

SECTION 8 – SEWER MAINS AND PIPING

8-01. **PVC Pipe:**

Where PVC pipe is specified, it shall comply with requirements of ASTM D-3034 SDR 35 type psm poly vinyl chloride (pvc) sewer pipe and fittings or better.

8-02. **Vitrified Clay Sewer Pipe:**

All clay sewer pipe and fittings for sanitary sewers shall be of the best quality of hard-burned vitrified glazed clay bell and spigot sewer pipe meeting the requirements of ASTM Designation C 13-57T.

8-03. **Jointing Vitrified Clay Pipe:**

(a) The vitrified glazed clay pipe shall have factory applied joints or coupling on the spigot and bell ends of the pipe meeting ASTM Designation C 425, latest revision, and compounded of a high quality polyurethane elastomer applied to the pipe and properly manufactured to a desired hardness and compressibility to form a tight compression joint. The resilient polyurethane should have the following characteristics:

- (1) A minimum tear strength of 50 psi.
- (2) Percent elongation of not less than 80% and shall return to original volume and shape upon release of elongation force.
- (3) A compression set value of less than 5%.
- (4) A minimum resistance to deflection of 165 psi at 10% deflection.
- (5) A minimum (shore “A” durometer) hardness of 70 from a temperature range of 20°F - 100°F.

The factory applied joint shall be the Dickey coupling, as manufactured by the W.S. Dickey Manufacturing Company, or an approved equal.

(b) In jointing vitrified glazed pipe, the surface shall be wiped free of dust, dirt, gravel, or other foreign matter prior to the application of the lubricant. The vitrified glazed clay pipe with the factory applied coupling shall be connected by first brushing upon the mating surfaces the prior lubricant as recommended by the pipe supplier. The spigot end shall then be centered in grade into the bell end of the last downstream clay pipe length and shoved “home” and properly seated with the application of a moderate force by a pry or lever device.

8-04. **Ductile Iron Pipe:**

Where ductile iron pipe is specified, it shall be as described in Paragraph 4-02.

8-05. **Construction In General:**

Construction of sanitary sewers shall begin at the low point of the line and continue in orderly succession throughout the work as directed by the engineer. Any deviation from this procedure shall be made only with the specific approval of the engineer. Construction shall begin only after the right of way has been cleared, the entire section staked, and the elevations carefully checked.

8-06. **Construction By General Contractors:**

Construction of sanitary sewers shall begin at the low point of the line and continue in orderly succession throughout the work as directed by the developer’s engineer and approved by CWL’s engineer. Any deviation from this procedure shall be made only with the specific approval of both the developer and CWL engineers.

Construction shall begin only after approved plans from the Arkansas Department of Health are submitted to CWL, and all necessary fees are paid in full. Construction by contractors shall then begin only after the right of way has been cleared, the entire section staked, and the elevations carefully checked.

Developer, along with a representative of the Contractor if different, shall meet with a representative of CWL on the first day planned for construction, to review any common issues. During construction, work shall be inspected by the Developer's consulting engineer for necessary safety practices, proper materials, and workmanship. CWL will provide inspections during construction, and other random inspections to insure that the plans approved by the Arkansas Department of Health and CWL are followed concerning workmanship and materials. No portion of the project shall be backfilled without CWL approval.

8-07. Excavation:

The bottom of the trench shall be excavated to a true line and grade according to the grades and lines furnished by the Engineer. For pipe sewers, the bottom of the trench under each bell shall be excavated sufficiently to allow the pipe to rest throughout its length. Bell hole excavation shall also be sufficient to allow proper placing of the joint compound. Should rock be encountered at excavation, contractor will backfill with suitable bedding material a minimum of 4" over said rock.

8-08. Laying Sewer Pipes:

- (a) Sewer pipe shall be laid on a firm bed and in a perfect conformity with lines and levels given.
- (b) All PVC sewer pipe shall be laid on no less than 4" of ¾ minus chat laid with even bearing on the bottom of the trench which shall be slopped with the earth and prepared to conform to the form of the pipe by back-filling with ¾ minus chat up to the "spring-line" of the pipe.
- (c) All other pipe shall be laid with even bearing on the bottom of the trench, which shall be slopped with earth and prepared to conform to the form of the pipe. Sufficient dimensions shall be cut in the bottom of the trench to achieve perfect clearance to the bell of the pipe, but not larger than is necessary to make a proper joint.
- (d) All water entering the excavations or other parts of the work shall be removed until all the work has been completed. No sanitary sewer shall be used for the disposal of trench water, unless specifically approved by the engineer, and then only if the trench water does not ultimately arrive at existing pumping or wastewater treatment facilities.
- (e) The inside shoulder of the bell and spigot ends must in all cases meet; the bell end in all cases shall be laid toward the high end of the sewer.
- (f) The grade of the pipe shall be obtained by the use of a pipe laser. The laser shall be placed in the pipe and a target utilized for grading and placement of pipe.
- (g) At the end of each day's work, and when pipe laying is discontinued for any reason, open ends of pipe shall be closed with a cast plug or cap firmly secured.
- (h) Final backfill shall be of suitable material removed from excavation except where other material is specified. Debris, frozen material, large clods or stones, organic matter or other unstable materials shall not be used for final backfill within 2 feet of the top of the pipe.
- (i) Final backfill shall be placed in such a manner as not to disturb the alignment of the pipe.

8-09. Manholes:

Poured in place or pre-cast concrete manholes will be used.

- (a) In general, pre-cast concrete manholes shall be manufactured in compliance with ASTM Designation 1964 C 478. The concrete used shall have a compressive strength of 4000 psi; maximum absorption determined by boiling test shall be 8%. Aggregate shall be crushed limestone. Commercial fiber reinforcement shall be 1½ lbs per cubic yard of concrete.
The internal diameter of the manhole section shall be 48 inches and the wall thickness of 5 inches. The cone sections shall have internal diameters of 48 inches at the base and 24 inches at the top and a vertical length of 36 inches with no steps. Other manhole sections shall be made in length of 16, 32, 48, and 64 inches.
- (b) All casting for manhole heads, covers, and other purposes must be made of heavy duty gray iron. Manhole cover should be 250 lbs and 24" diameter Western type or equivalent. Must be free from cracks, holes, swells, and cold sheets and have a workmanlike finish.
- (c) Manhole bottoms and inverts shall be made of Class "A" concrete.

CWL Specifications

- (d) Drop manholes shall be constructed at all manholes where the difference in invert elevation between incoming and outgoing sewer is 2.0 feet or more. Drop manholes shall be constructed of the same materials and dimensions as are standard manholes, the only difference being the inlet configuration as shown on the standard details sheet.
- (e) Manholes shall be vacuum tested in accordance with ASTM C 1244-93.
- (f) The specifications shall include a requirement for inspection and testing for water tightness or damage prior to placing into service, e.g. manhole bottoms and walls must be free of leakage prior to vacuum test. Also where existing manholes in service are to be broken into prior to a sewer main extension, the existing manholes must be re-vacuum tested.
- (g) The flow channel should be made to conform to the connecting sewers. The angle between connecting sewers shall be a minimum of 90°.
- (h) Straight-line manholes should drop one-tenth of a foot from inlet invert to outlet invert. Manholes that change alignment greater than 45 degrees should drop one-quarter of a foot from inlet invert to outlet invert.

8-10. **Infiltration:**

- (a) An air pressure test shall be performed on all contractor laid sewer pipe per ASTM C 828-80.
- (b) After job completion and ditch settlement, infiltration or pipe leakage, shall not exceed 100 gallons per day per mile of pipe per inch of pipe diameter.

8-11. **Deflection:**

All flexible laid sewer pipe shall be tested with a mandrel. Deflection shall not exceed 5%. The test shall be performed without mechanical pulling devices. The test shall be conducted after the final backfill has been in place for at least 30 days.

8-12. **Plugging Manholes (when tying into existing manholes):**

The downstream side of the first manhole within a sewer extension, must be mechanically plugged to prevent infiltration into CWL's sewer system. The plug must be supplied by the developer or contractor. This separation from CWL's sewer system must be maintained by the developer/contractor until final acceptance by CWL.

Slope

All sewers shall be designed and constructed to give velocities of not less than 2.0 feet per second based on Manning's formula using an "n" value of 0.013.

Slope	Min. Slope in Feet per 100 Feet
8 inch	0.40
10 inch	0.28
12 inch	0.22
15 inch	0.15
18 inch	0.12
21 inch	0.10
24 inch	0.08
30 inch	0.058
42 inch	0.037

SECTION 9 – LIFT STATIONS

9-01. **Lift Station Structure (Same as manhole):**

Poured in-place or pre-cast concrete; Lift Station will be used.

In general, pre-cast concrete Lift Station shall be manufactured in compliance with ASTM Designation 1964 C 478. The concrete used shall have a compressive strength of 4000 psi; maximum absorption determined by boiling test shall be 8%. Aggregate shall be crushed limestone. Steel reinforcement shall consist of a single line of circumferential reinforcement, placed in the center of the concrete pipe wall, with a minimum sectional area of .17 square inches per foot of pipe length. Fiber reinforcement shall be 1½ lbs. per cubic yard of concrete.

The inside diameter of the manhole section shall be 72" and the wall thickness of 5 inches. Soil tests shall be taken to design footing width.

9-02. **Check Valve Installation:**

Check valves and gate valves shall be installed in a 5' diameter vault with concrete floor. Vault bottoms and walls shall be free of all leakage. Vault shall have 36" x 36" or larger aluminum, single leaf, locking access door. Each pump shall have it's own set of check valves and gate valves with the gate valve on the down stream side of the check valve. Check valves and gate valves shall have adequate weight support at each location. All gate valves and check shall be easy operable and accessible for maintenance and replacement. Provisions shall be made to remove or drain accumulated water from the valve chamber. The valve chamber may be dewatered to the wet well through a drain line with a gas and water tight valve.

9-03. **Lift Station Valves:**

- (a) *Check Valves* shall be flange type, cast iron or bronze body, fully ported, resilient seated, with a outside weight and lever. Designed for 175 psi working pressure. Check valves shall conform to A.W.W.A. C 508-82.
- (b) *Gate Valves* shall be flange type, cast iron or bronze body, fully ported, open left, resilient seated, with wheel type operation. Designed for 175 psi working pressure. Gate valves shall conform to A.W.W.A. C 500-80.

9-04. **Pump and Piping:**

- (a) Pump and piping installation shall be completed before any sewage is admitted into basin and should be clean.
- (b) Installation of piping shall be inspected by CWL during the construction of all Ductile Iron piping. Pipe shall be class 150 Ductile Iron with cast-on type flange end x plain end.
- (c) Flange gasket shall be heavy duty red rubber 1/8" thick.
- (d) Hardware – bolts, nuts, flat washers and lock washers shall be 302 stainless steel.
- (e) Antiseize compound shall be used on threads.

9-05. **Lift Station Pump Removal System Equipment**

- (a) Stainless steel lift chain.
- (b) Top Rail Support.
- (c) Slide Rail Assembly 1½ " or larger Hydromatic Stainless Steel.
- (d) 30" x 48" or larger single door aluminum access cover.

9-06. **Pump Removal**

- (a) Submersible pumps shall be readily removable and replaceable without dewatering the wet well or disconnecting any piping in the wet well.
- (b) Provisions shall be made to facilitate removing pump, motors and mechanical and electrical equipment.

- 9-07. **Control Panel** shall not be mounted directly on top of wet well basin. The power and control wires shall be taken into an air-tight junction box.
- 9-08. **Pump Power Cables** ends shall never come in contact with water. If the cables are extended, do not immerse the splice in water. Install the cable so that it will not over heat. Overheating is caused by coiling the cable and exposing it to direct sunlight. Use short circuit breakers to prevent danger of electrical shock.
- 9-09. **Seal Failure** – All motors shall have seal failure probe installed near the bottom so that any leakage will be detected. A red warning light at the control panel comes on if water enters seal chamber. This is an indicator only and does not stop motor, but warns that seal should be replaced.
- 9-10. **Heat Sensor** – All motors shall have a heat sensing thermostat installed in top of winding in the motor. Any motor winding temperature above 248°F will open thermostat and stop motor. Thermostat will automatically reset as soon as it has cooled.
- 9-11. **Level Controls** shall be held by support bracket and cords are adjusted for proper depth. A sealed mercury switch at the bottom with adjustable lead weights.
- (a) Lower turn-off control shall be set so that pump stops when water level is about to top of motor.
 - (b) Upper turn-on control is set to start pump when level is at height specified above pump.
 - (c) Over-ride control is set a height specified above upper turn-on control.
 - (d) Alarm control is set at 6" to 12" above override control.
 - (e) No control should be set above lowest inlet invert.
- 9-12. **PUMP, MOTOR, & CONTROL ITEMS:**
- (a) Weather-proof control panel with locking hasp.
 - (b) Duplex junction box.
 - (c) 5 level control support bracket with lead weights.
 - (d) Level control cord.
 - (e) Remote alarm panel, NEMA 3R enclosure light.
 - (f) Alarm light red globe solid state.
 - (g) Alarm buzzer.
 - (h) Convenience outlet receptacle.
 - (i) Elapsed time meter.
 - (j) Auxiliary contacts.
 - (k) Motor heat sensor.
 - (l) Lightning arrestor.
 - (m) Moisture sensor.
 - (n) Sealed mercury switch.
- 9-13. **Backflow Preventer** – There shall be no physical connection between the potable water system and the wet well. If potable water is injected into wet well it shall have an approved air gap and must be at least twice the diameter of the water supply outlet, but never less than 1".
- 9-14. **Accessibility** to lift station and equipment shall be provided for maintenance vehicles during all weather conditions and must be approved by CWL.

SECTION 10 – FORCE MAIN LINES

10-01. **Pipe and Design Pressure:**

Pipe shall be PVC with a Pressure Rating (PR) of 200 (SDR 21) or better conforming to ASTM D2241 and ASTM 3139.

Fittings shall be cast iron and equal to water main strength materials suitable for design conditions. Thrust blocking and fittings should be designed to withstand water hammer pressures associated with the cycling of the lift station pumps.

10-02. **Installation of Force Mains:**

Installation of force mains shall be in accordance with requirement of Sections 3 through 6 of the CWL Specifications for water and sewer construction.

10-03. **Velocity and Diameter of Force Main:**

The design for pumping rates should be at a cleansing velocity of at least two feet per second. The minimum force main diameter for raw wastewater shall be four inches, unless approved by CWL and Arkansas Department of Health.

10-04. **Air and Vacuum Relief Valves:**

Air and Vacuum Relief Valves shall be placed in 46" diameter manhole and be placed at the high point of the force main to relieve any air when the pumps come on and relieve any vacuum when the pumps go off.

10-05. **Force Main Termination:**

Force Main Termination shall enter the gravity manhole near the bottom (a maximum of 1 foot from the invert). Also, the manhole must be a minimum of 8 feet in depth.

SECTION 11 – CONTRACTOR/DEVELOPER AGREEMENTS

11-01. Water Extensions:

1. Plans for the proposed work must be prepared by a professional engineer registered in the State of Arkansas and submitted to CWL. Developer will use CWL's specifications on file at the Arkansas Department of Health, unless mutually agreed by the parties.
2. Upon approval by CWL, Developer's consulting engineer will submit plans, if necessary, to the Arkansas Department of Health for State approval. An inspection fee will be paid to CWL at a rate of \$0.25/ft of line. Subdivision plans must have final approval by MAPC and be filed at the Circuit Court Clerk's office prior to final approval of the system. Any construction occurring prior to such final approval by MAPC shall be at the risk of the Developer.
3. Unless the installation is to be performed on existing public right-of-way, Developer shall furnish easements in favor of CWL and to its specifications across private property. Unless the easement is provided on property included in the original subdivision plat, Developer shall furnish a certificate of title showing ownership of the property covered by the easement.
4. Upon approval by Arkansas Department of Health and acquisition of all easements, construction may begin. Construction must be performed by a qualified contractor knowledgeable in all federal, state and local rules and regulations governing this type of work. Developer must show proof of adequate insurance coverage. (Arkansas Worker's Compensation, \$1,000,000.00 minimum general liability, and \$1,000,000.00 minimum auto liability.) Such insurance may be furnished to CWL by either the Developer or by the Contractor. Contractor must have a State Contractors License, which shall cover Municipal and Utility Construction or a classification specialty covering underground piping, cable, trenching, and boring. .
5. Developer, along with a representative of the Contractor if different, shall meet with a representative of CWL on the first day planned for construction, to review any common issues. During construction, work shall be inspected by the Developer's consulting engineer for necessary safety practices, proper materials, and workmanship. CWL will provide inspections during construction, and other random inspections to insure that the plans approved by the Arkansas Department of Health and CWL are followed concerning workmanship and materials. No portion of the project shall be backfilled without CWL approval.
6. If unsafe practices are discovered by CWL during our inspections of workmanship and materials, CWL will notify the OSHA. This in no way obligates CWL for the responsibility of the Contractor's safety practices.
7. Contractor must pressure test lines to 1.5 times the anticipated working pressure of the water line as calculated by CWL. Contractor shall perform Sterilization per CWL Specifications section 4-09. Contractor shall follow flushing guidelines as per CWL Specifications Section 4-10. Costs for above normal flushing will be the responsibility of the Developer/Contractor.
8. Upon completion of project, the Developer's consulting engineer will certify by letter that all work was accomplished in accordance with all approved plans and specifications and provide CWL with a set of record drawings, which shall include plans but not specifications. The consulting engineer will also certify that all easements have been obtained, that all water is laid on the easements or right-of-way.
9. Developer shall arrange a post construction meeting including the Engineer, and a representative of the Contractor, to meet with a representative of CWL prior to final approval by CWL.
10. The Developer will furnish CWL with a written warranty for one (1) year from acceptance date. This warranty will cover any defects in workmanship and/or materials, maintenance of lines, fill and/or other surface improvements, and grade adjustments of improvements located on or near the construction area. Emergency repairs will be performed by CWL and costs billed to the Developer.
11. The Developer will certify by letter that no liens exist on the work performed. A list of all contractors, subcontractors and material suppliers that worked or supplied materials on the job and a lien release from each will be submitted to CWL with this letter.
12. Newly constructed lines will not become a part of CWL's existing system until final approval has been given by CWL Engineering Department by letter. On the date of the acceptance letter, CWL will assume ownership and warranty will begin.
13. Contractor must bury locate wire in trench per CWL requirements.

CWL Specifications

14. Installation of domestic water meter taps are required to be made during the installation of the new water mains.

15. Electric Underground Installation (Where applicable):

(a) In order to simplify the contribution that Developers make for underground electric when they also install water lines, CWL will require that Developers install the underground electric conduit. This will be in lieu of paying the standard underground electrical charges.

(b) A mouse and string must be blown in after all applicable work is completed.

Replacement or repair of conduit that is unusable for any reason will be the responsibility of the Developer. The Developer will provide all material, labor and equipment. CWL will provide the appropriate engineering drawings.

16. Contractor shall indemnify and hold harmless CWL, its' officers, agents and employees from and against any and all claims, losses, damages, causes of action, suits, and liability of every kind, including all expenses of litigation, court costs, and attorney's fees, including but not limited to personal injury to or death of any person or for damage to any personal or real property arising out of or in connection with the work performed or products or equipment provided by the Contractor.

17. On all water projects that have not been accepted by CWL within 360 days after hydrostatic tests and bacterial tests, all tests will be required to be repeated and re-certified.

18. It is the intent of this agreement that the basic responsibility for performance with the requirements hereof shall be the responsibility of the Developer, who shall be fully responsible for all activities of the Contractor and shall directly respond to CWL regarding all such Contractor activities.

11-02. Sewer Extensions

1. Plans for the proposed work must be prepared by a registered professional engineer registered in the State of Arkansas, and submitted to CWL. Developer will use CWL's specifications on file at the Arkansas Department of Health, unless mutually agreed by the parties.

2. Upon approval by CWL, Developer's consulting engineer will submit plans, if necessary, to the Arkansas Department of Health for State approval. An inspection fee will be paid to CWL at a rate of \$0.50/ft for gravity lines and \$0.25/ft for force main lines. Subdivision plans must have final approval by MAPC and be filed at the Circuit Court Clerk's office prior to final approval of the system. Any construction occurring prior to such final approval by MAPC shall be at the risk of the Developer.

3. Unless the installation is to be performed on existing public right-of-way, Developer shall furnish easements in favor of CWL and to its specifications across private property. Unless the easement is provided on property included in the original subdivision plat, Developer shall furnish a certificate of title showing ownership of the property covered by the easement.

4. Upon approval by Arkansas Department of Health, construction may begin. Construction must be performed by a qualified contractor knowledgeable in all federal, state and local rules and regulations governing this type of work. Developer must show proof of adequate insurance coverage. (Arkansas Worker's Compensation, \$1,000,000.00 minimum general liability, and \$1,000,000.00 minimum auto liability.) Such insurance may be furnished to CWL by either the Developer or by the Contractor. Contractor must have a State Contractors License, which shall cover Municipal and Utility Construction or a classification specialty covering underground piping, cable, trenching, and boring.

5. Developer, along with a representative of the Contractor if different, shall meet with a representative of CWL on the first day planned for construction, to review any common issues. During construction, work shall be inspected by the Developer's consulting engineer for necessary safety practices, proper materials, and workmanship. CWL will provide inspections during construction, and other random inspections to insure that the plans approved by the Arkansas Department of Health and CWL are followed concerning workmanship and materials. No portion of the project shall be backfilled without CWL approval.

CWL Specifications

6. If unsafe practices are discovered by CWL during our inspections of workmanship and materials, CWL will notify OSHA. This in no way obligates CWL for the responsibility of the Contractor's safety practices.

7. All gravity lines must pass ASTM C 828-80 low pressure air test for sanitary sewers. All force main lines must pass a pressure test equivalent to 1 ½ times its expected working pressure. All manholes shall pass ASTM C 1244-93 vacuum test for concrete sewer manholes.

8. Upon completion of project, the Developer's consulting engineer will certify by letter that all work was accomplished in accordance with all approved plans and specifications and provide CWL with a set of record drawings, which shall include plans but not specifications. The consulting engineer will also certify that all easements have been obtained, that all sewer is laid on the easements or right-of-way.

9. Developer shall arrange a post construction meeting including the Engineer, and a representative of the Contractor, to meet with a representative of CWL prior to final approval by CWL.

10. The Developer will furnish CWL with a written warranty for one (1) year from acceptance date. This warranty will cover any defects in workmanship and/or materials, maintenance of lines, fill and/or other surface improvements, and grade adjustments of improvements located on or near the construction area. Emergency repairs will be performed by CWL and costs billed to the Developer.

11. The Developer will certify by letter that no liens exist on the work performed. A list of all contractors, subcontractors and material suppliers that worked or supplied materials on the job and a lien release from each will be submitted to CWL with this letter.

12. Newly constructed lines will not become a part of CWL's existing system until final approval has been given by CWL Engineering Department by letter. On the date of the acceptance letter, CWL will assume ownership and warranty will begin.

13. Contractor shall indemnify and hold harmless CWL, its' officers, agents and employees from and against any and all claims, losses, damages, causes of action, suits, and liability of every kind, including all expenses of litigation, court costs, and attorney's fees, including but not limited to personal injury to or death of any person or for damage to any personal or real property arising out of or in connection with the work performed or products or equipment provided by the Contractor.

14. On all sewer projects that have not been accepted by CWL within 360 days after mandrel tests and low pressure tests, all tests will be required to be repeated and re-certified.

15. It is the intent of this agreement that the basic responsibility for performance with the requirements hereof shall be the responsibility of the Developer, who shall be fully responsible for all activities of the Contractor and shall directly respond to CWL regarding all such Contractor activities.

11-03. **Construction Inspection Policy:**

On all sewer projects that have not been accepted by CWL within 360 days after mandrel tests and low pressure air tests, all tests will be required to be repeated and re-certified.

On all water projects that have not been accepted by CWL within 360 days after hydrostatic tests and bacterial tests, all tests will be required to be repeated and re-certified.

11-04. **Water Meter Tap Policy:**

Installation of domestic water meter taps are required to be made during the installation of the new water mains.

11-05. **Electric Underground:**

In order to simplify the contribution that developers make for underground electric when they also install the water lines, City Water and Light will require that developers install the underground electric conduit. This will be in lieu of paying the standard \$2.50/ft charge.

CWL Specifications

The 2" conduit must be gray schedule 40 and the 4" conduit must be gray type II pipe. The elbows must have a 36" radius. A mouse and string must be blown in after all applicable work is completed. Replacement or repair of conduit that is unusable for any reason will be the responsibility of the developer. The developer will provide all material, labor, and equipment. City Water and Light will provide the appropriate engineering drawings.



120 South Limit Avenue
Sedalia, MO 65301
660-826-7000

302 Campusview Drive, Suite 208
Columbia, MO 65201
573-256-7200



Addendum #1

**Dogwood Cottages
Blytheville, Arkansas
Wallace Job #2772**

September 21, 2012

The following are deletions, additions and/or clarifications to the plans and specifications and shall be considered as if originally contained therein:

Drawing Changes (Drawings Attached)

Civil

1. See attached document by Crockett Engineering Consultants, dated 9/21/2012, that references the summary of civil changes and clarifications.

Plumbing

P1.0D, P1.1D, P1.0Da4, and P1.1Da4 (Attachment #1) and P1.0CB (Attachment #3)

1. Clarifications have been made regarding responsibilities of the site utility contractor, plumbing contractor and the water service provider – Dogwood Water.
2. Clarifications have been made regarding the water meter locations. See civil for water meter locations for length requirements by the site utility contractor and the plumbing contractor. Water meters shall be 5/8" and shall be provided and installed by Dogwood Water.
3. Clarifications have been made regarding the connection responsibilities of the site utility contractor and the plumbing contractor at the exterior cleanout of each unit and the community building. Specifics have been added on the cleanout size and the reducer required from 4" to 3" sanitary sewer pipe at each dwelling unit cleanout.

Electrical

E1.0D and E1.0Da4 (Attachment #2)

1. Duplex electrical service plans and electrical plans have been revised based on service entrance locations provided by Electrical provider – Entergy.

Site Electrical layout – by Entergy

1. See attached proposed, site electrical layout for underground electric locations and proposed transformer locations. As discussed between Crockett Engineering and Entergy and approved by Jason Glass of Entergy, final transformer locations and underground

secondary locations may be adjusted to coordinate with water, sanitary sewer locations and drainage swale locations. General locations are to remain.

Drawing Clarifications (Drawings Unattached)

Landscaping

LS1.0

1. Leyland Cypress is an acceptable species for the row of evergreens on the south property line.
2. Bermuda sod shall be used in lieu of fescue sod originally specified.
3. Boxwoods and Dwarf Nandinas may be substituted for the Pfitzer Euonymus and Japanese Yews.
4. Tree stabilizers, by Tree Staple Inc or equal, may be used in lieu of tree stakes originally specified.

Architectural

A1.0Da4

1. Door #7 on the Door Schedule shall be 9'-0" wide in lieu of 16'-0" wide originally specified. Size is shown graphically correct on floor plans and exterior elevations.

A2.0D, A2.1D, A2.2D, A2.0Da4, A2.1Da4 and A2.2Da4

1. Overframed gable on the front elevation at the front entry doors shall be pre-engineered, hip valley sets in lieu of field framing originally specified.

A3.0D, A3.1D, A3.0Da4 and A3.1Da4

1. Clear egress opening area at bedroom windows shall be 5.0 sf in lieu of 5.7 sf originally specified (egress windows at grade level). 3'-0" x 5'-0" bedroom windows originally specified meet egress requirements.

Specifications

1. The Pre-bid Agenda and Instruction to Bidders distributed at the Pre-bid meeting, dated September 19, 2012 are attached and are to be included in the project manual.

Attachments:

1. The summary of civil changes and clarifications by Crockett Engineering Consultants, dated 9/21/2012.
2. The following Civil drawing sheets prepared by Crockett Engineering Consultants are being reissued – CE0, CE1, CE2, CE3, CE4, CE5, CE6, CE7 and CE8 (revised sheets are clouded with a delta #1 and bear a latest revision date of September 21, 2012).

3. The following Architectural drawing sheets prepared by Wallace Architects, LLC are being reissued in 8.5x11 format – (labeled as Add #1, clouded with a delta #1 and bearing a latest revision date of September 21, 2012.)
 - P1.0D Attachment #1
 - P1.1D Attachment #1
 - P1.0Da4 Attachment #1
 - P1.1Da4 Attachment #1
 - P1.0CB Attachment #3
 - E1.0D Attachment #2
 - E1.0Da4 Attachment #2
4. Pre-bid Conference Agenda and Instruction to Bidders, dated September 19, 2012.
5. For coordination purposes only, the following drawing sheet prepared by Electrical Service Provider – Entergy (undated and labeled as 1 of 2) is being issued.

END OF ADDENDUM #1



Explanation of Civil Plan Revisions

Dogwood Cottages

Blytheville, AR

September 21, 2012

Addendum #1

Cover Sheet

1. Revision Key was revised according to these changes.

Sheet CE3

1. The existing 4" sanitary sewer force main was added to the plan.
2. The combined 4" laterals were revised to incorporate a 6" common lateral with two 4" laterals going to each specified unit.
3. The estimated quantities were revised to show 10" sewer rather than 8" sewer.

Sheet CE4

1. The 4" connection from the force main was added to the sanitary sewer profile.

Sheet CE5

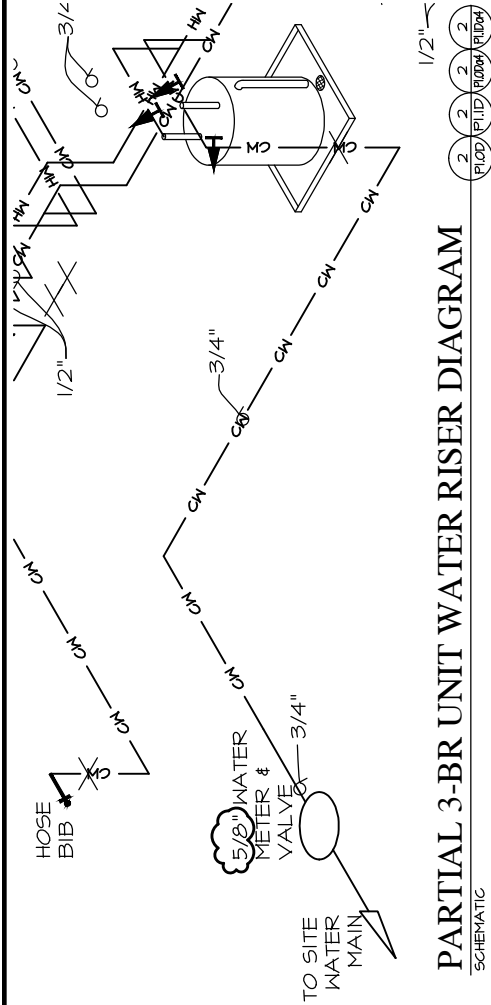
1. The C-900 waterline pipe has been revised to Class 200 pipe.
2. The separation note on the plans has been revised.
3. A note stating all construction shall be in accordance with the Dogwood Water Association regulations has been added to the plan.

Sheet CE7

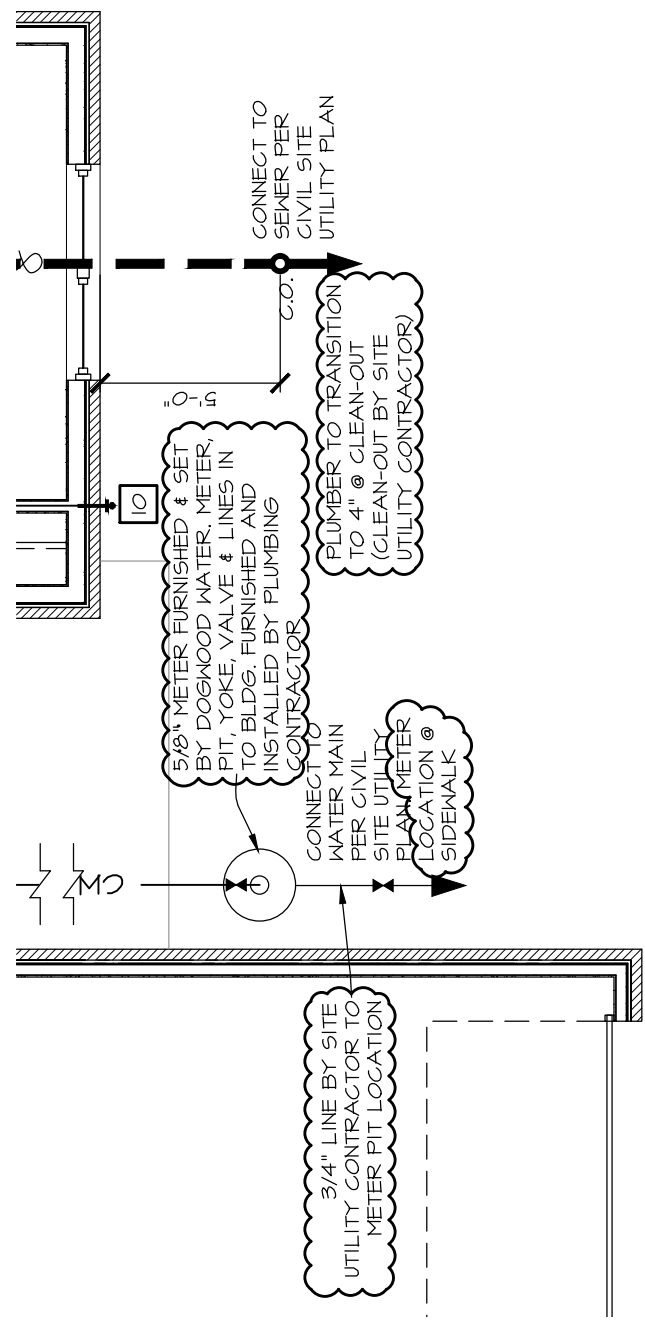
1. Pavement cross-sections have been added to the sheet. Alternate cross-sections have been added as well.

Sheet CE8

1. A curb detail has been added to the plan.
2. All reinforcement has been removed from the sidewalk detail.
3. A driveway cross-section has been added to the plan.



PARTIAL 3-BR UNIT WATER RISER DIAGRAM

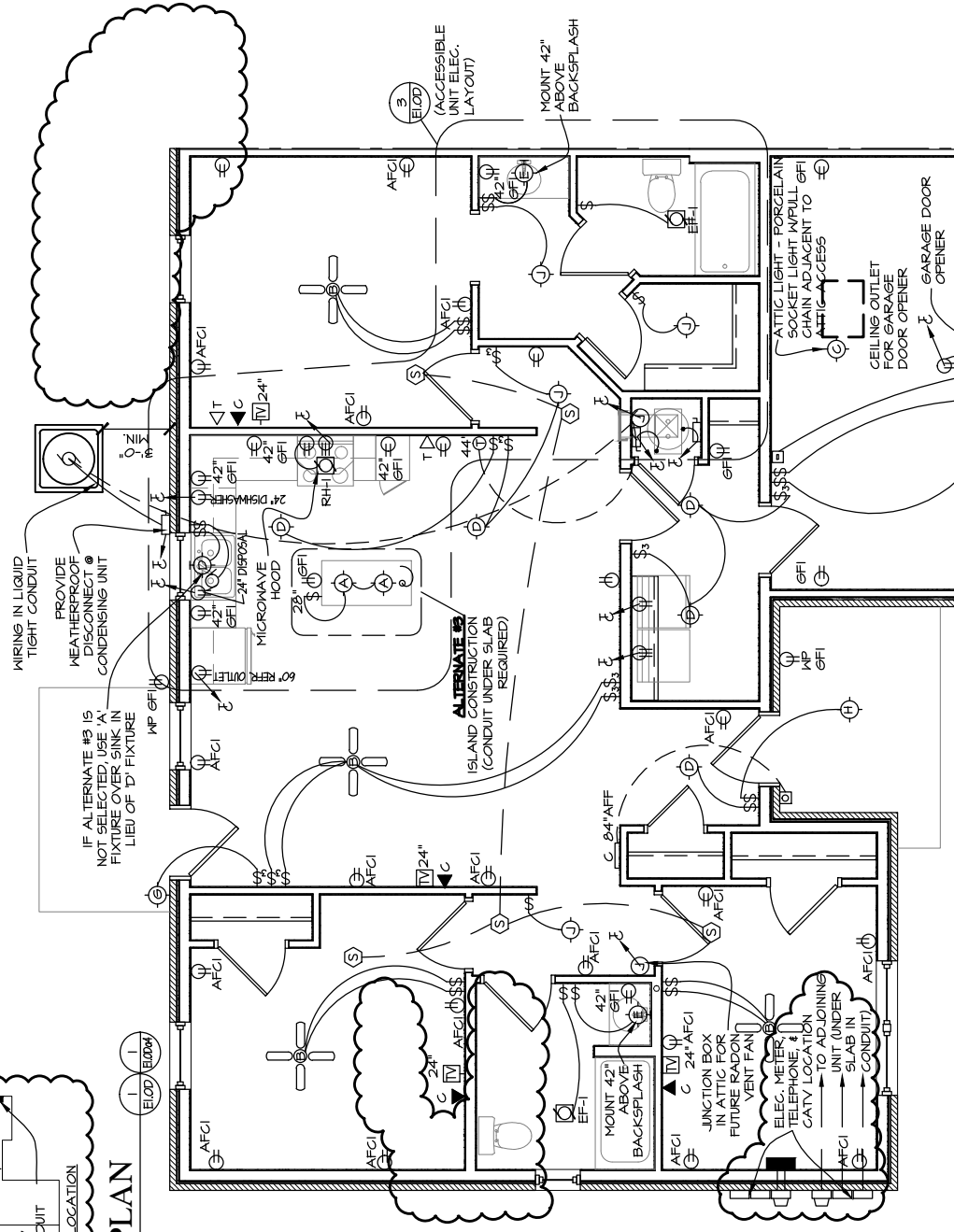


PARTIAL 3-BR UNIT PLUMBING PLAN

ADDENDUM	#1
ATTACHMENT	#1
SHEET	P1.0D/ P1.1D P1.0Dx4/ P1.1Dx4
JOB NO.	2772
DATE:	21 SEP 2012

DOGWOOD COTTAGES
Blytheville, Arkansas

SCHEMATIC

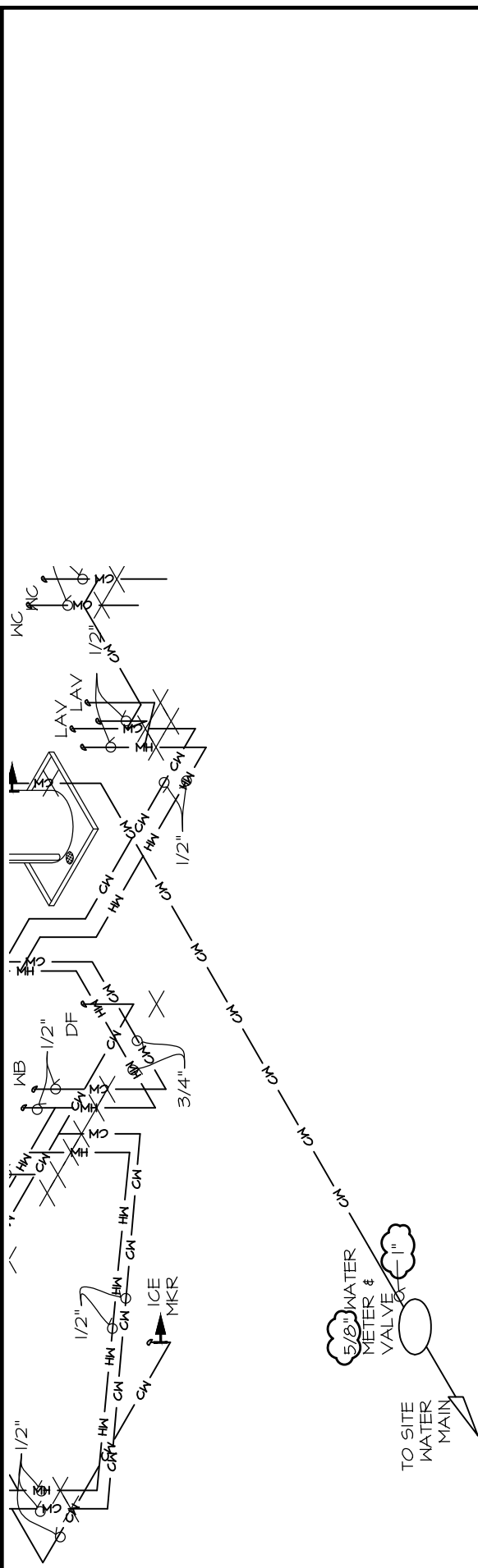


PARTIAL TYPICAL 3-BR UNIT ELECTRICAL PLAN

ADDENDUM	#1
ATTACHMENT	#2
SHEET	E1.0D E1.0Da4
JOB NO.	2772
DATE: 21 SEP 2012	

DOGWOOD COTTAGES

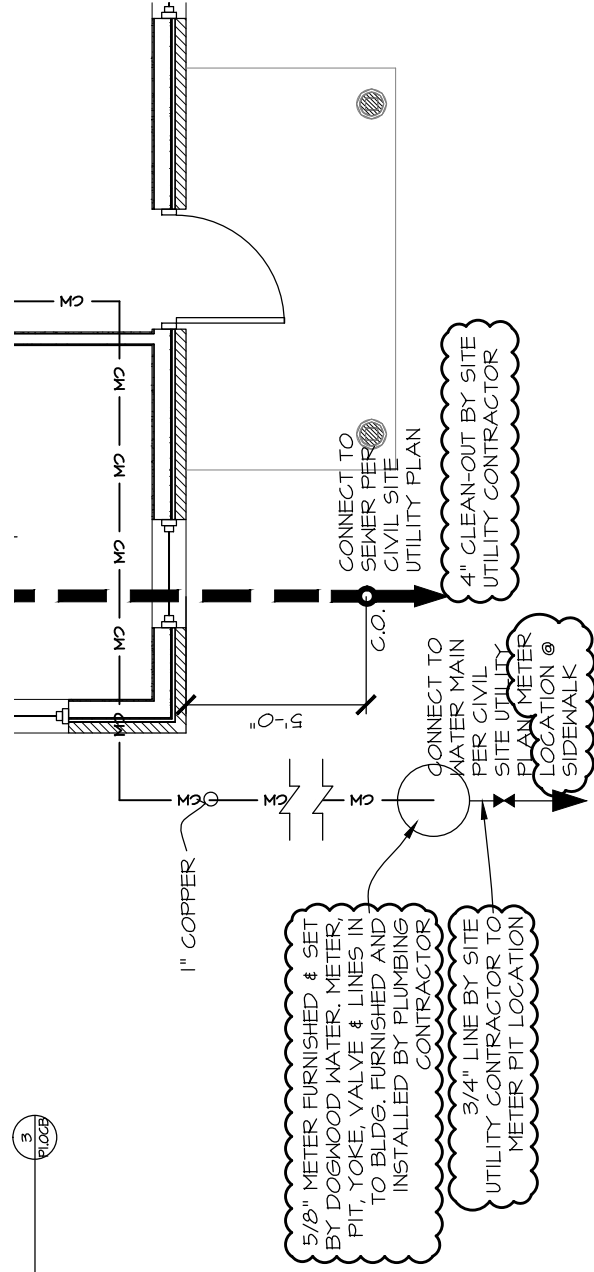
Blytheville, Arkansas



PARTIAL COMMUNITY BUILDING
WATER RISER DIAGRAM

SCHEMATIC

3
P10CB



PARTIAL COMMUNITY
BUILDING PLUMBING PLAN

SCHEMATIC

4
P10CB

ADDENDUM	#1
ATTACHMENT	#3
SHEET	P1.0CB
JOB NO.	2772
DATE:	20 SEP 2012

DOGWOOD COTTAGES

Blytheville, Arkansas



PRE-BID CONFERENCE

Dogwood Cottages
Blytheville, AR

AGENDA

DATE: September 19, 2012 9:00 AM

- 1) Attendance Sign In
- 2) Project Architect, Mike Kleffner, AIA, Wallace Architects, Columbia, MO
- 3) Civil Engineer, Tim Crockett, Crockett Engineering Consultants, Columbia, MO
- 4) General Contractor, DCI Construction, Springfield, MO (AR Lic # 0209340513)
- 5) **Bid Date and Time: October 2nd, 2012 at 2:00 PM**
- 6) **Bids may be Faxed to (417) 832-1668**
- 7) Bids may be submitted on your company letterhead. There is no formal "Bid Form" however each should be clear and descriptive of the work included in each proposal for bids to be considered.
 - Note "Addenda Received" on your bid form
 - Provide any alternate pricing related to the scope of work bidder is submitting for
 - No "Bid Bond" is required
 - Payment & Performance Bond will not be required unless there are special circumstances
- 8) This project is **NOT** tax exempt and all sales taxes apply and shall be included in all bids
- 9) Bid Documents Availability (see Invitation to Bid)
- 10) Addenda – To be issued by Friday morning September, 21st
- 11) Alternate Pricing : Located in the spec book and on the plans
 - Alt #1 Install Vinyl siding in lieu of fiber cement siding
 - Alt #2 Brick Arch at Front Entry with Base Bid Floor Plan (includes concrete, framing, soffit, brick, roofing, electrical)
 - Alt #3 Kitchen Island, Including cabinet, countertop and electrical via underslab conduit
 - Alt #4 One Car Garage in lieu of two car as well as downsized living room, see full set of "a4" drawings
 - Alt #5 Brick Arch at front entry with Alternate #4 Floor Plan (includes concrete, framing, soffit, brick, roofing, electrical)
 - Alt #6 Vinyl siding in lieu of Fiber Cement siding for Alternate #4

12) Unit Pricing

- Top Soil (if additional is required \$ _____ per cu. yd.
- Mass Rock excavation and removal \$ _____ per cu. yd.
- Trench Rock excavation and removal \$ _____ per cu. yd.

13) Allowances

- Brick allowance shall be \$300.00 per thou
- Corporations, Partnerships & LLC's must be able to provide a "Certificate of Good Standing" from the Arkansas Secretary of State's office
- Sole Proprietors must provide a W-9

14) Project is designed to achieve and Energy Star HEERS rating of 55

15) Each Trade is responsible for caulking and/or air sealing any/all penetrations through the framing members and drywall that are created by their work.

16) All licenses to be the responsibility of the subcontractor including a City License

17) Security – Subcontractor will be responsible for the safe storage of their materials and tools. DCI Construction does not provide security for tools or un-installed materials. Builders Risk Insurance does not cover materials that are not installed.

18) Safety

- a) OSHA requirements shall be strictly adhered to throughout the duration of the project for all trades including but not limited to hard hats, personal protective safety gear, fall protection, trench shoring or benching, scaffolding, ladders, saw guards, GFCI protection, extension cords, ect.

19) Subcontractor Insurance, Workmen's Compensation, General Liability, Automobile Liability required. Owner, MHDC and Investor may be included as Additional Insured (sample insurance requirements and required form attached)

20) Review of the project

- a) **Scope of Work**
- b) **Approximate Construction Start , October 2012**
- c) **Duration approx 7 months**

21) Questions

Instructions to Bidders

All bidders

1. All bids submitted for Subcontract work shall include all, labor, materials, equipment, hoisting, stocking, storage, safety requirements, safety equipment, rigging, taxes, permits, licenses, tap or hook-up fees, dues or any other item required to complete the scope of work bidder desires to be considered for.
2. All subcontractors shall include in their bid caulking and/or air sealing of any and all penetrations through top plates or exterior walls made during the course of their work.
3. Daily Clean up shall be performed by each and every subcontractor including broom clean up in buildings to the satisfaction of DCI Construction.
4. All bids shall remain Valid for 60 Days
5. Liquidated Damages will be included in each Subcontract in the amount of \$200 per day.
6. All equipment brought on site including excavating equipment, dump trucks, material handling equipment etc. shall have all OSHA required warning devices and safety protection in proper working order
7. All saws shall have proper working guards. All workmen shall have personal protective gear including but not limited to hardhats, goggles, harnesses, lanyards long pants, hard soled shoes, shirts with sleeves, etc.

Sitework, Utilities, Demolition and Hazardous Materials Abatement

1. The grading subcontractor shall provide and maintain all erosion controls shown on drawings.
2. Combined Grading, Storm Sewer and Sanitary Sewer bids shall be broken out as separate numbers.
3. During the entire course of construction, all existing utilities must be protected and service shall not be interrupted, including sanitary sewer, water service, electric power, telephone, gas, etc.
4. Site clearing and grading shall include removal of any concrete curbs, approaches, sidewalks etc., where new street ties into existing. Neat and straight saw cuts shall be required at all roads and walks
5. Proper over-excavation and engineered fills shall be performed by and included by the grading subcontractor in accordance with the Geotechnical Report.
6. Site works bids shall include all requirements of Plans, Specifications and Geotech Report included but not limited to the following: erosion control, grading to within +/- one tenth, import or export of all required fill including unsuitable soils, compaction per Geotech and Specifications, Tree removal, finish grading, grading behind curbs after curb installation, provide and place topsoil ready for blading and raking by landscaper.
7. Domestic Water Service Mains shall be installed by utility contractor and will be completed simultaneously. Finish grading over water mains shall be included by the site work contractor.
8. Sanitary Sewer shall be extended to and stubbed out within five foot (5') of each house
9. Site Utility bids shall include backfill and compaction of all trench excavation, trench shoring if required per OSHA requirements, de-watering of trenches, aggregate backfill where required

10. Compaction testing shall be provided on a one time basis for each area. If additional testing is required due to sub grade failure the cost of such additional testing shall be at the expense of the sitework contractor.

Landscaping

1. Finish grading of topsoil placed by site work contractor
2. Raking of all areas including removal of any rocks, dirt clods, roots, vegetation etc. prior to placing plantings, mulch or sod
3. Sod shall be good healthy condition and shall be watered and maintained by the landscaper for a minimum of two weeks after installation.

Paving

1. Provide and install all aggregate base compacted and in place
2. Provide and install all asphalt Paving per plan and specifications
3. Provide pavement striping per plan

Concrete

1. Include all Structural Excavation for footings and/or foundations
2. Weather protection and curing.
3. All concrete material, including concrete mix designs for approval.
4. All reinforcing steel and welded wire fabric, including shop drawings for approval.
5. All aggregate base under concrete.
6. All vapor barriers, sealants, dowels, forming, temporary shoring, expansion joints, control joints, etc.
7. All concrete pumping and means of placement as necessary.
8. Excavation and backfill for all structural concrete below grade.
9. Removal of all concrete spoils from site.
10. Review the entire sets of drawings and include all cast in place concrete on the site, for all houses, in the streets and shown at the four existing houses/buildings to remain and be renovated.
11. Furnish and install caulking at all sidewalk joints, driveway joints and paving joints.
12. Include the following in concrete bids: aggregates under slabs, walks and curbs, vapor barriers, rigid insulation under slabs and behind foundations, embed bolts for framing bottom plates, foundation for Monument sign at entrance, etc.

Masonry

1. Include a Brick allowance of \$300.00 per thousand for King Size brick
2. Provide all sand, mortar, admixtures, water, masonry flashings, wall ties, caulking of brick control joints, nervestrol flashing, monument sign at entrance, etc.
3. Broken brick, excess mortar around foundations and all masonry debris shall be cleaned up by the masonry contractor on completion of each building and shall be placed in a dumpster provided by the masonry subcontractor and removed from site by masonry subcontractor.
4. Nervestrol, 20 mil Spec. Section 07100

Framing and Rough Carpentry

1. Framing materials, hangers, clips and trusses provided by others

2. Framing labor includes but not limited to all building, setting in [place, attaching ect., of all walls, setting all trusses including any hoisting equipment required, over framing at roof backing, blocking, sheathing, decking, bracing, subfacia, anchor bolt nuts and washers tightened down, house wrap, taping of house wrap, window tape
3. Set all windows and exterior doors and install seal tape as noted on plans. Fasten exterior doors threshold to concrete with tap-cons,
4. Install building wrap, tape all joints
5. Install all blocking, bracing, drywall nailers, backing for cabinets, shelving, toilet and bath accessories
6. Use scrap materials for blocking or bracing to minimize waster
7. Provide all nails, fasteners and construction adhesives

Finish Carpentry

1. Provide all nails and fasteners required to install all doors, trim and hardware
2. Hang all interior pre-hung door units including shims at three locations on each side.
3. Shim and adjust exterior doors and install casing
4. Install all bath hardware provided by others
5. Install all door hardware provided by others
6. Install address Numbers
7. Include unloading and distribution of all items provided by contractor.
8. Install microwave ovens
9. Installation of cabinets and counter tops and vanities and vanity tops shall be by cabinet provider.

Cabinetry

1. Cabinet package shall include hardware and 2 1/4" crown mould
2. Provide and install hard surface window sills per plan
3. Counter top shall be caulked to wall with matching counter top color
4. Include countertops, vanities and cultured marble vanity tops.

Roofing

1. Roofing subcontractor shall include shingles, felt, moisture barrier, drip edge, nails, flashing, roof vents, ridge vent, ridge cap and any required flashing for a complete weather tight installation in accordance to plans and specifications except the following
2. Attic Radiant Barrier 07300-2 will not be included by the roofing contractor (Paragraph 2.1.H)
3. Hip and ridge shingles may be cut from three tab shingles matching roof color rather than preformed as written in the specifications

Insulation

4. All plates shall be caulked to concrete
5. All windows and doors shall have air sealing foam installed
6. All insulation whether batt or blown shall be installed to a Grade 1 Level
7. Provide and install all batt and blown insulation per plans and specifications for walls and attic, air baffles, vapor barriers, caulking ext.
8. Remove scrap insulation, plastic bags etc. to dumpster

Drywall and Plaster

1. Include all drywall board, nails, screws, tape, compound, sanding and texture
2. Drywall shall be scrapped out daily to a dumpster provided by the Drywall Contractor and disposed of properly by Drywall contractor off site.
3. Drywall contractor shall scrap all floors and vacuum up all sanding dust at the completion of drywall scope for each floor
4. Repair/replace existing stucco finish on existing buildings as noted on plans.
5. Apply silicone caulk between concrete and bottom of drywall per notes on drawings.

Painting

1. All necessary preparation and painting of all drywall and interior doors/trim of new houses.
2. Painter shall caulk all opening in the drywall prior to painting including all switch boxes, receptacle boxes, Electrical Panel, Ceiling light boxes, HVAC vents and return air grills locations, etc. for air sealing purposes

Flooring

1. Basic prep work of all control joints shall be included
2. Repair, strip and clean existing tile to remain in existing buildings as noted on plans.

Plumbing

1. Include Water service from meter to unit including excavation, bedding and backfill. Water Meter Pit and Meter by others
2. Connect to sanitary sewer including cleanout at five foot (5') outside of each unit.
3. Include all excavation, bedding, backfill, compaction for under slab plumbing including Passive Radon piping.
4. Hook up water to ice makers and dishwashers and run one cycle to check for leaks.
5. Furnish and install garbage disposers.
6. Provide pipe boots for all roof penetrations to be installed by the roofer
7. Caulk toilets to sheet vinyl
8. Caulk floor drains to finish flooring.
9. Insulate exposed piping per plan & specifications and ADA requirements.
10. Furnish and install caulking at all plumbing pipe penetrations through drywall for air sealing. Provide and install concrete seal around tub drain for Radon protection
11. Furnish and install escutcheons at all pipe penetrations whether exposed or under cabinets
12. Cultured marble vanity tops shall be provided and installed by the cabinet subcontractor.
13. **Include 1-piece flat panel tub/shower units with factory installed backing for future grab bars.** The handicap tub/shower units shall include the grab bars, hand held sprayers and handicap seats.

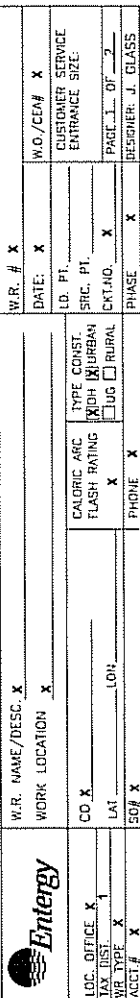
HVAC

1. All low voltage thermostat wiring.
2. Provide and install angle iron brackets required for mounting of air handlers.
3. Furnish and install any access doors if needed for this scope of work.
4. Furnish and install all support pads for condensing units.
5. Include factory disconnects for all condensing units or heat pumps.
6. Provide and install temporary vent covers at time of ductwork installation on all openings

7. All joints in ductwork shall be taped or sealed to eliminate air loss
8. All ductwork to be hard piped except the last six (6') foot of each supply run may be flex duct connecting to the register boot.

Electrical

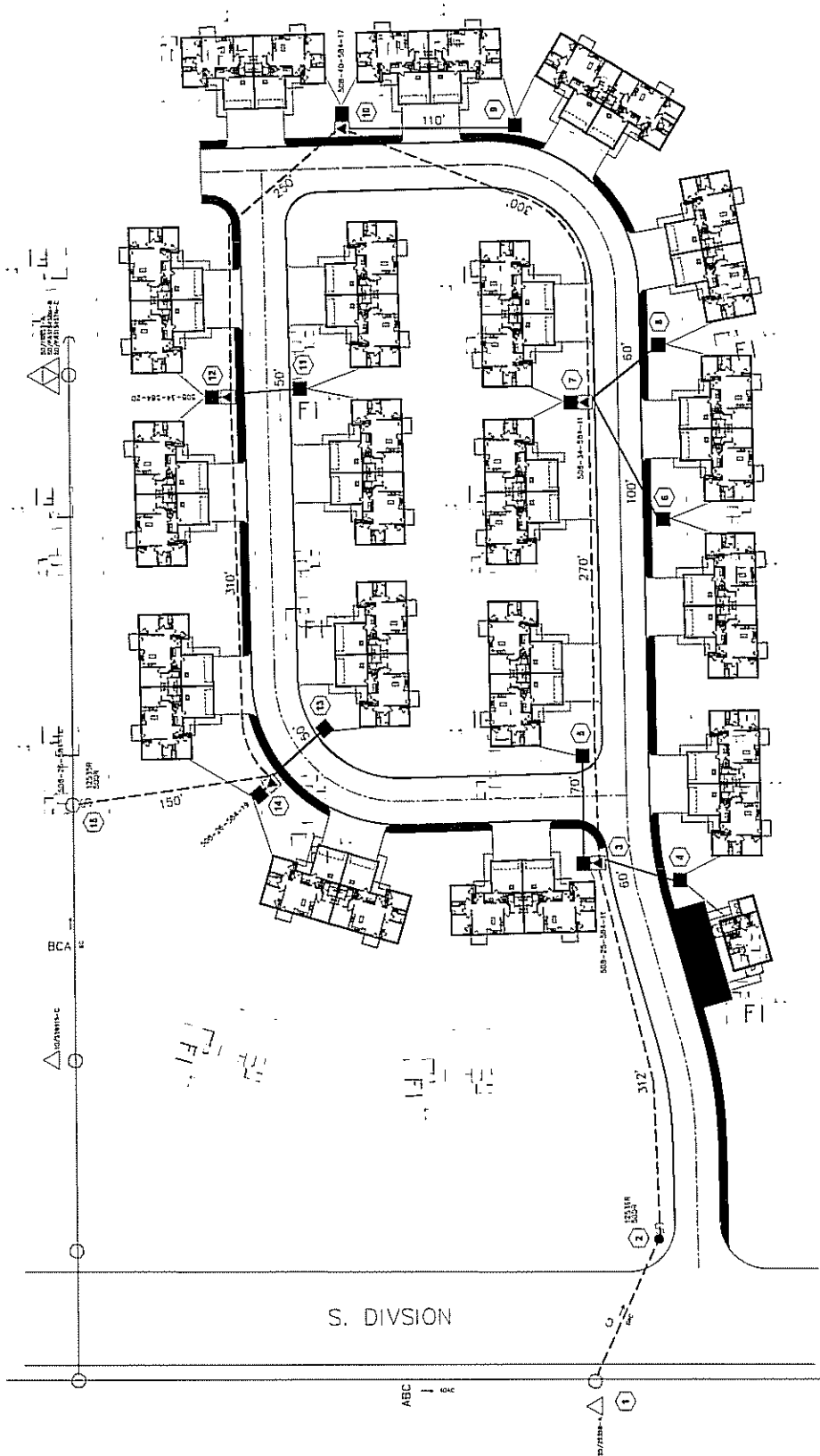
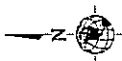
1. Provide and install 8 each temporary power panels and receptacles at various locations as may be required by DCI in compliance with OSHA, all with GFCI protection, for use by all trades. 220 volt temporary and 200 amp 110 volt service shall be available on each. Furnish and install temporary electrical service connection to contractor's office trailer and remove upon completion.
2. Provide permits for temporary power, if any.
- 3.
4. Include all low voltage wiring except thermostat wiring.
5. All caulking of penetrations through top plate of exterior and interior wall framing and all penetrations to the exterior.
6. Furnish and install disconnects for all condensing units.
7. All telephone and cable TV wiring, devices and cover plates.



DIRECTION OF US SERVICE

THE CONCEPT

4'-CONDUIT 4' DEEP



CUSTOMER TO PROVIDE
TRENCH, CONDUIT, BACKFILL,
AND 14" NYLON ROPE.
ALL ELBOWS ARE TO
BE LONG SWEEP 90
DEGREE RADIUS.
FOR PEDISTALS BEHIND
TRANSFORMERS, USE
2" LONG SWEEP 90S AND
A COUPLING.
SERVICES WILL BE INSTALLED AT
DOWN POINT ON DUPLEX TO A
GANG METER PANEL.
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PROJECT ALTERNATES

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dated July 18, 2012, 52 pages)

Geotechnical Report Addendum (Prepared by Koehler Engineering & Land Surveying, Inc.,
dated September 6, 2012, 2 pages)

Sample ARR 150000 Inspection Form – Stormwater Pollution Prevention Plan (provided by
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Sample Notice of Intent for Discharges of Stormwater Runoff – Arkansas Department of
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Sample (NPDES) National Pollutant Discharge Elimination System

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SECTION 10670 – Storage Shelving
SECTION 10800 – Toilet & Bath Accessories

SECTION 11000 – Equipment

SECTION 12505 – Window Blinds

SECTION 15400 – Plumbing Fixtures & Equipment
SECTION 15600 – Heating, Ventilating & Air Conditioning

SECTION 16000 – Electrical

Electrical Load Calculations

Panel Schedules

Entergy Electric Residential Guidelines & Specifications (Condensed - 34 pages)

Energy Scope of Work (econsultants, LLC)



INVITATION TO BID

Dogwood Cottages

LOCATION: Northeast Intersection of Hwy 61 and Dogwood Road
Blytheville, Arkansas

PRE-BID MEETING: Wednesday September 19, 2012 9:00 AM
at Chamber of Commerce Bldg
300 West Walnut St., Blytheville, AR

BID DATE: Tuesday October 2, 2012 2:00 PM
(bids may be faxed to General Contractors office)

SUBMIT BIDS TO: Denton Cline
DCI Construction, LLC Lic. # 0209340513
1354-C E. Kingsley
Springfield, MO 65804

Phone: 417-832-8382
Fax: 417-832-1668

ARCHITECT: Mike Kleffner, AIA
Wallace Architects, LLC
Columbia, MO
Phone: 573-256-7200

Plans and Specifications may be viewed at the Following locations:

- General Contractors Office, Springfield, MO
- Online at Drexel Technologies, www.drexeltech.com , eDISTRIBUTION PLAN ROOM
- McGraw-Hill Dodge online
- limited sets may be obtained from the General Contractor with a \$150.00 Deposit and \$50.00 non refundable shipping charge.

PROJECT SUMMARY: Construction of eighteen (18) new duplexes, thirty six (36) total units and one (1) community Building. Scope includes: Site grading, site utilities (sanitary, water, storm), concrete curb & gutter, sidewalks, asphalt paving, landscaping, concrete foundations & slabs, wood framing, brick veneer, Hardi siding, shingle roof, plumbing, HVAC, electrical, insulation, drywall, painting, doors, windows, interior trim, hardware, flooring, appliances, interior finishes, ect.

Additional Information: All bidders required to have valid Arkansas Contractors License, General Liability Insurance, Automobile Liability Insurance and Workmen's Compensation Insurance

1354-C East Kingsley • Springfield, Missouri 65804
417-832-8382 • Fax: 417-832-1668

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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(1479765827)

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that 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, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

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§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and

completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 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 claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

(Paragraphs deleted)

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

(Paragraphs deleted)

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4.

§ 4.2.9 The Architect will conduct a review of the Work to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, the Contractor's written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and

decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

Notwithstanding any provision of this Agreement and any of its amendments to the contrary, Architect has no duty to Owner, Contractor, any of their subcontractors, agents, or assigns or to anyone else, to inspect the Work for defects, for lack of quality or for lack of good workmanship. In the event that Architect observes any defects, lack of quality, or lack of good workmanship in the Work while Architect is on site, then Architect will raise the issue with the Owner and Contractor. However, by no means does this provision or the making of such an observation create any duty to inspect for, search out, or find any such defects, lack of quality, or lack of good workmanship. Owner hereby agrees to indemnify and hold harmless, and covenants not to sue, Architect, its owners, employees, contractors, agents, and assigns from any and all claims, demands, costs, expenses, law suits, attorneys fees, liability, judgments, and damages which arise or may arise from any defects, lack of quality or lack of workmanship in the Work or the lack of Architect to observe any defects, lack of quality, or lack of workmanship during any site visits or inspections.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 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 no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract

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Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be

reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner that the Work has progressed to the point indicated. Such Certification shall be based on the Architect's limited observations at the site as provided by the Amendment to AIA Document B181 and on the data comprising the Contractor's Application for Payment. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made any inspections beyond the monthly inspection as provided in the Amendment to AIA Document B181, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by

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the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will review the Work to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another review by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final review and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such review and, when the Architect finds that final payment is appropriate to make, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's limited on-site visits and limited inspections, the Work has been completed and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. However, the issuance of a final Certificate for Payment will not be a representation that the Architect has (1) made any inspections beyond the monthly inspection as provided in the Amendment to AIA Document B181, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to mold, asbestos or polychlorinated biphenyl (PCB), or other toxic or hazardous materials encountered on the site by the Contractor, the Contractor shall, upon

recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees

of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

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§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in

any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

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§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

SECTION 01100

GENERAL REQUIREMENTS

SCOPE OF WORK - The work included under these Specifications consists of furnishing all items, materials, operations, or methods listed, mentioned, indicated or scheduled on the Drawings and/or in these Specifications, including all labor, materials, equipment, transportation, temporary facilities, services and incidentals necessary and required for the construction and completion of the project named on the title in accordance with the Contract Documents.

CONTRACT SPECIFICATIONS - The General Requirements apply to every division (2 through 16) of these specifications. All specifications instructions are directed to the General Contractor and the inclusion of any work by mention, note, or itemizations, however brief, implies the General Contractor shall provide same, unless specifically directed otherwise. Where a specific Contractor is named, he shall be responsible for and provide work so designated. In specifying an item by manufacturer's name and/or catalog number, such items shall be provided complete with all the standard devices and accessories as indicated in the latest edition of the manufacturer's catalog or brochure published at date of invitation to submit proposals, unless specifically stated otherwise.

CONTRACT DRAWINGS - The Contract Drawings, or Plans, on which the Proposal and Contract are based, are listed on the cover sheet of the Plans.

GENERAL REQUIREMENTS OF WORK

A. Drawings

1. Do not scale Mechanical and Electrical Drawings for dimensions. Accurately lay-out such work from dimensions indicated on Architectural Drawings unless such be found in error. Consult Architect for any interpretations concerning locations of equipment.
2. Consult Drawings for miscellaneous items of each trade and provide same as indicated.

B. Shop Drawings

1. Shop drawings shall illustrate principal component parts, methods of assembly, mechanical and electrical connections, accessories and relationship to the building components. General Contractor shall submit five sets of complete shop drawings to the architect. All shop drawings shall be reviewed and approved by the General Contractor prior to submission to the Architect and then will be returned to the General Contractor (by the Architect) for distribution. Failure to follow this process could result in unnecessary delays as shop drawings received by the Architect and not approved by the General Contractor will be returned unchecked to the General Contractor.

2. The General Contractor shall submit a minimum of (6) six copies of each submittal for the Architect's review and use in distribution to the Owner, other consultants and/or parties involved. The Architect shall return a minimum of (3) copies upon completion of review process.
3. Items to have Shop Drawings submitted in general are:
 - a. Site Furnishings
 - b. Concrete Mix and Accessories
 - c. Masonry and Masonry Accessories
 - d. Metals (refer to Division 5 for additional information)
 - e. Finish Carpentry (refer to Division 6 for additional information)
 - f. Roofing Materials and Accessories
 - g. Sealants
 - h. Vinyl Siding
 - i. Gypsum Board Finishes
 - j. Windows
 - k. Doors and Frames (wood and metal)
 - l. Finish Hardware
 - m. Glazing Material
 - n. Paint Finishes
 - o. Ceramic Tile
 - p. Vinyl Composition Tile
 - q. Carpeting
 - r. Fire Protection Devices
 - s. Toilet and Bath Accessories
 - t. Window Blinds
 - u. Appliances
 - v. Plumbing equipment and fixtures
 - w. HVAC (equipment, grilles, registers and fire dampers)
 - x. Electrical equipment and fixtures

(This list is provided as a courtesy – it does not release the Contractor of responsibility of reviewing the Specifications complete and submitting requested information for review/approval by Architect)

C. Architect's Selection and Approval of Materials

1. Where approval of Architect for material or equipment is required, secure such approval before procurement.
2. Where colors and/or patterns are to be selected by Architect and/or Owner, request such selection in ample time for procurement.

3. For each job-finished material, such as masonry, plaster, concrete, paint and other finishes, prepare a sample panel or area, then obtain Architect's approval before installing the balance of such work. When Architect requires additional panels or samples, provide same as necessary to secure his approval. Where practical, if approved, sample panels may become a part of building construction. Subsequent work shall be in accordance with approved sample panels.
4. The aesthetic values of every material and installation, such as shape, proportion, texture, finish and color, will be an important consideration to the Architect and his decisions concerning same shall be final.

D. Protection of Work and Property

1. The Architect shall not be responsible for, nor have control over, nor charge of construction means, procedures, methods, techniques, or for safety programs or precautions in conjunction with the project construction. The General Contractor shall be solely responsible for these under the Construction Contract. The Architect shall not be responsible for the General Contractor's failure to carry out work in accordance with the Contract Documents. The Architect shall not have control over or in any way be responsible for the General Contractor's scheduling or acts or omissions of the General Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the work.
2. The General Contractor shall initiate, maintain, and supervise all safety precautions and programs in conjunction with the performance of the Contract, and shall be responsible for same.
3. The General Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of public authorities dealing with safety of persons or property or their protection from damage, injury, or loss. The General Contractor shall also give notices in accordance with the foregoing.
4. The General Contractor shall construct and maintain temporary drainage and pump as necessary to keep site and excavations free from water. Remove ice and snow as necessary for safety and proper execution of his work, provide cover and protection for his work from inclement weather and brace all construction to prevent damage from wind.
5. Keep covered all materials, cavities and holes subject to damage by falling materials or deposits of water, snow or ice.
6. In cold weather protect work from damage from frost and freezing. In hot weather protect work from rapid drying out.
7. Transport, handle, store and erect materials in a manner to keep them free from injury.

8. Support no runways, ramps or construction equipment on or transport over any items or assemblies subject to displacement, disfigurement or other damage.
9. Protect work in place, requiring job-finishing, until such finishing has been completed
10. Protect previously placed work by suitable coverings or other protections during installation of subsequent work. Clean off any foreign materials accidentally deposited on finish surfaces and, where such would stain, corrode or otherwise disfigure, clean immediately with material that will not damage finished work.
11. Where finished floors are subject to damage, suitably cover traffic areas until building acceptance.

E. Temporary Equipment

1. The General Contractor shall provide temporary hoists, walks, ramps, ladders, runways, scaffolding, shoring, bracing and other equipment required for proper progress of his work and remove same at work completion.

F. Appropriate Materials and Installation

1. Before submitting a proposal the General Contractor, his Subcontractors and Material Suppliers shall observe Drawings and Specifications and should any material and/or its installation be indicated or specified in a manner not approved by the material manufacturer, notify the Architect and receive his instructions. Failing to do so, the Contractor shall provide other materials suitable for the installation as selected by the Architect, or if not discovered until after installation, The Contractor shall replace materials with such other suitable and selected materials, and in either event, at no added cost to Owner.
2. All materials shall be new unless otherwise specifically covered by the drawings, specifications, or approved by the Owner.
3. Materials or products specified by name of manufacturer, brand name or trade name, and/or catalog reference at plans and specifications, shall be deemed to establish standards of quality and style, and not to be proprietary in nature. Any article or material, which will adequately perform the duties imposed by the general design, will be considered, providing it is of same substance and function.
4. If the Contractor proposes construction method other than that shown or specified, complete drawings and engineering notes shall accompany request. The General Contractor shall submit five sets of drawings and notes to the Architect. All drawings and notes shall be reviewed and approved by the General Contractor prior to submission to the Architect and then will be returned to the General Contractor (by the Architect) for distribution. Failure to follow this process could result in unnecessary delays as drawings

received by the Architect and not approved by the General Contractor will be returned unchecked to the General Contractor.

G. Receiving and Storing Materials

1. On receipt of materials check for in-transit damage in ample time to replace any damaged materials prior to installation.
2. Wherever possible deliver materials and equipment to project site in manufacturer's original package, keeping labels intact until final cleaning. Where items are to be job-assembled, label, tag, mark or otherwise properly identify each component part until incorporated in building.
3. Store materials in a manner to prevent deterioration, staining, soiling and intrusion of foreign materials. Provide waterproof, well-ventilated enclosures for materials subject to deterioration by dampness. Adequately protect those materials subject to damage by freezing and frost.

H. Closing-In Work

1. The General Contractor shall notify his Subcontractors, Owner and all Contractors and Subcontractors employed directly by the Owner when he is ready for them to install their portions of the work and see that they comply within a reasonable period of time. Do not enclose or cover any piping, wiring, ducts, equipment or other items until proper test and inspections have been made by Architect and/or proper authorities.

I. Warranties

1. Before being eligible for final payment, the General Contractor shall deliver to Architect, all manufacturer's and special warranties specified for materials, equipment and installations. These shall be compiled in a book and must include the name, address and phone number of the installation subcontractor, the name, address and phone number of the supplier and the printed warranty on each model of the following items:
 - a. Water heaters
 - b. Heating and air conditioning systems
 - c. All Appliances
 - d. Siding
 - e. Soffit Material
 - f. Gutter and Downspouts
 - g. Roofing

(This list is provided as a courtesy – it does not release the Contractor of responsibility of reviewing the Specifications complete and submitting requested information for review/approval by Architect)

PROJECT CLOSE OUT

- A. Owner may place and install equipment during the progress of the building or occupy portions finished before the entire completion of the work. Such occupancy will not in any way evidence completion or acceptance of any part of the work.
- B. When building is completed, the entire premises and building shall be clean of all rubbish and excess materials, no matter by whom it is left, and remove all of this from the building, the property, and adjacent area. All labels, paint spots, dirt and debris shall be cleaned/washed off of all glazing thoroughly, inside and outside.

SPECIAL PROVISIONS

A. Locations, Lines and Levels

- 1. The Owner shall furnish evidence of the locations of property lines, restrictions and a permanent benchmark. Contractor shall establish location of building on property and establish and maintain all other grades, line, levels and bench marks; check and compare all drawings, verifying grades, lines, levels and dimensions indicated thereon, and report all inconsistencies to the Architect and receive his instructions before commencing work.
- 2. The General Contractor shall provide and maintain well-built batter boards at corners and establish and safeguard bench marks in at least two widely separated places and, as work progresses, establish bench marks at each building level and establish exact locations on partitions on rough floors as a guide to trades.

B. Building Permit

- 1. The General Contractor shall be responsible for obtaining and payment for a Building Permit.
- 2. The General Contractor and/or his Subcontractor's shall be responsible for obtaining and paying for individual Plumbing, Electrical and any other such permits and/or licenses as required by the local authority(s).

C. The Contractor shall be responsible for verifying measurements at the building before ordering material or doing work. No extra compensation will be allowed for difference between actual dimensions and measurements indicated on the drawings. Any differences found shall be submitted to the Architect and Owner for consideration before proceeding with the work.

D. Special Inspections

- 1. The General Contractor, his Subcontractor's and Material Suppliers shall comply with construction and fabrication provisions and allow all required inspections in accordance with the "Special Inspections" section of the prevailing Building Code(s).

E. Regulated Substances

1. No portion of the Plans for the Project call for or require the use of the following regulated substances: (a) asbestos in any form, (b) urea formaldehyde foam insulation, or (c) any other chemical, material or substance the proposed or actual use of which is prohibited or is in violation of any law, rule, or regulation of any federal, state, county, regional, or local governmental or regulatory unit or authority. No Contractor shall not use products containing these regulated substances.

TEMPORARY FACILITIES

1. Field Office

1. The General Contractor shall erect and maintain in good condition during progress of work a weatherproof field office building (adequate size trailer also acceptable) for use of the General Contractor and the Architect's Representative (during routine site visits). Provide such building with heat, electric light and lockable door.

2. Toilet Accommodations

1. General Contractor shall provide temporary, exterior, completely closed latrine. Provide necessary supplies and keep clean at all times.

3. Electrical Energy

1. The General Contractor shall arrange and pay for metering temporary electrical service to his Field Office and apartment building(s) sufficient for his needs throughout the construction process. Use of electrical service in buildings is not permitted. Provide lights and electrical extensions to locations necessary for proper and safe operations and permit other contractors to use and remove the same at his own expense. The General Contractor shall pay for all temporary electrical service consumed from start of project through final closeout.

4. Water

1. The General Contractors may use water from existing hose bibbs or extend lines therefrom at their own expense. The General Contractor shall pay for and provide a temporary water meter at the connection and shall pay for all water consumed. The General Contractor is fully responsible for monitoring all water consumption to prevent "wasteful" use and to prevent connection/use from other connection locations.

5. Heat

1. The General Contractor shall provide emergency heat necessary to prevent damage from dampness and cold and to provide proper climate conditions as necessary to prohibit

damage to installed materials. General Contractor shall pay for all fuels (i.e., propane, LP, Natural gas, etc.) and/or electrical service consumed for heating until building is completed.

SPECIAL CONSTRUCTION REQUIREMENTS

- A. The General Contractor shall, by site visit prior to bid, determine extent and nature of work involved in this project based on a visual inspection.
- B. In as much as possible, all attempts have been made to cover the scope of work involved. However, should the General Contractor discover during the course of construction, etc., that other conditions exist which might require extra work, he shall immediately call this to the attention of the Architect. Once the Architect, Owner, and General Contractor are in agreement on the extent and nature of said extra work, the General Contractor shall within (14) calendar days provide an estimated cost for extra work. Once extra cost has been reviewed and accepted by Owner and Architect a Change Order shall be processed and signed by all parties. Extra cost work done by the General Contractor without following the aforementioned procedure or without providing the Owner with anticipated costs prior will result in no payment for said work.
- C. The General Contractor shall at all times during the course of construction, and repair work protect all existing furnishings, finishes, construction, etc., which are not scheduled to be repaired or replaced. Contractor shall be liable for losses for damage to items of that nature and shall repair to previous original condition or replace as situation dictates.
- D. All materials which are not salvaged by the Owner shall be properly cleaned up and disposed of by the General Contractor in according with prevailing regulations. All fees for disposal are to be paid for by the General Contractor. The site shall remain clean at all times from construction and demolition debris.
- E. The General Contractor shall fill and level with topsoil all areas of site rutted or cut up during the course of the Contract, then sod or plug as per the specifications.

END OF SECTION

Project Unit Pricing

Contractor is to provide unit pricing for the items listed below should changes in the Scope occur once construction begins.

1. Topsoil material and placement in excess of that specified on drawings
and specs \$_____ per cu. yd.
2. Mass rock excavation and removal \$_____ per cu. yd.
3. Trench rock excavation and removal \$_____ per cu. yd.

ALTERNATE BID 1

VINYL SIDING

In order for a Bid to be responsive, Bidder must submit an additive bid, a deductive bid, or a “no change” bid, for each Alternate listed below. The failure to do so shall result in the Bid being rejected as non-responsive. The failure to quote an amount, unless the bidder marks the “no change” box, will result in the bid being rejected as non-responsive.

The Contract Time will change by the number of days, if any, specified for each accepted Alternate.

Alternate No. 1

Description: At duplex building elevations, install vinyl siding (per
Section 07464) in lieu of fiber cement siding per elevation
drawings.

Bid for Alternate No. 1

If “Add” or “Deduct” is intended, indicate by placing figures in the corresponding boxes. If “No Change” is intended, indicate by marking the “No Change” box.

Add \$, , .

Deduct \$, , .

☐ **No Change: Bidder will perform this Alternate without change to Contract Sum.**

No extension of time will be granted if this Alternate is accepted.

DCI Construction, LLC reserves the right to accept this Alternate within 30 calendar days after the date DCI Construction, LLC signs the Agreement.

END OF ALTERNATE 1

ALTERNATE BID 2

ARCHED ENTRYWAY

In order for a Bid to be responsive, Bidder must submit an additive bid, a deductive bid, or a “no change” bid, for each Alternate listed below. The failure to do so shall result in the Bid being rejected as non-responsive. The failure to quote an amount, unless the bidder marks the “no change” box, will result in the bid being rejected as non-responsive.

The Contract Time will change by the number of days, if any, specified for each accepted Alternate.

Alternate No. 2

Description: At duplex building front elevation, install arched brick
entryway at front door per elevation drawings.

Bid for Alternate No. 2

If “Add” or “Deduct” is intended, indicate by placing figures in the corresponding boxes. If “No Change” is intended, indicate by marking the “No Change” box.

Add \$, , .

Deduct \$, , .

☐ **No Change: Bidder will perform this Alternate without change to Contract Sum.**

No extension of time will be granted if this Alternate is accepted.

DCI Construction, LLC reserves the right to accept this Alternate within 30 calendar days after the date DCI Construction, LLC signs the Agreement.

END OF ALTERNATE 2

ALTERNATE BID 3

KITCHEN ISLAND

In order for a Bid to be responsive, Bidder must submit an additive bid, a deductive bid, or a “no change” bid, for each Alternate listed below. The failure to do so shall result in the Bid being rejected as non-responsive. The failure to quote an amount, unless the bidder marks the “no change” box, will result in the bid being rejected as non-responsive.

The Contract Time will change by the number of days, if any, specified for each accepted Alternate.

Alternate No. 3

Description: At duplex building kitchen, install island cabinet and
countertops per drawings.

Bid for Alternate No. 3

If “Add” or “Deduct” is intended, indicate by placing figures in the corresponding boxes.
If “No Change” is intended, indicate by marking the “No Change” box.

Add \$, , .

Deduct \$, , .

☐ **No Change: Bidder will perform this Alternate without change to Contract Sum.**

No extension of time will be granted if this Alternate is accepted.

DCI Construction, LLC reserves the right to accept this Alternate within 30 calendar days after the date DCI Construction, LLC signs the Agreement.

END OF ALTERNATE 3

ALTERNATE BID 4

REVISED UNIT PLAN

In order for a Bid to be responsive, Bidder must submit an additive bid, a deductive bid, or a “no change” bid, for each Alternate listed below. The failure to do so shall result in the Bid being rejected as non-responsive. The failure to quote an amount, unless the bidder marks the “no change” box, will result in the bid being rejected as non-responsive.

The Contract Time will change by the number of days, if any, specified for each accepted Alternate.

Alternate No. 4

Description: See complete drawing set with “a4” suffix for revised unit size; 1-car garage, smaller living room, revised laundry room, coat closet and HVAC closet, etc. Note that Alternate No. 1 and 3 are applicable to Alternate No. 4 as well and should be included with separate pricing. Alternate No. 5 relates to the Arched Entryway at the main entrance (similar to Alternate No. 2).

Bid for Alternate No. 4

If “Add” or “Deduct” is intended, indicate by placing figures in the corresponding boxes. If “No Change” is intended, indicate by marking the “No Change” box.

Add	\$	<input type="text"/>	,	<input type="text"/> <input type="text"/> <input type="text"/>	,	<input type="text"/> <input type="text"/> <input type="text"/>	.	<input type="text"/> <input type="text"/>
Deduct	\$	<input type="text"/>	,	<input type="text"/> <input type="text"/> <input type="text"/>	,	<input type="text"/> <input type="text"/> <input type="text"/>	.	<input type="text"/> <input type="text"/>

☐ **No Change: Bidder will perform this Alternate without change to Contract Sum.**

No extension of time will be granted if this Alternate is accepted.

DCI Construction, LLC reserves the right to accept this Alternate within 30 calendar days after the date DCI Construction, LLC signs the Agreement.

END OF ALTERNATE 4

ALTERNATE BID 5

ARCHED ENTRYWAY FOR ALTERNATE 4

In order for a Bid to be responsive, Bidder must submit an additive bid, a deductive bid, or a “no change” bid, for each Alternate listed below. The failure to do so shall result in the Bid being rejected as non-responsive. The failure to quote an amount, unless the bidder marks the “no change” box, will result in the bid being rejected as non-responsive.

The Contract Time will change by the number of days, if any, specified for each accepted Alternate.

Alternate No. 5

Description: For Alternate No. 4, at duplex building front elevation,
install arched brick entryway at front door per elevation
drawings.

Bid for Alternate No. 5

If “Add” or “Deduct” is intended, indicate by placing figures in the corresponding boxes. If “No Change” is intended, indicate by marking the “No Change” box.

Add \$, , .

Deduct \$, , .

☐ **No Change: Bidder will perform this Alternate without change to Contract Sum.**

No extension of time will be granted if this Alternate is accepted.

DCI Construction, LLC reserves the right to accept this Alternate within 30 calendar days after the date DCI Construction, LLC signs the Agreement.

END OF ALTERNATE 5

ALTERNATE BID 6

VINYL SIDING FOR ALTERNATE 4

In order for a Bid to be responsive, Bidder must submit an additive bid, a deductive bid, or a “no change” bid, for each Alternate listed below. The failure to do so shall result in the Bid being rejected as non-responsive. The failure to quote an amount, unless the bidder marks the “no change” box, will result in the bid being rejected as non-responsive.

The Contract Time will change by the number of days, if any, specified for each accepted Alternate.

Alternate No. 6

Description: For Alternate No. 4, at duplex elevations, install vinyl siding (per
Section 07464) in lieu of fiber cement siding per elevation
drawings.

Bid for Alternate No. 6

If “Add” or “Deduct” is intended, indicate by placing figures in the corresponding boxes. If “No Change” is intended, indicate by marking the “No Change” box.

Add \$, , .

Deduct \$, , .

☐ **No Change: Bidder will perform this Alternate without change to Contract Sum.**

No extension of time will be granted if this Alternate is accepted.

DCI Construction, LLC reserves the right to accept this Alternate within 30 calendar days after the date DCI Construction, LLC signs the Agreement.

END OF ALTERNATE 6

KOEHLER

ENGINEERING & LAND SURVEYING, INC.

**Site Geotechnical Examination
New Two Family Residential Development
South Division Street - North of Dogwood Road
Blytheville, Arkansas**

PREPARED FOR:

Gardner Capital, Inc.

Prepared at the Request of:

Ms. Janna Darmon, Development Coordinator

*Prepared for the sole use of Koehler Engineering and Land Surveying, Inc.,
Gardner Capital, Inc., and Their Designees*



Date: July 18, 2012





KOEHLER ENGINEERING & LAND SURVEYING, INC.

194 Coker Lane
CAPE GIRARDEAU, MO 63701
PH: (573) 335-3026 FX: (573) 335-3049

July 19, 2012

Report to:

Gardner Capital, Inc.

In care of:

Ms. Janna Darmon
Development Coordinator
Gardner Capital, Inc.
1414 Primrose, Suite 100
Springfield, MO 6580

**RE: Subsurface Exploration and Foundation Recommendations
For Proposed New Two-Family Residence Subdivision in Blytheville,
AR**

Ms. Darmon;

Attached is our geotechnical report for the proposed new single story, two family (duplex) structures to be constructed in your development in Blytheville Arkansas. The accompanying report presents the findings of the subsurface exploration and geotechnical recommendations regarding the design and construction of building foundations and street pavements. The services we have provided are in general conformance with our discussions for the project prior to the issuance of your notice to proceed with the work.

In summary, the soils encountered in the borings were somewhat varied with regard to both depth below grade and location on the site. The soils range from adequate to good suitability for conventional foundations to be installed within the parameters expressed within the report. The upper site soils were typically cohesive and well consolidated, and will yield good bearing capacities. Free water encountered in all borings, but typically not at a depth that would interfere with foundations. The material and site, is fully suitable for installation of conventional spread footings (wall or column), subject to the limitations detailed herein.

Our detailed report and recommendation are presented in the following pages. We appreciate the opportunity to be of service to you and Gardner Capital, Inc. If you need any additional information, or have any questions of any nature, please feel free to contact our office at your convenience.

Regards,

KOEHLER ENGINEERING &
LAND SURVEYING, INC.

Chris Koehler; PE, PLS
Enclosures

SEAL
AR PE # 13670

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General Notes

Important Information About Your Geotechnical Report

Site Soil Test / Classification Data

Site Soil Boring Logs

Key to Symbols

GEOTECHNICAL REPORT

Gardner Capital, Inc. ~ Duplex Subdivision in Blytheville, AR

KELS FILE #34759

July, 2012

1.0 INTRODUCTION

At the request of Ms. Janna Darmon, Development Coordinator for Gardner Capital, Inc., and the initial contact for a new two family structure residential subdivision to be constructed in Blytheville, Arkansas, Koehler Engineering and Land Surveying, Inc. performed a geotechnical study. The purpose of the study was to characterize and evaluate the subsurface conditions, and to provide recommendations for the residence foundations and pavement surfaces. Our services were provided in accordance with the original discussions with the Owner's representative and in accordance with our understanding of the requirements of the project.

2.0 SITE AND PROJECT DESCRIPTION

The project site is located on the east side of South Division Street approximately 200 feet north of Dogwood Drive near the Southern City Limits of Blytheville, Arkansas. The site location is indicated in Figure 1 on page 4. The site area has historically been used for agricultural purposes, and soils on the site have had minimal disturbance other than agricultural activities in the past 100 years. No structures are known to have previously been located on the project site. The site was planted in soy beans at the time of the field investigation. The housing development is expected to contain a small office building and 18 duplex structures in the present phase. The site is to be

accessed from a single connection near the southwest corner of the site on South Division Street.

Geologically, the site lies on the Mississippi River Alluvial Plain, a subset of the larger Gulf Coastal Plain. The Mississippi River Alluvial Plain is relatively level in the project vicinity, and typically contains unconsolidated sediments such as sand, clay, silt, gravel, and loess. The site surface materials are typically characterized by a layer of organic topsoil, organic sediments (silts) and lean clays, transitioning to layers of mildly to moderately expansive clays, which then transition to poorly graded sands and gravels. Bedrock at this location is typically well over 100 feet below the surface grade.

Groundwater was encountered in 12 of the 15 borings, however the material at the groundwater level has a low permeability rate, and the auger holes typically filled slowly. The depth to groundwater was generally 15 to 16 feet below grade, and given time groundwater would likely have been present in all borings. Groundwater would not be expected to pose any difficulties during construction during most times of the year, however the low permeability rate of the soil coupled with wet conditions would allow the soil to retain water, and site conditions could deteriorate rapidly under the combination of construction traffic and wet weather.

The proposed permanent buildings are to be single story residential structures on or near the present site grade. Finished floor elevations have not been established, however it is expected that the finished floor elevation will be within 1 to 2 feet of the present site grades. The buildings are to be generally rectangular in shape, and laid out as indicated on the accompanying site boring diagram. An exhibit with a preliminary site plan with boring locations is included in Figure 4 on page 8.

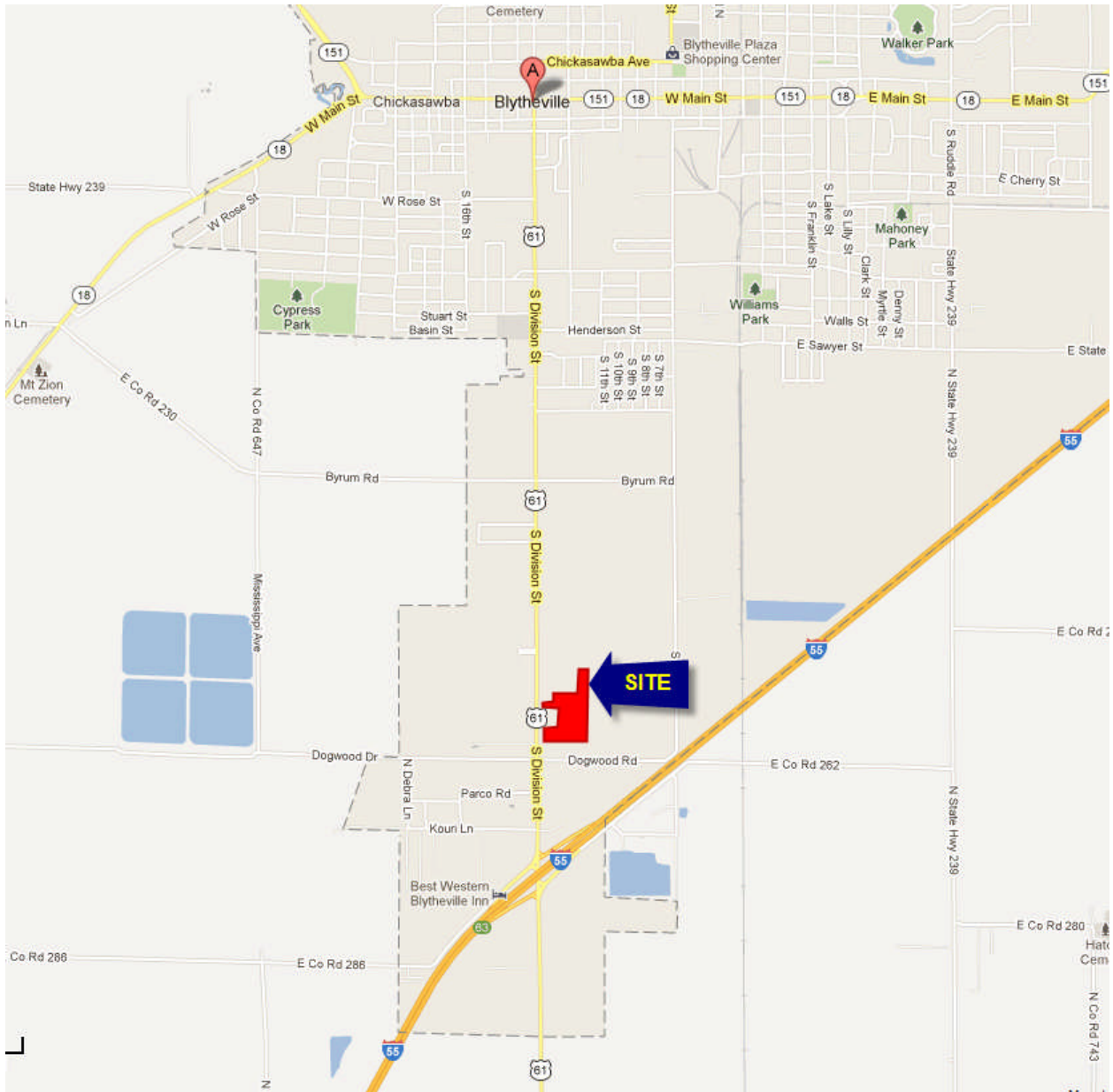


Figure 1: Site Map Exhibit, Gardner Capital Duplex Development, Blytheville, Arkansas.

The buildings are anticipated to be single story structures on existing grades or prepared fill with an eave height above grade estimated between 10 and 12 feet.

The proposed structure finished floor elevations are expected to range between elevation 248 and 253 msl.



Figure 2: Gardner Capital Duplex Development, Blytheville, AR; Orthophoto Exhibit (Google)

The project site slopes generally north to south at approximately .5% to 1%. There is a drainage ditch along east side of S. Division Street. Street grades on the final constructed site would not be expected to exceed 2.0% in grade.

Indications from the field exploration activities indicate that site soils consist predominantly of an upper strata of firm to stiff lean clays with isolated firm to

stiff silts, overlying a layer of very soft to soft expansive clays. The expansive clays were located at depths that should not affect the building foundations. In general, the upper site clays exhibited adequate to good bearing potential, ranging from firm to stiff, with the material generally well consolidated. The lower clays (typically at depths in excess of 6 feet below grade) were frequently expansive, with saturation increasing with depth to the water table at about 16 feet below grade, and very weak. Care should be taken not to excavate to a depth that would allow these strata to enter into the foundation zone of influence.

Additional discussion on site development is more fully presented in Sections 6 and 7 of this report.

The thickness and stratification of the sub-soils is further indicated on the Boring Logs provided in the Appendix of this report. The structure borings were terminated at depths of 20 to 25 feet below present grade. Auger refusal was not encountered in any of the borings. Borings 10-15 were for pavement recommendations, and these were terminated at a depth of approximately 15 feet below grade. Additional discussion of the soil in the borings is detailed in Section 5.0 of this report.

The proposed permanent buildings are anticipated to bear primarily a combination of conventional linear wall foundations and isolated column foundations. Foundation recommendations for the structures are presented in Section 6.0 of this report.

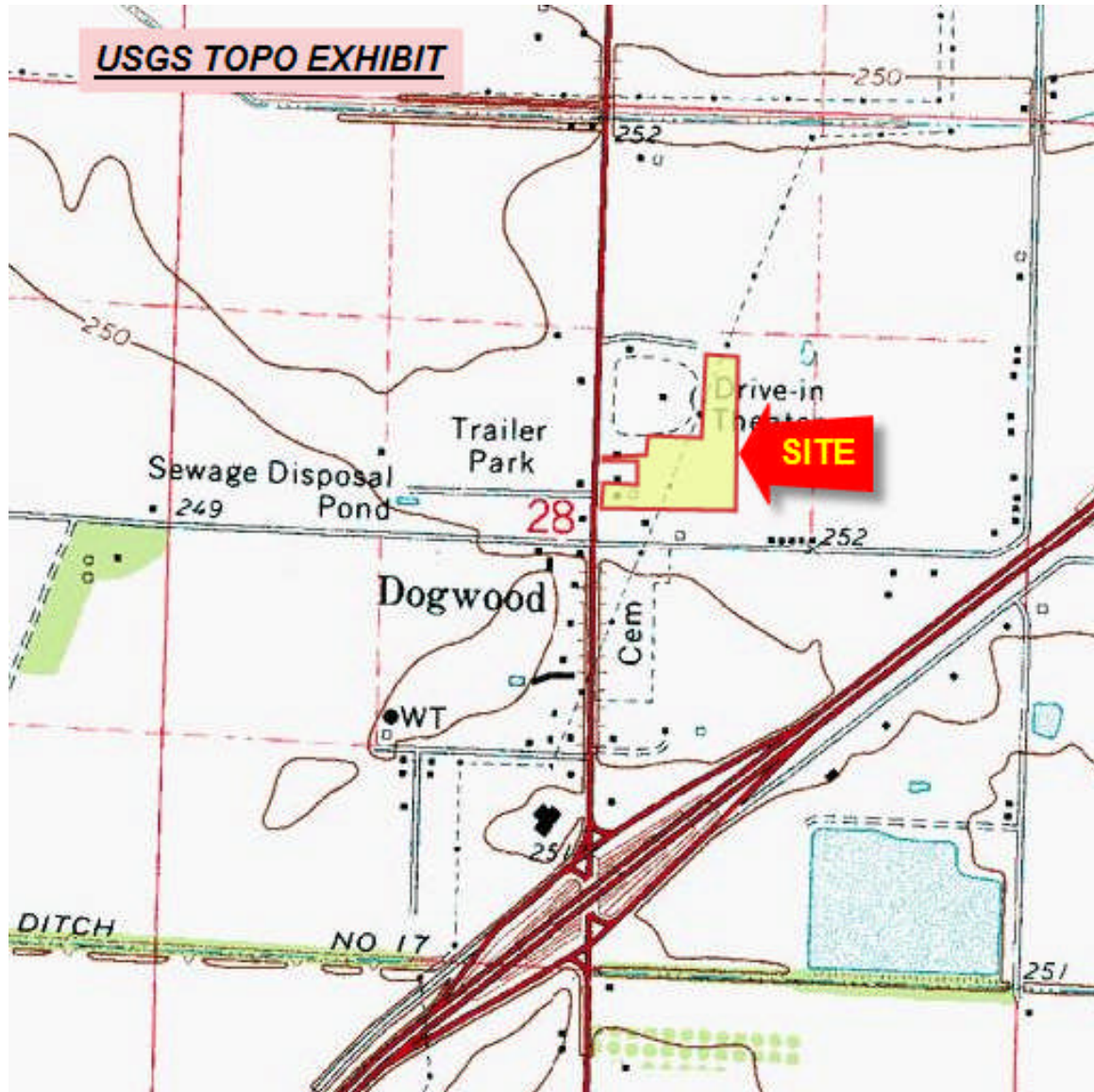


Figure 3: Site USGS Quadrangle Exhibit (From Blytheville AR Quadrangle)

3.0 SUBSURFACE EXPLORATION

A total of fifteen (15) borings, designated B1 through B15, were drilled at the approximate locations as indicated in Figure 4 on the following page. All fifteen borings were taken at locations within the footprint of proposed structures or within the pavement locations.

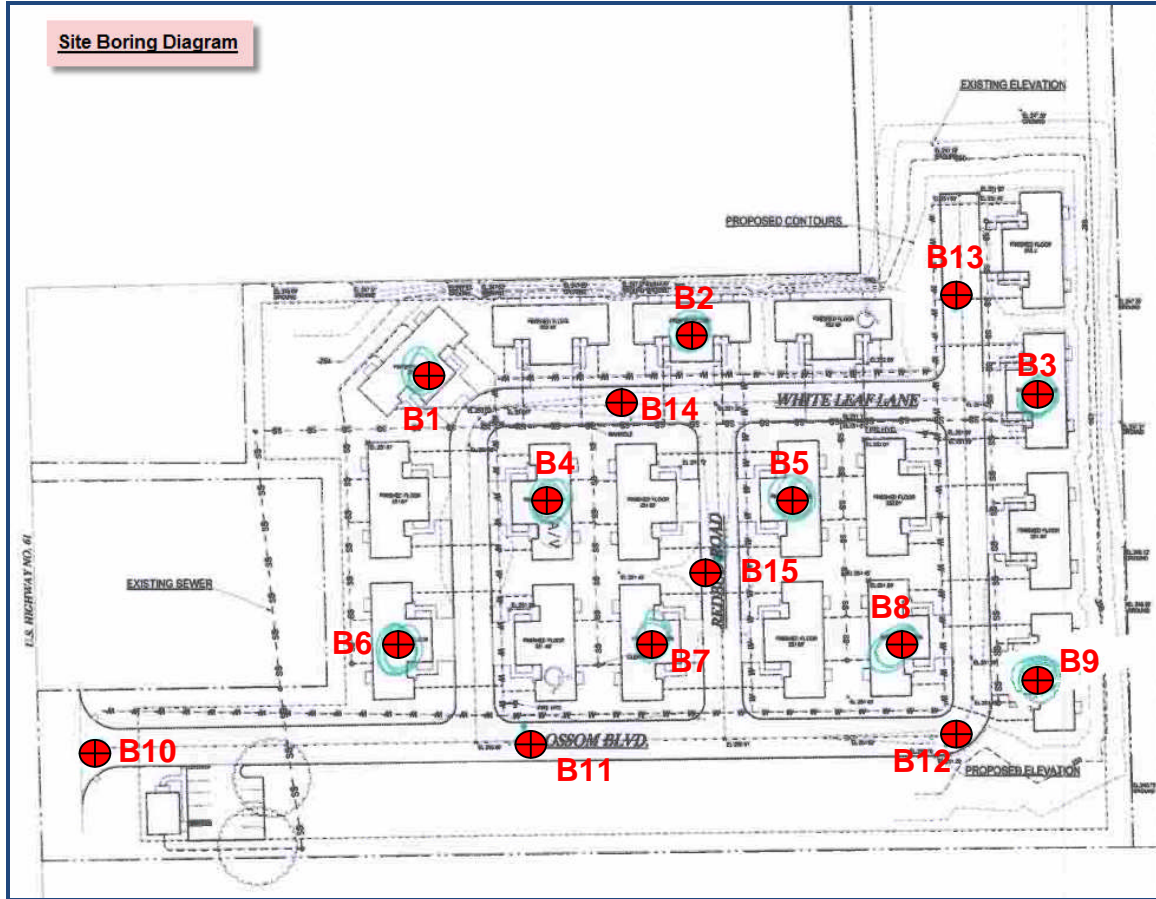


Figure 4: Site Boring Diagram.

Drilling was conducted utilizing a CME 55 truck mounted rotary drill. All borings were advanced using a 3.25 inch inside diameter hollow stem flight auger. All borings were advanced to depths of approximately 15 feet in the street, and 20 to 25 feet in the residences. During drilling operations the in-situ subsoils were sampled utilizing a split barrel sampling device in accordance with ASTM D-1586. During the split barrel sampling procedure, Standard Penetration Tests (SPT) were performed at regular intervals through the depth of the borings. The SPT value ("N" Value) is defined as the number of blows required to advance a 2-inch O.D., split barrel sampler a distance of one foot by a 140 pound hammer falling 30 inches. These "N" values provide additional indications of the consistency or relative density of most soil deposits and are included on the Soil

Boring Logs in the Appendix of this report. Groundwater was encountered in 12 of the 15 boring, however the material at the groundwater level has a very low permeability rate, and the auger holes typically filled slowly. The depth to groundwater was generally 15 to 16 feet below grade, and given time groundwater would likely have been present in all borings. The depth and presence of groundwater is indicated on the Boring Logs. Groundwater is known to vary seasonally, and it should be noted that groundwater could be more or less of an issue during construction at certain times of the year.

4.0 LABORATORY ANALYSIS

In the laboratory, the soil samples were subjected to visual classifications and moisture content determinations. Load-frame unconfined compressive strength tests were performed on one sample from boring B2. Samples from Borings B1, B7, and B9 were tested to determine their Atterberg limits in accordance with ASTM 2487 and ASTM 4318. The soil samples were generally found to be consolidated and cohesive in nature.

Sample Description	<u>Unconfined Comp. Str. Q_u, @ failure</u>	<u>Liquid Limit (LL):</u>	<u>Plasticity Index (PI)</u>
B2, Sample 1, Light Gray Brown Silt	6,380 psf	X	X
B1, Sample 2, Light Gray-Brown Lean Clay	x psf	37	14
B1, Sample 3, Light Gray-Brown Lean Clay	x psf	47	28
B7, Sample 2, Light Gray-Brown Lean Clay	x psf	44	23
B7, Sample 3, Light Gray-Brown Fat Clay	x psf	66	39
B7, Sample 5, Bluish Gray Fat Clay	x psf	70	45
B9, Sample 2, Light Gray-Brown Lean Clay	x psf	35	13
B9, Sample 3, Light Gray-Brown Lean Clay	x psf	43	23

Table 1: Soil Sample Unconfined Compressive Strength (Qu), Liquid Limits (LL) & Plasticity Indices (PI).

The determination of the load frame measured unconfined compressive strength, Liquid Limit (LL) and Plasticity Index (PI) for selected samples are indicated in Table 1 on page 9.

Since the field soils did vary somewhat, close observation should be exercised during all site excavation and general earth moving activities to monitor the type of material being utilized.

Results of all field and laboratory tests are summarized on the enclosed Boring Logs and supplemental Laboratory Data Sheets in the Appendix. Following completion of laboratory testing, the soil samples were placed in glass jars and stored in our laboratory. Unless notified of the need for further testing, the samples will be discarded after 30 days from the date of this report.

5.0 DESCRIPTION OF SUBSURFACE CONDITIONS

The types of foundation materials encountered at the test boring locations are described on the Soil Boring Logs. The lines delineating the changes in strata on the logs represent an approximate boundary between the various soil classifications. The Unified Soil Classifications System (USCS) symbols used in this report and on the Boring Logs are estimates based on visual classifications of the soil. It should be recognized that the soil descriptions are considered representative for the specific test hole locations, but that variations may occur between the sampling intervals and boring locations. A summary of the major soil profile components is described in the following paragraphs.



The natural soils on the site consist predominantly of an upper strata of brown or brown – gray lean clays with occasional gray silts, overlying deeper deposits of bluish gray fat clays and occasional silts. The lean clays were typically in the upper six feet (minimum) of the site, and extended to a depth of up to 18 feet below grade in some borings. This material would be expected to remain stable from outside influences. The deeper expansive clay strata were mildly expansive, however they are presently stable, and unless the site were dewatered to a depth of 15 to 20 feet below grade, or the water table were substantially altered, this material should not result in any negative effect on the proposed pavements or building foundations. An examination of the existing topographic survey with site elevations, and the preliminary site layout provided, indicates that existing grade for the residential structures varies from approximately 247 to 250. Assuming the buildings are set slightly above the existing grade to facilitate drainage away from the structures, expected finished floor elevations would be expected to range between 248 and 252. Based upon these elevations, the structure foundations would be expected to bear on shallow fills placed over the existing upper stable, firm to stiff soils. Refer to section 6 for additional discussion regarding the preparation of the building grade.

Soil properties from the boring logs are summarized in table 2 below for reference in the design recommendations of section 6.

Property Description	TYPICAL RANGE OF PROPERTY VALUES
----------------------	----------------------------------

SOIL STRATA TYPE	Approximate Layer Thickness (Ft.)	Standard Penetration (N)	Moisture Content, %	Dry Unit Weight (pcf)	Cohesion c (tsf)	Liquid Limit	Plasticity Index
Low Plasticity (Lean) Clay	6-18	4-17	13-39	105	.0-4.5	35-47	13-28
Bluish Brown Silt (B3 only)	3	8	36	106	0	-	-
Light Grayish Brown Silt	3-6	10-11	16	-	4.5	-	-
High Plasticity (Fat) Clay	7-14	0-5	38-58	103	0-1.75	66-70	39-45

Table 2: Average Soil Values for Site Soils.

Moisture contents for all borings ranged from 13% to 58%. In the upper 4 to 6 feet of the site, where the primary soils support will be critical, the values typically ranged between 17% to 26%. The soils were generally cohesive in nature. Standard Penetration Test (SPT) blow counts ranged from 0 to 17. The blow counts in the zone for primary foundation influence generally ranged from 6 to 10.

There was moderate variation in the blow counts for the site, which indicates a corresponding moderate variation in the in-situ bearing capacity of the soils. As a result, field observation and determination is strongly recommended beneath wall and isolated foundations during project construction, to verify the bearing capacities are in line with the boring data.

Additional information regarding the soil types, moisture contents, and strengths can be found on the Boring Logs in the Appendix of this report.

6.0 DESIGN RECOMMENDATIONS

6.1 Building foundations:

Preliminary information provided to the Geotechnical consultant indicates the permanent residential structures will be constructed as indicated in Figure 4 on page 8 of this report. The site is sloping minimally from south to north / northeast. The proposed structures are expected to have finished floor elevations of between 248 and 252. It is anticipated that shallow foundations would bear 12 to 18 inches below the present grades, at elevations ranging from 247 to 251.

No preliminary building structure loads were supplied in the geotechnical RFP, however indications from the client's representative indicated that these were to all be single story, two family (duplex) structures. Structures of this nature generally have linear perimeter and fire wall foundations, with isolated interior or exterior column foundations. It is expected that the loads on foundations will be on the order of 1.5 to 2.5 kips per lineal foot for wall loads. Typical column loads would be expected to range between 10 and 20 kips.

Based upon the preceding assumptions, conventional spread footing foundations bearing existing soils (low plasticity clays and silts), are acceptable for this structure.

It is recommended that the soils beneath the structure and all pavements be stripped to a depth of no more than 6 inches to remove the bulk of the organic matter, while leaving most of the better supporting soils in place. Prior to the placement of any fill for the building pads, the existing grade should be proof-rolled with a loaded tandem axle dump truck to identify isolated soft spots. If soft or pumping spots are revealed, these should be corrected by scarifying and re-

compacting, or removal of the material and replacement with compacted lean clays.

For site fills where required, the contractor should place lean clay material in accordance with the guidance presented herein and later in Section 7.0 of this report. All fills required for the structures, porches or other foundations, drives, and streets should be placed and compacted in place, brought to final sub-grade elevations in loose lifts not to exceed 8 inches, and compacted to a minimum of 96% of the maximum dry density in accordance with ASTM D698.

Based upon the soils encountered during our exploration and considering the compacted fills to be placed on the building pad, **shallow foundations** can be sized for maximum net allowable bearing pressures of 2,100 pounds per square foot for linear wall foundations, and 2,650 pounds per square foot for isolated, square or round, column footings. Isolated foundations should further be separated by a minimum dimension equal to their largest dimension, to prevent group settlement.

For lateral resistance, we recommend an allowable bearing resistance of 100 psf be utilized. It is possible that some localized areas of inadequate bearing materials may be encountered during construction; however, any areas of unsuitable soil should be minimal.

Isolated, square, column footings should have a minimum dimension of 24 inches. Exterior footings should also have a minimum width of 18 inches to avoid punching failure, and be provided with at least 12 inches of cover for frost protection.

For footings designed and constructed in accordance with our recommendations, total settlement should not exceed 1 inch, with differential settlement between adjacent footings of less than 1/2 inch. To minimize potential for differential settlement, it is emphasized that all fills to create the building pad should be tested to ensure the required compaction is met during grading operations.

The proposed concrete slab for the building should be designed using a modulus of subgrade reaction (k) of 125 lbs per cubic inch (pci). The concrete floor slab may be supported on a 4 inch layer of free draining granular material, such as clean limestone.

The City of Blytheville, Arkansas follows the 2006 International Residential Code (IRC). The seismic hazard maps presented in the 2006 IRC would define this site as being within Site Class E. The site latitude and longitude for the project were examined and determined to be North 35.533916° by West 89.55009°. Utilizing this longitude and latitude, S_s was determined to be 1.494 g, and S₁ determined to be 0.405 g. Based upon these design values, values of the seismic parameters of F_a and F_v were both then determined to be 1.00.

Based upon these parameters, the following calculations were utilized to determine values for S_{MS}, S_{M1}, S_{DS}, and S_{D1}.

$$S_{MS} = F_a * S_s = 1.0 * 1.494 \text{ g} = 1.494 \text{ g}$$

$$S_{M1} = F_v * S_1 = 1.00 * 0.405 \text{ g} = 0.405 \text{ g}$$

$$S_{DS} = 2/3 * S_{MS} = 0.667 * 1.494 = 996 \text{ g}$$

$$S_{D1} = 2/3 * S_{M1} = 0.667 * 0.405 = 0.270 \text{ g}$$

6.2 Parking and Access Drive Surface Recommendations:

The project is to have a single drive off South Division Street into the site, a small parking lot for the office building, and street pavements to access the residences. Minor grade modifications are expected, with cuts and fills of 1 to 2 feet expected over the site. The recommendations presented below should be utilized for the parking lot, streets, and access drives at the project location.

For parking and drive areas, the site soils should be prepared in the following fashion. Where the existing grade is to be utilized, or where fills are to be placed, organic materials should first be stripped, and then the site re-compacted and proof rolled to verify that the site is competent prior to the placement of fills (see discussion from paragraph 6.1. Where fills are to be placed, they should be made in accordance with Table 5 presented in section 7 of this report.

Based upon the borings conducted at the locations indicated on the Boring Location Diagram, the parking lot, street and drive recommendations for the project were developed and presented in tables 3 and 4.

Automobile (Light Duty) Parking Lots:	
Traffic Loading:	100 Passenger Cars / Day
Design Life:	20 Years
California Bearing Ratio (CBR):	6.0 (Min.)
Pavement Design:	
Bituminous Concrete Surface: (AR Sec. 407-2)	3.5 Inches (in 2 lifts, 2.0" & 1.5")
Arkansas Sec. 303 Class 3 or 4 Crushed Limestone:	7 Inches
OR	
Portland Cement Concrete:	6 Inches
Arkansas Sec. 303 Class 3 or 4 Crushed Limestone:	N/A

Table 3: Light Duty Pavement Recommendations.

Provisions should be made to assure the crushed limestone sub-base and base course is allowed to drain free water in the crushed stone. Due to the heavy point loadings of steel dumpster wheels, if a dumpster is provided at the office, then the dumpster storage areas should be paved with Portland Cement Concrete Pavement, 8 inches thick. Fibermesh incorporation into the dumpster pad at the rate of 1.5 lbs / cu. yard is also recommended.

Heavy Duty Pavements:		
	Traffic Loading:	400 Passenger Cars / Day 2 Delivery Trucks / 1 Garbage Truck
	Design Life:	20 Years
	California Bearing Ratio (CBR):	6.0 (Min.)
Pavement Design:		
	Bituminous Concrete Surface: (AR Sec. 407-2)	3.0 Inches
	Bituminous Base Course (AR-Dot Base):	3.0 Inches
	Arkansas Sec. 303 Class 3 or 4 Crushed Limestone:	8 Inches
	OR	
	Portland Cement Concrete:	7 Inches
	Arkansas Sec. 303 Class 3 or 4 Crushed Limestone:	4 Inches

Table 4: Heavy Duty Pavement Recommendations.

It is further recommended that all pavements be placed in accordance with the most current version of the Arkansas Department of Transportation standards.

7.0 SITE DEVELOPMENT AND CONSTRUCTION CONSIDERATIONS

7.1 General Site Considerations:

Koehler Engineering and Land Surveying, Inc., or another qualified firm, should observe all building foundation and slab construction, and pavement slab excavations for problem areas, such as soft zones or areas of high moisture content. Excessive disturbance of soils in the footing excavations should be avoided and could complicate construction. The potential for such disturbance will increase during wetter times of the year. Footing excavations that have excessively disturbed soils should be over-excavated to approved undisturbed soils. Over-excavation and replacement with structural fill should be performed where inadequate bearing materials are present in footing excavations.

The bottom of the foundation excavation should be examined to determine the existence of any soft soils which will not meet the design strength indicated in the design recommendations. Should such soft soils be encountered, they should be removed under the direction of the Geotechnical Engineer and suitable fill replaced in the foundation excavation, or foundation design modifications should be made which provide for the weaker soil conditions.

The base of all excavations should be clean, relatively dry, and free of loose soils or uncompacted fill. Excavations should be protected from extreme temperatures, precipitation, and construction disturbances. To reduce the possibility of desiccation or saturation of the foundation soils, we recommend that concrete be placed as soon as possible after excavations are made.

Once the concrete foundations have been completed the area adjacent to the foundations (outside the structure) should be backfilled with structural fill of earth or aggregate nature. Earthen material should be a lean clay material or well graded, well compacted sand, while aggregate material, if used, should be a well

graded material with a high percentage of fine aggregate. Either material should be compacted to a minimum of 95% of the maximum density in accordance with ASTM D698, at +/- 2% of the optimum moisture, prior to the construction of slabs adjacent to the building foundations.

7.2 General Site Grading Requirements:

Excavations made away from the building should be brought to grade in the following fashion. The initial excavation should remove 6 inches of topsoil material and stockpile it in a location acceptable to the owner. This stockpile should be protected by a perimeter silt fence to prevent migration of this material onto the adjacent site.

Where material is to be cut, it should be brought to grade utilizing conventional methods. Care should be taken to minimize the amount of cut to keep competent supporting soils intact, and not to mix any expansive material with other material that may be placed under pavement or building structures. Where material is to be placed for fills, it should be placed in accordance table 5.

<i>Fills under building slabs and foundations:</i>		
	Maximum Loose Lift thickness (inches)	8 Inches
	Compacted Lift thickness (inches):	6 Inches
	Minimum Compaction Obtained (ASTM D698)	98%
<i>Fills Under Drives and Parking Areas:</i>		
	Maximum Loose Lift thickness (inches)	8 Inches
	Compacted Lift thickness (inches):	6 Inches
	Minimum Compaction Obtained (ASTM D698)	95%
<i>Fills for site grading:</i>		
	Maximum Loose Lift thickness (inches)	10 Inches
	Compacted Lift thickness (inches):	8 Inches
	Minimum Compaction Obtained (ASTM D698)	85%

Table 5: Grading & Compaction Requirements

7.3 Constructed Slope Stability:

The large majority of the materials on the project site exhibited moderate to high cohesive strengths, which lend themselves to good slope stability. Final, constructed slopes from the site materials could typically support a 2.5 horizontal to 1 vertical relationship and remain stable if free from outside influence. However, these slopes would be difficult to mow and maintain, and would be more prone to erosion. It is recommended that final site slopes be limited to 3:1, except in landscaped areas where additional maintenance is anticipated.

8.0 CONSTRUCTION MONITORING PROGRAM

The following list summarizes Koehler Engineering and Land Surveying, Inc.'s recommendations for a construction monitoring program. These services are recommended to provide quality assurance in assessing the design assumptions to document earth-related construction procedures for compliance with the plans, specifications, and good engineering practices. Koehler Engineering and Land Surveying, Inc. should be contracted to:

- Participate in a formal preconstruction meeting with the Owner's representative, Architect, and Contractor, prior to construction at the site.
- Observe the site excavation and foundation subgrade preparation activities.
- Assess the suitability of the underlying materials upon which the foundations will bear.
- Field probe a distance of 48 inches beneath the bottom of the foundation excavation to check for the presence of isolated weak strata or expansive material.
- Test the in-situ bearing capacity beneath all linear and spread footings, to verify adequacy in accordance with the project recommendations and the project design.
- Provide quality assurance testing of foundation and slab concrete and pavement materials.

9.0 LIMITATIONS

The recommendations provided herein are for the exclusive use of our client and only for the specific application to the project described. They are based upon subsurface information obtained in 15 specific, relatively widely spaced, boring locations within the project area, our understanding of the project as presented in this report, and geotechnical engineering practices consistent with the local standard of care. No other warranty is expressed or implied. Koehler Engineering and Land Surveying, Inc. should be contacted if conditions encountered are not consistent with those described.

We should also be provided with a set of final development plans, once they are available, to review whether our recommendations have been understood and applied correctly, and to assess the need for additional exploration and analysis. Failure to provide these documents to Koehler Engineering and Land Surveying, Inc. may nullify some or all of the recommendations provided herein. In addition, any changes in the planned project or changed site conditions may require revised or additional recommendations on our part.

The final part of our geotechnical service should consist of direct observation during construction, to observe that conditions actually encountered are consistent with those described in this report, and to assess the appropriateness of the analyses and recommendations contained herein. Koehler Engineering and Land Surveying, Inc. cannot assume responsibility or liability for the adequacy of its recommendations without being retained to observe construction.



APPENDIX

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your ASFE-Member Geotechnical Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.



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GENERAL NOTES

SAMPLE IDENTIFICATION

Visual soil classifications are made in general accordance with the Unified Soil Classification System on the basis of textural and particle size categorization, and various soil behavior characteristics. Visual classifications should be substantiated by appropriate laboratory testing when a more exact soil identification is required to satisfy specific project application criteria.

Particle Size \pm

Boulders: 8 inches	Coarse Sand: 2mm to 4mm	Silt: 0.005mm to 0.074mm
Cobbles: 3 to 8 inches	Medium Sand: 0.42mm to 2mm	Clay: 0.005mm
Gravel: 5mm to 3 inches	Fine Sand: 0.074mm to 0.42mm	

DRILLING & SAMPLING SYMOBLS

SS: Split-spoon, 2" O.D. by 1-3/8" I.D.

ST: Shelby Tube, 2" O.D. or 3" O.D., as noted in text

AU: Auger Sample

DB: Diamond Bit

CB: Carbide Bit

RB: Roller Bit

WS: Wash Sample

BS: Bag Sample

HA: Hand Auger

Soil Property Symbols

N: Standard penetration count, indicating number of blows of a 140lb hammer with a 30 inch drop, required to advance a split spoon sampler one foot.

Qu: Unconfined compressive strength, tons per square foot (tsf)

Qp: Calibrated hand penetrometer resistance, tsf

MC: Moisture content, %

LL: Liquid Limit PL: Plastic Limit PI: Plasticity Index

Dd: Dry density, pounds per cubic foot (pcf)

PID: Photoionization Detector (Hnu meter) volatile vapor level, ppm

SOIL RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

NON-COHESIVE SOILS		COHESIVE SOILS		
Classifier	N-Value Range	Classifier	Qu Range (tsf)	N-Value Range
Very Loose	0-3	Very Soft	0-0.25	0-2
Loose	3-7	Soft	0.25-0.5	2-5
Medium Dense	7-15	Medium Stiff	0.5-1.0	5-10
Dense	15-38	Stiff	1.0-2.0	10-14
Very Dense	38+	Very Stiff	2.0-4.0	14-32
		Hard	4.0+	32+

Groundwater

Approximate Groundwater level at time noted on soil boring log, measured in open bore hole unless otherwise noted. Groundwater levels often vary with time, and are affected by soil permeability characteristics, weather conditions, & lateral drainage conditions.

Koehler Engineering and Land Surveying

194 Coker Lane, Cape Girardeau Mo. 63701 - Phone # (573) 335 3026 Fax # (573) 335 3049

Unified Soil Classification System (ASTM 2487)

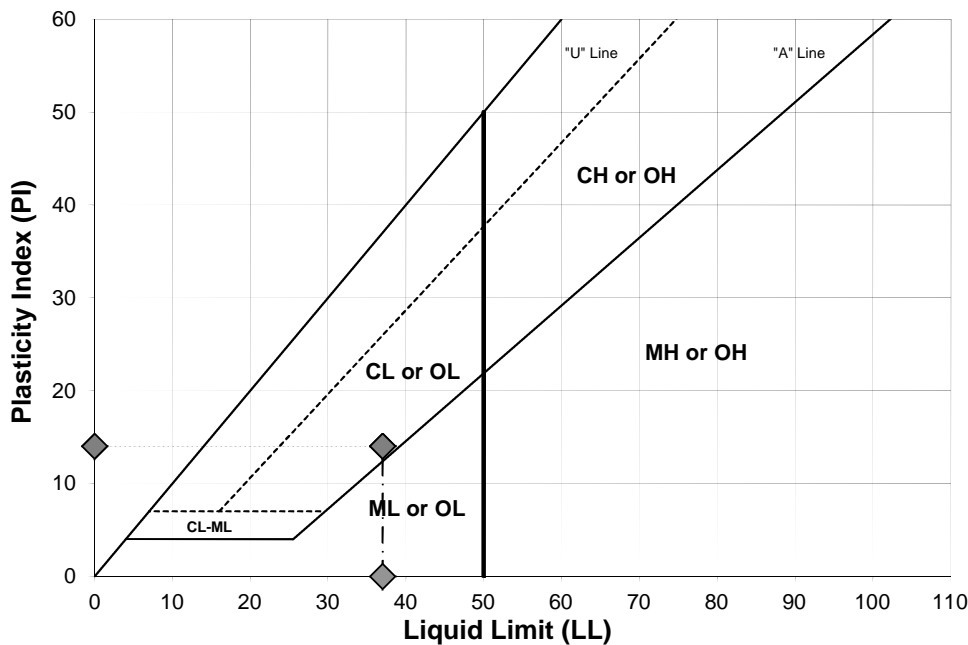
Job #	Tested By:	Report #
Client:	Gardener Capital	
Project:	New Site Development In Blytheville Arkansas	

Sample #:	B1 s2
Sample Site:	
Sample Elev.:	3.5 feet BGS

Moist Color :	Light Grayish Brown
Unified Soil Classification :	CL - Lean Clay

For classification of fine-grain soils and fine-grain fraction of course-grained soils (ASTM 4318)

Liquid Limit	37
Plasticity Index	14



ML	Silt
CL	Lean Clay
CH	Fat Clay
CL-ML	Silty Clay
MH	Elastic Silt
OH	Organic Elastic Silt
OL	Organic Lean Clay
OH	Organic Fat Clay
OL	Organic Silt

Percent Gravel
Percent Sand
Percent of Minus 200 Sieve

Cc
Cu

Koehler Engineering and Land Surveying

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Unified Soil Classification System (ASTM 2487)

Job # Tested By: Report #

Client: Gardener Capital

Project: New Site Development In Blytheville Arkansas

Sample #: B1 s3

Sample Site:

Sample Elev.: 6 feet BGS

Moist Color :

Grayish Brown

Unified Soil Classification :

CL - Lean Clay

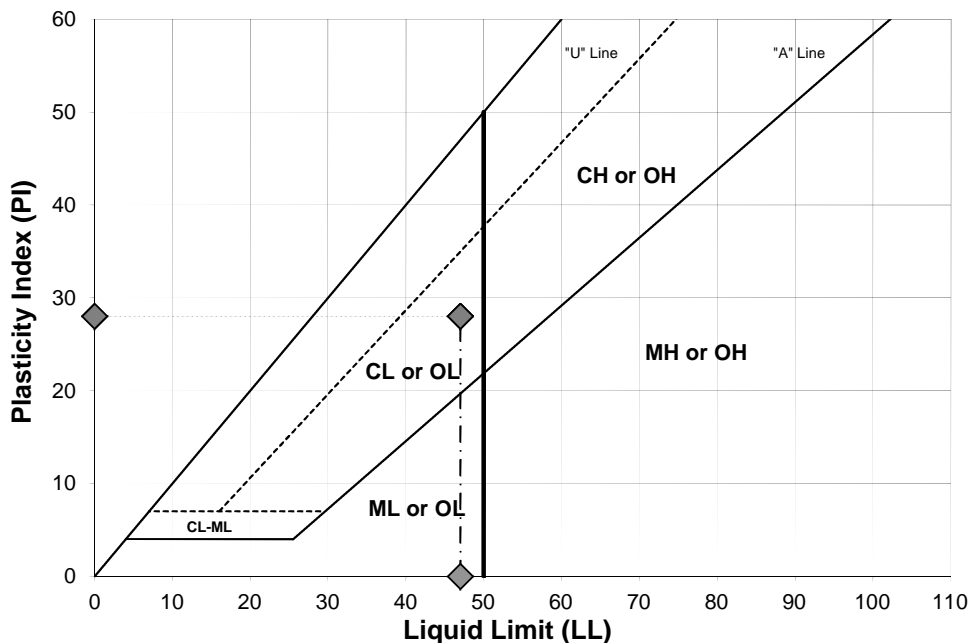
For classification of fine-grain soils and fine-grain fraction of course-grained soils (ASTM 4318)

Liquid Limit

47

Plasticity Index

28



ML	Silt
CL	Lean Clay
CH	Fat Clay
CL-ML	Silty Clay
MH	Elastic Silt
OH	Organic Elastic Silt
OL	Organic Lean Clay
OH	Organic Fat Clay
OL	Organic Silt

Percent Gravel
Percent Sand
Percent of Minus 200 Sieve

Cc
Cu

Koehler Engineering and Land Surveying

194 Coker Lane, Cape Girardeau Mo. 63701 - Phone # (573) 335 3026 Fax # (573) 335 3049

Unified Soil Classification System (ASTM 2487)

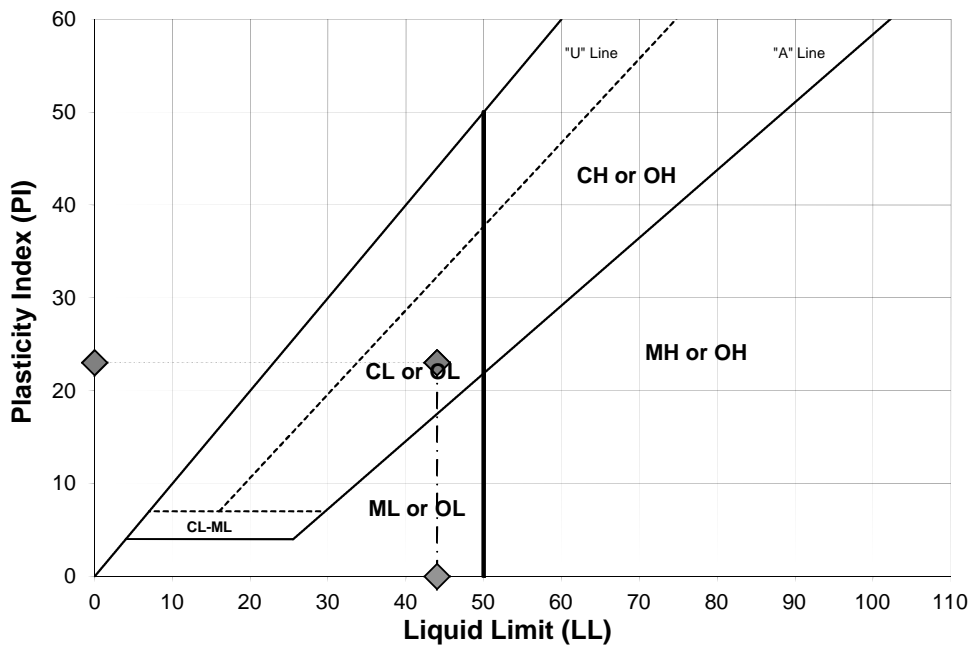
Job #	Tested By:	Report #
Client:	Gardener Capital	
Project:	New Site Development In Blytheville Arkansas	

Sample #:	B7 s2
Sample Site:	
Sample Elev.:	3.5 feet BGS

Moist Color :	Light Grayish Brown
Unified Soil Classification :	CL - Lean Clay

For classification of fine-grain soils and fine-grain fraction of course-grained soils (ASTM 4318)

Liquid Limit	44
Plasticity Index	23



ML	Silt
CL	Lean Clay
CH	Fat Clay
CL-ML	Silty Clay
MH	Elastic Silt
OH	Organic Elastic Silt
OL	Organic Lean Clay
OH	Organic Fat Clay
OL	Organic Silt

Percent Gravel
Percent Sand
Percent of Minus 200 Sieve

Cc
Cu

Koehler Engineering and Land Surveying

194 Coker Lane, Cape Girardeau Mo. 63701 - Phone # (573) 335 3026 Fax # (573) 335 3049

Unified Soil Classification System (ASTM 2487)

Job # Tested By: Report #

Client: Gardener Capital

Project: New Site Development In Blytheville Arkansas

Sample #: B7 s3

Sample Site:

Sample Elev.: 6 feet BGS

Moist Color :

Light Grayish Brown

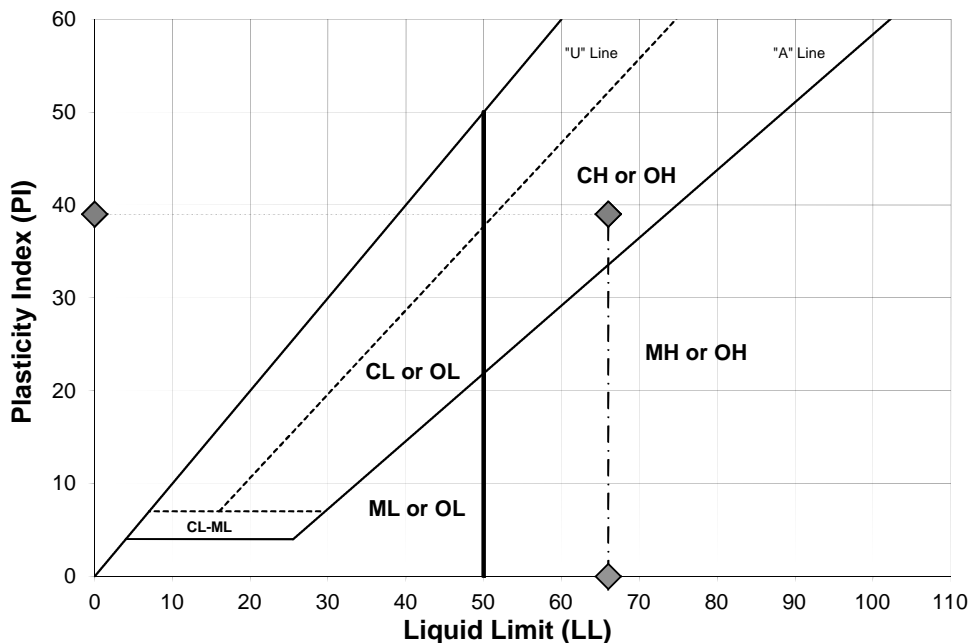
Unified Soil Classification :

CH - Fat Clay

For classification of fine-grain soils and fine-grain fraction of course-grained soils (ASTM 4318)

Liquid Limit
Plasticity Index

66
39



ML	Silt
CL	Lean Clay
CH	Fat Clay
CL-ML	Silty Clay
MH	Elastic Silt
OH	Organic Elastic Silt
OL	Organic Lean Clay
OH	Organic Fat Clay
OL	Organic Silt

Percent Gravel
Percent Sand
Percent of Minus 200 Sieve

Cc
Cu

Koehler Engineering and Land Surveying

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Unified Soil Classification System (ASTM 2487)

Job # Tested By: Report #

Client: Gardener Capital

Project: New Site Development In Blytheville Arkansas

Sample #: B7 s5

Sample Site:

Sample Elev.: 13.5 feet BGS

Moist Color :

Blueish Gray

Unified Soil Classification :

CH - Fat Clay

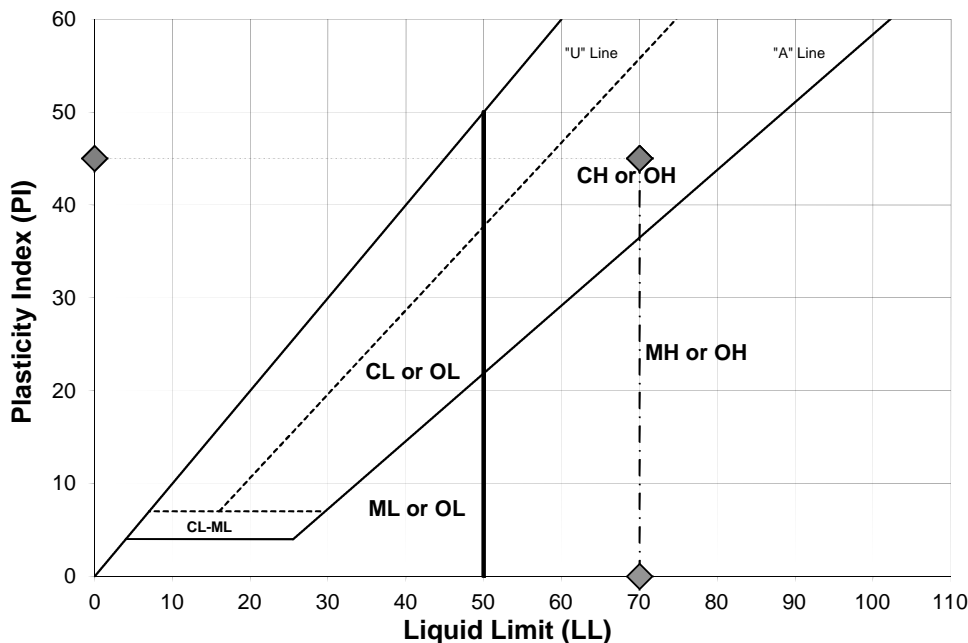
For classification of fine-grain soils and fine-grain fraction of course-grained soils (ASTM 4318)

Liquid Limit

70

Plasticity Index

45



ML

Silt

CL

Lean Clay

CH

Fat Clay

CL-ML

Silty Clay

MH

Elastic Silt

OH

Organic Elastic Silt

OL

Organic Lean Clay

OH

Organic Fat Clay

OL

Organic Silt

Percent Gravel

Percent Sand

Percent of Minus 200 Sieve

Cc

Cu

Koehler Engineering and Land Surveying

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Unified Soil Classification System (ASTM 2487)

Job # Tested By: Report #

Client: Gardener Capital

Project: New Site Development In Blytheville Arkansas

Sample #: B9 s2

Sample Site:

Sample Elev.: 3.5 feet BGS

Moist Color :

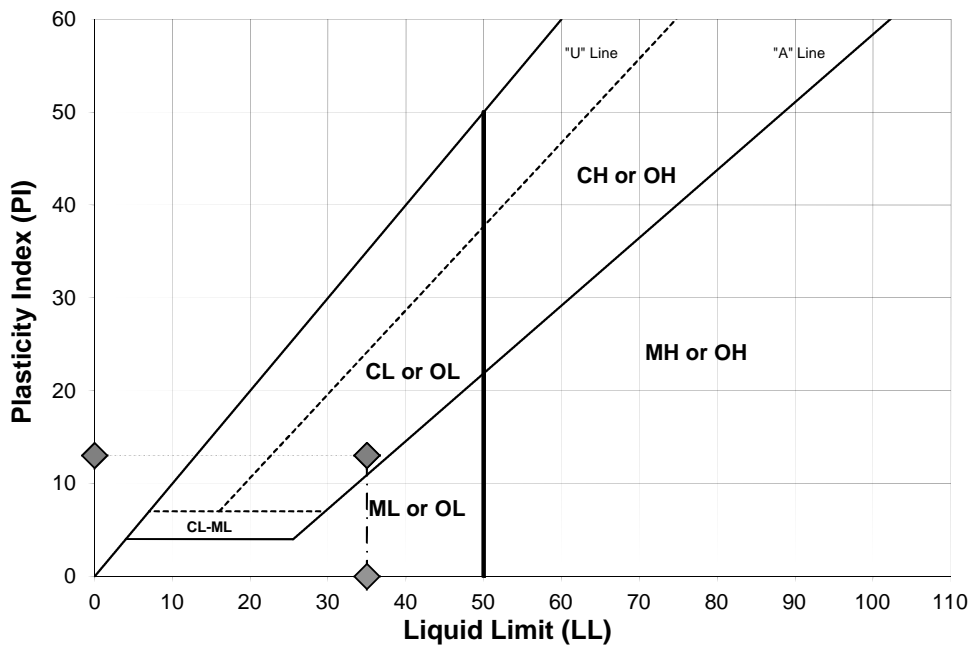
Brownish Gray

Unified Soil Classification :

CL - Lean Clay

For classification of fine-grain soils and fine-grain fraction of course-grained soils (ASTM 4318)

Liquid Limit **35**
Plasticity Index **13**



ML	Silt
CL	Lean Clay
CH	Fat Clay
CL-ML	Silty Clay
MH	Elastic Silt
OH	Organic Elastic Silt
OL	Organic Lean Clay
OH	Organic Fat Clay
OL	Organic Silt

Percent Gravel
Percent Sand
Percent of Minus 200 Sieve

Cc
Cu

Koehler Engineering and Land Surveying

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Unified Soil Classification System (ASTM 2487)

Job # Tested By: Report #

Client: Gardener Capital

Project: New Site Development In Blytheville Arkansas

Sample #: B9 s3

Sample Site:

Sample Elev.: 6 feet BGS

Moist Color :

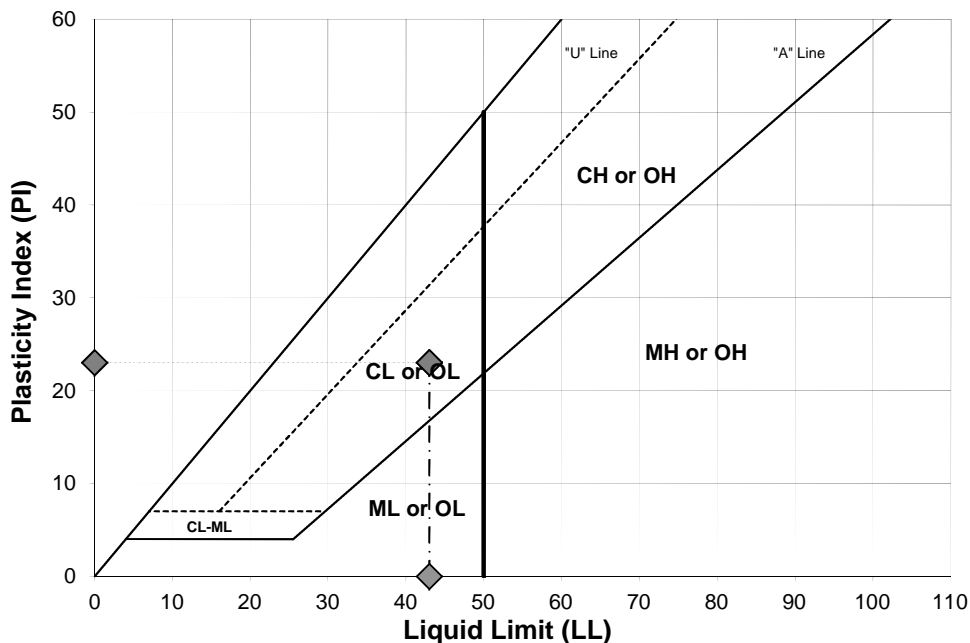
Brownish Gray

Unified Soil Classification :

CL - Lean Clay

For classification of fine-grain soils and fine-grain fraction of course-grained soils (ASTM 4318)

Liquid Limit **43**
Plasticity Index **23**



Percent Gravel
Percent Sand
Percent of Minus 200 Sieve

Cc
Cu

KOEHLER ENGINEERING AND LAND SURVEYING

194 COKER LANE, CAPE GIRARDEAU MO. 63701 PHONE # (573) 335-3026

Client

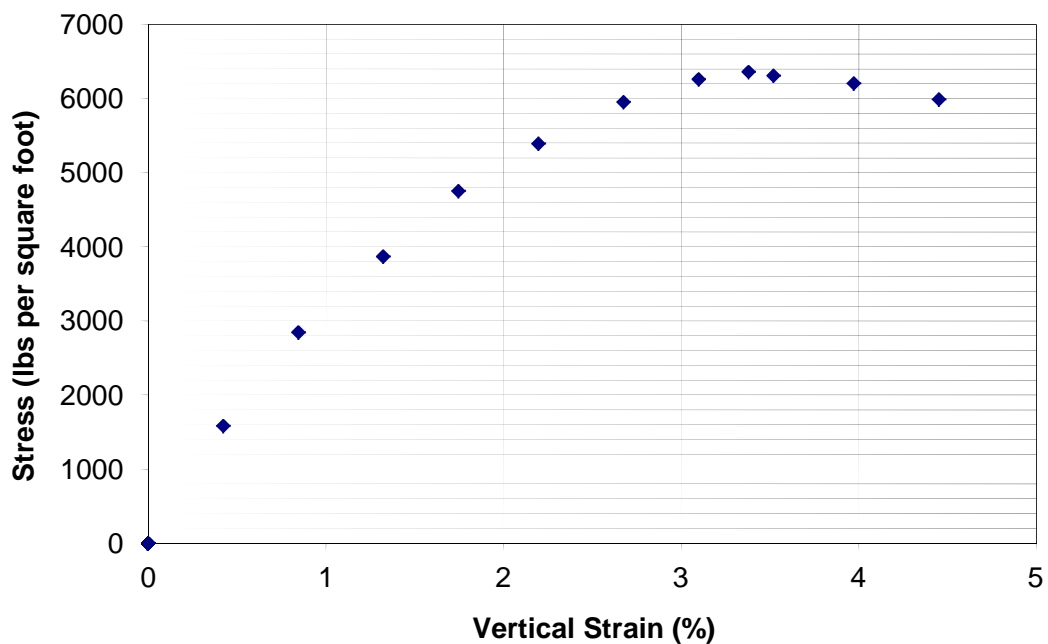
Gardner Capital

Project

Blytheville Arkansas Site

Date	7-12-12
Sample Description:	Light Grayish Brown Silt
Sample #:	1
Sample Depth:	1 feet
Moisture:	16.4 %
Q _u	6360 lbs/ft ²
Strain	4 %
Sample Condition:	undisturbed
Initial H/D Ratio:	2.6
Area of Specimen	1.52 inches
Volume Of Specimen	5.39 inches
Moist Unit Weight of Soil	122.3 lbs/ft ³
Dry Unit Weight of Soil	105.0 lbs/ft ³
Remarks:	

Unconfined Compressive Strength



LOG OF BORING NO.B1

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL × - - - - - × LL 20 40 60 80			
							Moisture			
							N Blows			
0			Elevation=247.23							
			Light Brown Lean Clay	17	16.0	4.5+				
4			Light Grayish Brown Lean Clay	6	27.2	0.25				
			Grayish Brown Lean Clay	5	29.7	0.5				
8			Blueish Gray Lean Clay	2	29.4	1.0				
12										
			Blueish Gray Fat Clay	1	44.8	1.5				
16										
			Blueish Gray Fat Clay	2	39.1	0				
20			End of Boring							
24										
28										

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER INITIAL: 15
FINAL:

Page 1 of 1

LOG OF BORING NO.B2

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	<div> <div>PL ×-----× LL</div> <div>20 40 60 80</div> </div>			
							Moisture			
							N Blows			
0			Elevation=247.61							
			Light Grayish Brown Silt	9	18.4	3.0				
4			Light Grayish Brown Silt	6	26.2	2.5				
			Light Grayish Brown Lean Clay	5	33.7	1.75				
8			Light Grayish Brown Fat Clay	3	38.4	0.75				
12			Blueish Gray Fat Clay	5	39.9	0.75				
16			Blueish Gray Fat Clay	4	39.3	0				
20			End of Boring							
24										
28										

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER > INITIAL:
FINAL:

Page 1 of 1

LOG OF BORING NO.B3

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL × - - - - - × LL 20 40 60 80			
							Moisture			
							N Blows			
0			Elevation=247.48							
			Dark Gray Lean Clay	11	17.7	4.5+				
4			Gray Lean Clay	6	23.8	1.75				
			Blueish Brown Silt	8	35.5	0				
8			Blueish Gray Fat Clay	5	46.9	0.75				
12			Dark Gray Fat Clay	4	33.3	1.75				
16			Dark Gray Fat Clay	2	48.8	0.25				
20			End of Boring							
24										
28										

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER INITIAL: 16
FINAL:

LOG OF BORING NO.B4

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL ×-----× LL				
							20 40 60 80				
							Moisture				
							N Blows				
0			Elevation=248.05								
			Light Brown Silty Lean Clay	6	15.6	4.5+					
4			Light Brown Silt	6	25.5	2.25					
			Grayish Brown Lean Clay	4	36.5	1.5					
8			Light Gray Lean Clay	4	30.2	1.25					
12											
			Blueish Gray Lean Clay	4	41.1	1.0					
16											
			Blueish Gray Fat Clay	1	51.6	0.75					
20											
24			Blueish Gray Fat Clay	1	45.0	0.5					
			Heaving Soil - End of Boring								
28											

COMPLETION DEPTH 25
DATE: 7-09/10-12

DEPTH TO WATER > INITIAL:
FINAL:

Page 1 of 1

LOG OF BORING NO.B5

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL × - - - - - × LL 20 40 60 80			
							Moisture			
							N Blows			
0			Elevation=248.07							
			Light Gray Silt	8	15.8	4.5+				
4			Light Gray Silt	6	17.3	2.5				
			Grayish Brown Lean Clay	3	33.3	1.5				
8			Grayish Brown Lean Clay	3	33.4	1.25				
12			Blueish Gray Fat Clay	3	50.5	1.0				
16			Blueish Gray Fat Clay	1	55.6	0				
20			End of Boring							
24										
28										

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER INITIAL: 16
FINAL:

Page 1 of 1

LOG OF BORING NO.B6

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL ×-----× LL				
							20 40 60 80				
							Moisture				
							N Blows				
0			Elevation=249.24								
			Light Grayish Brown Silt	11	16.0	4.5+					
4			Light Grayish Brown Silt	10	13.4	1.75					
			Light Grayish Brown Lean Clay	4	29.9	1.5					
8			Blueish Gray Lean Clay	5	37.0	1.0					
			Blueish Gray Fat Clay	5	41.8	1.0					
16			Blueish Gray Fat Clay	4	57.0	0.25					
20			End of Boring								
24											
28											

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER INITIAL:
FINAL:

Page 1 of 1

LOG OF BORING NO.B7

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL × --- × LL			
							20	40	60	80
							Moisture			
							N Blows			
0			Elevation=248.41							
			Light Grayish Brown Silt	13	12.4	4.5+				
4			Light Grayish Brown Lean Clay	9	19.9	4.5				
			Light Grayish Brown Fat Clay	11	27.1	2.25				
8			FatLight Grayish Brown	5	36.5	1.0				
12										
			Blueish Gray Fat Clay	2	39.6	1.0				
16										
			Blueish Gray Fat Clay	3	57.8	1.0				
20			End of Boring							
24										
28										

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER INITIAL: 16
FINAL:

Page 1 of 1

LOG OF BORING NO.B8

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL × - - - - - × LL 20 40 60 80			
							Moisture			
							N Blows			
0			Elevation=248.41							
			Light Gray Silt	10	19.5	4.5				
4			Light Gray Silt	8	15.0	4.5+				
			Light Grayish Brown Fat Clay	6	45.8	1.5				
8			Light Grayish Brown Fat Clay	3	38.6	0.75				
12			Blueish Gray Fat Clay	5	42.1	1.0				
16										
			Blueish Gray Fat Clay	1	39.8	0.25				
20			End of Boring							
24										
28										

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER INITIAL: 16
FINAL:

Page 1 of 1

LOG OF BORING NO.B9

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)					
							PL	×	-----	×	LL
							20	40	60	80	
							Moisture				
N Blows											
0			Elevation=248.37								
			Brown Lean Clay	7	26.2	2.5					
4			Brownish Gray Lean Clay	5	23.4	1.0					
			Brownish Gray Lean Clay	6	27.3	1.25					
8											
			Grayish Brown Lean Clay	4	34.6	1.0					
12											
			Blueish Gray Fat Clay	2	46.2	0.5					
16											
			Blueish Gray Fat Clay	1	52.9	0.25					
20											
			End of Boring								
24											
28											

COMPLETION DEPTH 20
DATE: 7-09/10-12

DEPTH TO WATER INITIAL: 16
FINAL:

Page 1 of 1

LOG OF BORING NO.B10

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	<div> <div>PL ×-----× LL</div> <div>20 40 60 80</div> </div>			
							Moisture			
							N Blows			
0			Elevation=250.22							
			Brown Silt	9	20.0	4.5+				
4			Light Grayish Brown Silt	10	15.7	4.5+				
			Light Grayish Brown Lean Clay	7	26.3	1.25				
8			Light Grayish Brown Lean Clay	6	38.9	0				
12			Light Grayish Brown Lean Clay	4	38.1	0				
16			End of Boring							
20										
24										
28										

COMPLETION DEPTH: 15
DATE: 7-09/10-12

DEPTH TO WATER: INITIAL: 16
FINAL:

LOG OF BORING NO.B11

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL ×-----× LL				
							20 40 60 80				
							Moisture				
							N Blows				
0			Elevation=248.01								
			Light Gray Silt	8	17.1	2.25					
4			Light Grayish Brown Silt	10	24.0	1.75					
			Light Grayish Brown Lean Clay	6	33.6	0.25					
8			Light Grayish Brown Lean Clay	4	34.2	0.5					
			Light Grayish Brown Lean Clay								
12			Light Grayish Brown Lean Clay								
			Blueish Gray Fat Clay	4	41.6	0.5					
16			End of Boring								
20											
24											
28											

COMPLETION DEPTH: 15
DATE: 7-09/10-12

DEPTH TO WATER: INITIAL: 16
FINAL:

Page 1 of 1

LOG OF BORING NO.B12

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL ×-----× LL				
							20 40 60 80				
							Moisture				
							N Blows				
0			Elevation=248.51								
			Light Grayish Brown Silt	9	18.3	4.5+					
4			Light Grayish Brown Silt	10	18.2	1.75					
			Light Grayish Brown Lean Clay	8	22.5	2.25					
8			Light Grayish Brown Lean Clay	4	35.7	1.25					
12											
			Light Grayish Brown Fat Clay	5	27.6	0.75					
16			End of Boring								
20											
24											
28											

COMPLETION DEPTH: 15
DATE: 7-09/10-12

DEPTH TO WATER: INITIAL: 16
FINAL:

Page 1 of 1

LOG OF BORING NO.B13

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)					
							PL	×	-----	×	LL
							20	40	60	80	
							Moisture				
N Blows											
0			Elevation=247.42								
			Brown Silt	9	19.9	4.25					
4			Light Grayish Brown Silt	7	24.1	2.5					
			Light Grayish Brown Lean Clay	6	30.9	0.25					
8											
			Light Grayish Brown Lean Clay	5	31.1	0.75					
12											
			Blueish Gray Fat Clay	5	48.0	1.25					
16			End of Boring								
20											
24											
28											

COMPLETION DEPTH: 15
DATE: 7-09/10-12

DEPTH TO WATER: INITIAL: 16
FINAL:

Page 1 of 1

LOG OF BORING NO.B14

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL × - - - - - × LL 20 40 60 80			
							Moisture			
							N Blows			
0			Elevation=247.82							
			Light Grayish Brown Silt	7	25.0	2.75				
			No Recovery	6						
4			Light Grayish Brown Fat Clay	5	48.3	0.75				
8			Light Grayish Brown Lean Clay	4	22.0	0.25				
12			Blueish Gray Fat Clay	5	44.2	0.5				
16			End of Boring							
20										
24										
28										

COMPLETION DEPTH: 15
DATE: 7-09/10-12

DEPTH TO WATER: INITIAL: 16
FINAL:

LOG OF BORING NO.B15

Gardener Capital New Site Development
Blytheville Arkansas

Location _____

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	N BLOWS	% Moisture	Cohesion (t/sq. ft)	PL × - - - - - × LL 20 40 60 80			
							Moisture			
							N Blows			
0			Elevation=248.59							
			Light Brown Silt	6	14.5	3.5				
4			Light Brown Silt	9	18.5	3.5				
			Light Grayish Brown Lean Clay	5	35.8	1.5				
8			Light Gray Lean Clay	4	38.4	0.25				
12										
			Blueish Gray Fat Clay	5	56.8	0.25				
16			End of Boring							
20										
24										
28										

COMPLETION DEPTH: 15
DATE: 7-09/10-12

DEPTH TO WATER: INITIAL: 16
FINAL:

Page 1 of 1



KOEHLER ENGINEERING & LAND SURVEYING, INC.

194 Coker Lane
CAPE GIRARDEAU, MO 63701
PH: (573) 335-3026 FX: (573) 335-3049

September 6, 2012

Report to:

Ms. Janna Darmon
Development Coordinator
Gardner Capital, Inc.
1414 Primrose, Suite 100
Springfield, MO 6580

&

Mr. Mike Kleffner, AIA, NCARB, LEED AP, BD&C
Wallace Architects

**RE: Supplemental Subsurface Recommendations for Geotechnical
Report for Project #34759, Duplex Housing in Blytheville, Ark.**

Ms. Darmon;

In accordance with our discussion with Mr. Mike Kleffner, AIA, representing Wallace Architects and Gardner Capital, we have examined our original recommendations presented in the original geotechnical report to reflect three scenarios not originally disclosed or anticipated. Mr. Kleffner's inquiry was as follows:

Due to the relatively shallow elevation of the existing sanitary sewer line (4'-0 depth at location per 2nd attachment), we are needing to bring a good amount of fill to the east edge of the site so we can connect to the existing lines without a pump station. The City does not want another pump station added at this development. Can you please look at revising your report to note recommendations based on foundations resting on 3 conditions?

1. Existing soils (per your original report)
2. Engineered fill built up 0-24"
3. Engineered fill built up 24-48"

The additional fill would have no effect either way on the seismic site class, design category, or the accelerations noted and seismic coefficients required for design.

Items two and three of the above list would allow for an increased bearing capacity under the following conditions.

The material to be utilized should be a stable material of a non expansive nature, preferable a lean clay or sandy lean clay. Some silt would be expected within the material, but the material should classify as clay.

Prior to the placement of fill, the existing ground surface should be stripped and compacted in place to prepare proper support for the new fill layers. The fill material to elevate the grade should be placed in uniform lifts and compacted in accordance with the requirements of Table 5 from the original report.

The addition of 24 of material will have minimal impact, as the bottom of the foundations will still be bearing at or near native soils, and the original recommendations will continue to apply.

In areas with approximately 48 inches of fill placed in accordance to the direction herein and within the original report, the bearing capacity could be increased to 2,400 pounds per square foot for linear wall foundations, and 3,000 pounds per square foot for isolated column foundations. The lateral resistance could be increased to 125 psf as well, and the modulus of subgrade reaction (k) could be increased to 140 pounds per cubic inch (pci).

Since the materials will vary in thickness, and it is desirable to use a single pavement thickness and material throughout the site, the original paving recommendations for drives and parking lots are not altered.

We appreciate the opportunity to be of service to you and Gardner Capital, Inc. If you need any additional information, or have any questions of any nature, please feel free to contact our office at your convenience.

Regards,

KOEHLER ENGINEERING &
LAND SURVEYING, INC.



Chris Koehler, PE, PLS
Enclosures



ARR150000 Inspection Form – Stormwater Pollution Prevention Plan

Inspector Name: _____

Date of Inspection: _____

Inspector Title: _____

Date of Rainfall: _____

Duration of Rainfall: _____

Days Since Last Rain Event: _____ days

Rainfall Since Last Rain Event: _____ inches

Description of any Discharges During Inspection: _____

Location of Discharges of Sediment/Other Pollutant (specify pollutant & location): _____

Locations in Need of Additional BMPs: _____

Information on Location of Construction Activities

Location	Activity Begin Date	Activity Occuring Now (y/n)?	Activity Ceased Date	Stabilization Initiated Date	Stabilization Complete Date

Information on BMPs in Need of Maintenance

Location	In Working Order?	Maintenance Scheduled Date	Maintenance Completed Date	Maintenance to be Performed By

Changes required to the SWPPP: _____

Reasons for changes: _____

SWPPP changes completed (date): _____

"I certify under penalty of law that this document and all attachments such as Inspection Form were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Responsible or Cognizant Official: _____ Date: _____

Title: _____



ARKANSAS
Department of Environmental Quality

**NOTICE OF INTENT
FOR DISCHARGES OF STORMWATER
ASSOCIATED WITH LARGE CONSTRUCTION ACTIVITY
AUTHORIZED UNDER NPDES GENERAL PERMIT ARR150000**

The enclosed form may be used to obtain coverage under NPDES general permit ARR150000 for discharges of stormwater associated with large construction activity at any site or common plan of development or sale that will result in the disturbance of five (5) or more acres of total land area.

Return the completed form to:

Arkansas Department of Environmental Quality
Permit Branch, Water Division
5301 Northshore Drive
North Little Rock, AR 72118

Unless notified by the Director to the contrary, dischargers who submit a complete Notice of Intent in accordance with the requirements of this permit are authorized to discharge stormwater from construction sites under the terms and conditions of this permit two weeks after the date the NOI is postmarked.

As required by ADEQ Regulation No. 9, an initial permit fee of \$200.00 must be submitted with this NOI. Subsequent annual fees of \$200.00 per year will be billed by the Department. Failure to remit the required permit fee may be grounds for the Director to deny coverage under this general permit, and to require the owner or operator to apply for an individual NPDES permit.

NOTE: A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE PREPARED PRIOR TO SUBMITTAL OF THIS NOI PER PART II.A OF THE GENERAL PERMIT. THE SWPPP MUST BE SUBMITTED FOR REVIEW ALONG WITH THIS NOI FOR LARGE CONSTRUCTION SITES PER PART I.B.6.B OF THE GENERAL PERMIT.

For additional information please contact:

Stormwater Runoff Engineer
Ph.: (501) 682-0623
Fax: (501) 682-0880
website: www.adeq.state.ar.us

INSTRUCTIONS

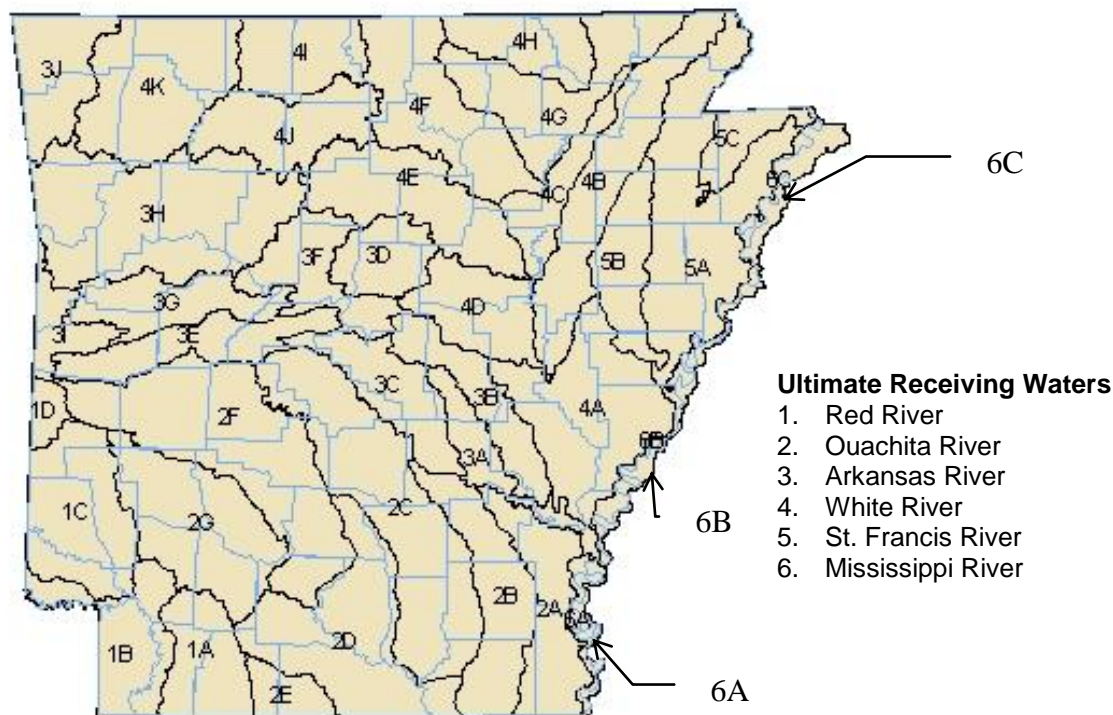
I. How to Determine Latitude and Longitude:

1. If a physical address is known go to www.terra-server-usa.com.
2. Select Advanced Find
3. Select Address
4. Input address
5. Click on Aerial Photo
6. Click on the Info link at the top of the page
7. Note the Latitude and Longitude are in Decimal Coordinates.
8. Go to www.geology.enr.state.nc.us/gis/latlon.html to convert coordinates to Degrees, Minutes, and Seconds.

NOTE: If a physical address does not exist you may find the coordinates in the Legal Description of the property.

II. How to Determine your Ultimate Receiving Waters:

1. Locate the county of your project.
2. Find the numbered segment overlaying the county. For example 2C overlays most of Saline County.
3. Match the number from the segment to the one of the numbered Ultimate Receiving Waters. For example: A project located in Western Saline County is in segment 2C. The “2” determines that the Ultimate Receiving Water for the project is the Ouachita River.



III. How to determine if the receiving stream is on the approved Arkansas 303(d) List:

1. Go to www.epa.gov/owow/tmdl
2. Using the map of the United States, click on Arkansas.
3. Using the “Waters Listed by Waterbody Type” links search for your receiving stream.
4. If your receiving stream is not listed, than your receiving stream is not on the approved Arkansas 303(d) List.
5. If your receiving stream is listed, than click on the links for that receiving stream to determine the pollutants causing the impairment.
6. Once a determination is made that your receiving stream is on the approved Arkansas 303(d) List, than you must determine if the receiving stream has an approved TMDL by using the “Approved TMDLs by Pollutant since January 1, 1996” links toward the bottom of the webpage.

IV. How to obtain information in regard to Endangered Species:

Contact the U.S. Fish and Wildlife Service at (501) 513-4470 or www.fws.gov/arkansas-es .

Arkansas Department of Environmental Quality
Permits Branch, Water Division
5301 Northshore Drive
North Little Rock, AR 72118
(501) 682-0623

**NOTICE OF INTENT
FOR DISCHARGERS OF STORMWATER RUNOFF
ASSOCIATED WITH LARGE CONSTRUCTION ACTIVITY
AUTHORIZED UNDER NPDES GENERAL PERMIT ARR150000**

Application Type: New ☐ Renewal ☐ (Permit Tracking Number ARR(____))

I. PERMITTEE/OPERATOR INFORMATION

Permittee (Legal Name): _____

Operator Type:

Permittee Mailing Address: _____

☐ STATE

☐ PARTNERSHIP

Permittee City: _____

☐ FEDERAL

☐ CORPORATION*

Permittee State: _____ Zip: _____

☐ SOLE PROPRIETORSHIP

Permittee Telephone Number: _____

☐ PUBLIC

☐ OTHER

Permittee Fax Number: _____

Permittee E-mail Address: _____

*State of Incorporation: _____

* The legal name of the Permittee must be identical to the name listed with the Arkansas Secretary of State.

II. INVOICE MAILING INFORMATION

Invoice Contact Person: _____

City: _____

Invoice Mailing Company: _____

State: _____ Zip: _____

Invoice Mailing Address: _____

Telephone: _____

III. FACILITY/PROJECT CONSTRUCTION SITE INFORMATION

1 acre = 43,560 square feet

Project Name: _____

Contact Person: _____

Project County: _____

Project Physical Address: _____

Directions to the Project: _____

Project City: _____ Zip: _____

Project Estimated

Telephone Number: _____

Start Date: _____

Total amount of soil to be disturbed
(estimate to nearest 1/2 acre): _____

Project Estimated

Total Project Acreage

End Date: _____

(Estimate to nearest 1/2 acre): _____

Project Latitude: _____ degrees _____ minutes _____ seconds

Project Longitude: _____ degrees _____ minutes _____ seconds

Type of Project: Subdivision ☐ School ☐ Other: _____

Is the Project part of a larger common plan of development or sale? Yes ☐ No ☐

Linear Project Starting Coordinates (if applicable):

Linear Project Ending Coordinates (if applicable):

Latitude: ____° ____' ____" Longitude: ____° ____' ____" Latitude: ____° ____' ____" Longitude: ____° ____' ____"

**Arkansas Department of Environmental Quality
Permits Branch, Water Division
5301 Northshore Drive
North Little Rock, AR 72118
(501) 682-0623**

VII. CERTIFICATION OF OPERATOR

_____ (Initial) "I certify that, if this facility is a corporation, it is registered with the Secretary of State of Arkansas. Please provide the full name of corporation if different than that listed in Section I above. "

_____ (Initial) "I certify that as a whole the stormwater discharge(s), and the construction and implementation of Best Management Practices (BMP's) to control stormwater runoff, are not likely to adversely affect species of critical habitat for a listed species."

_____ (Initial) "I certify that a stormwater pollution prevention plan has been prepared for this facility in accordance with Part II.A of this permit, which provides for, or will provide for, compliance with local sediment and erosion plans, local stormwater permits or stormwater management plans, in accordance with Part II.A.4.c of this permit."

_____ (Initial) "I certify that the cognizant official designated in Part VIII of this Notice of Intent is qualified to act as a duly authorized representative under the provisions of 40 CFR 122.22(b). If no cognizant official has been designated, I understand that the Department will accept reports signed by the applicant"

"I certify under penalty of law that this document and all attachments such as Inspection Form were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Responsible Official Printed Name: _____ Title: _____
Responsible Official Signature: _____ Date: _____

VIII. COGNIZANT OFFICIAL

Cognizant Official Printed Name: _____ Title: _____
Cognizant Official Signature: _____ Telephone: _____

IX. PERMIT REQUIREMENT VERIFICATION

Please check the following to verify completion of permit requirements.

	Yes	No*
Submittal of Complete NOI?	<input type="checkbox"/>	<input type="checkbox"/>
Submittal of Required Permit Fee?	<input type="checkbox"/>	<input type="checkbox"/>
Check Number: _____		
Complete SWPPP?	<input type="checkbox"/>	<input type="checkbox"/>

*** If you answer No to any of the above questions, then a permit can not be issued!**

Stormwater Pollution Prevention Plan (SWPPP) for Construction Activity
for Large Construction Sites

National Pollutant Discharge Elimination System (NPDES)
General Permit # ARR150000

Prepared for:

Date:

Prepared by:

Project Name and Location: _____

Property Parcel Number (*Optional*): _____

Operator Name and Address: _____

A. Site Description

a. Project description, intended use after NOI is filed: _____

b. Sequence of major activities which disturb soils: _____

c. Total Area: _____ Disturbed Area: _____

d. Soils Information:

i. Runoff Coefficient Pre-Construction (See Appendix A) : _____

ii. Runoff Coefficient Post-Construction (See Appendix A) : _____

iii. Describe the soil or the quality of any discharge from the site: _____

B. Responsible Parties

Individual/Company	Phone Number	Service Provided for SWPPP (i.e., Inspector, SWPPP revisions, Stabilization Activities, BMP Maintenance, etc.)

C. Receiving Waters

a. The following waterbody (or waterbodies) receives stormwater from this construction site: _____

b. Is the project located within the jurisdiction of an MS4? ☐ Yes ☐ No

i. If yes, Name of MS4: _____

c. Ultimate Receiving Water:

☐ Red River

☐ Ouachita River

☐ Arkansas River

☐ White River

☐ St. Francis River

☐ Mississippi River

D. Documentation of Permit Eligibility Related to the 303(d) list and Total Maximum Daily Loads (TMDL) (http://www.adeg.state.ar.us/water/branch_planning/default.htm)

a. Does the stormwater enter a waterbody on the 303(d) list or with an approved TMDL? ☐Yes ☐No

b. If yes:

i. Waterbody identified on 303(d) list: _____

ii. Pollutant addressed on 303(d) list or TMDL: _____

iii. This specific project or generally construction activity is identified on 303(d) list or associated assumptions and allocations identified in the TMDL for the discharge: ☐Yes ☐No

iv. Additional controls implemented: _____

E. Attainment of Water Quality Standards After Authorization

a. The permittee must select, install, implement, and maintain BMPs at the construction site that minimize pollutants in the discharge as necessary to meet applicable water quality standards. In general, except in situations explained below, the SWPPP developed, implemented, and updated to be considered as stringent as necessary to ensure that the discharges do not cause or contribute to an excursion above any applicable water quality standard.

b. At any time after authorization, the Department may determine that the stormwater discharges may cause, have reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. If such a determination is made, the Department will require the permittee to:

i. Develop a supplemental BMP action plan describing SWPPP modifications to address adequately the identified water quality concerns and submit valid and verifiable data and information that are representative of ambient conditions and indicate that the receiving water is attaining water quality standards; or

ii. Cease discharges of pollutants from construction activity and submit an individual permit application.

I understand and agree to follow the above text regarding the attainment of water quality standards after authorization. ☐Yes ☐No

F. Site Map Requirements (Attach Site Map):

a. Pre-construction topographic view;

- b. Direction of stormwater flow (i.e., use arrows to show which direction stormwater will flow) and approximate slopes anticipated after grading activities;
- c. Delineate on the site map areas of soil disturbance and areas that will not be disturbed under the coverage of this permit;
- d. Location of major structural and nonstructural controls identified in the plan;
- e. Location of main construction entrance and exit;
- f. Location where stabilization practices are expected to occur;
- g. Locations of off-site materials, waste, borrow area, or equipment storage area;
- h. Location of areas used for concrete wash-out;
- i. Location of all surface water bodies (including wetlands);
- j. Locations where stormwater is discharged to a surface water and/or municipal separate storm sewer system if applicable,
- k. Locations where stormwater is discharged off-site (should be continuously updated);
- l. Areas where final stabilization has been accomplished and no further construction phase permit requirements apply.

G. Stormwater Controls

- a. Initial Site Stabilization, Erosion and Sediment Controls, and Best Management Practices:

- i. Initial Site Stabilization: _____

- ii. Erosion and Sediment Controls: _____

- iii. If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the operator will replace or modify the control for site situations: ☐Yes ☐No

- If No, explain: _____

- iv. Off-site accumulations of sediment will be removed at a frequency sufficient to minimize off-site impacts: ☐Yes ☐No

- If No, explain: _____

- v. Sediment will be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%: ☐Yes ☐No

- If No, explain: _____

- vi. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges: ☐Yes ☐No

If No, explain: _____

- vii. Off-site material storage areas used solely by the permitted project are being covered by this SWPPP: ☐Yes ☐No

If Yes, explain additional BMPs implemented at off-site material storage area: _____

b. Stabilization Practices

- i. Description and Schedule: _____

- ii. Are buffer areas required? ☐Yes ☐No

If Yes, are buffer areas being used? ☐Yes ☐No

If No, explain why not: _____

If Yes, describe natural buffer areas: _____

- iii. A record of the dates when grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be included with the plan.

☐Yes ☐No

If No, explain: _____

- iv. Deadlines for stabilization: Stabilization procedures will be initiated 14 days after construction activity temporarily ceases on a portion of the site.

c. Structural Practices

- i. Describe any structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site: _____

- ii. Sediment Basins:

Are 10 or more acres draining to a common point? ☐Yes ☐No

Is a sediment basin included in the project? ☐ Yes ☐ No

If Yes, what is the designed capacity for the storage?

☐ 3600 cubic feet per acre = : _____

or

☐ 10 year, 24 hour storm = : _____

☐ Other criteria were used to design basin: _____

If No, explain why no sedimentation basin was included and describe required natural buffer areas and other controls implemented instead: _____

iii. Describe Velocity Dissipation Devices: _____

H. Other Controls

a. Solid materials, including building materials, shall be prevented from being discharged to Waters of the State: ☐ Yes ☐ No

b. Off-site vehicle tracking of sediments and the generation of dust shall be minimized through the use of:

☐ A stabilized construction entrance and exit

☐ Vehicle tire washing

☐ Other controls, describe: _____

c. Temporary Sanitary Facilities: _____

d. Concrete Waste Area Provided:

☐ Yes

☐ No. Concrete is used on the site, but no concrete washout is provided.

Explain why: _____

☐ N/A, no concrete will be used with this project

e. Fuel Storage Areas, Hazardous Waste Storage, and Truck Wash Areas: _____

I. Non-Stormwater Discharges

a. The following allowable non-stormwater discharges comingled with stormwater are present or anticipated at the site:

☐ Fire-fighting activities;

☐ Fire hydrant flushings;

- ☐ Water used to wash vehicles (where detergents or other chemicals are not used) or control dust in accordance with Part II.A.4.H.2;
- ☐ Potable water sources including uncontaminated waterline flushings;
- ☐ Landscape Irrigation;
- ☐ Routine external building wash down which does not use detergents or other chemicals;
- ☐ Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled materials have been removed) and where detergents or other chemicals are not used;
- ☐ Uncontaminated air conditioning, compressor condensate (See Part I.B.12.C of the permit);,
- ☐ Uncontaminated springs, excavation dewatering and groundwater (See Part I.B.12.C of the permit);
- ☐ Foundation or footing drains where flows are not contaminated with process materials such as solvents (See Part I.B.12.C of the permit);

b. Describe any controls associated with non-stormwater discharges present at the site: _____

J. Post-Construction Stormwater Management:

Describe measures installed during the construction process to control pollutants in stormwater discharges that will occur after construction operations have been completed: _____

K. Applicable State or Local Programs: The SWPPP will be updated as necessary to reflect any revisions to applicable federal, state, or local requirements that affect the stormwater controls implemented at the site. ☐ Yes ☐ No

L. Inspections

a. Inspection frequency:

☐ Every 7 calendar days

or

☐ At least once every 14 calendar days and within 24 hours of the end of a storm even 0.5 inches or greater (a rain gauge must be maintained on-site)

b. Inspections:

Completed inspection forms will be kept with the SWPPP.

☐ ADEQ's inspection form will be used (See Appendix B)

or

☐ A form other than ADEQ's inspection form will be used and is attached (See inspection form requirements Part II.A.4.L.2)

c. Inspection records will be retained as part of the SWPPP for at least 3 years from the date of termination.

d. It is understood that the following sections describe waivers of site inspection requirements. All applicable documentation requirements will be followed in accordance with the referenced sections.

- i. Winter Conditions (Part II.A.4.L.3)
- ii. Adverse Weather Conditions (Part II.A.4.L.4)

M. Maintenance:

The following procedures to maintain vegetation, erosion and sediment control measures and other protective measures in good, effective operating condition will be followed: _____

Any necessary repairs will be completed, when practicable, before the next storm event, but not to exceed a period of 3 business days of discovery, or as otherwise directed by state or local officials.

N. Employee Training:

The following is a description of the training plan for personnel (including contractors and subcontractors) on this project: _____

****Note, Formal training classes given by Universities or other third-party organizations are not required, but recommended for qualified trainers; the permittee is responsible for the content of the training being adequate for personnel to implement the requirements of the permit.**

Certification

"I certify under penalty of law that this document and all attachments such as Inspection Form were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Responsible or Cognizant Official: _____

Title: _____

Date: _____

Computation Sheet for Determining Runoff Coefficients

Appendix A

Total Site Area = _____ Acres [A]

Existing Site Conditions

Impervious Site Area ¹ = _____ Acres [B]

Impervious Site Area Runoff Coefficient ^{2, 4} = _____ [C]

Pervious Site Area ³ = _____ Acres [D]

Pervious Site Area Runoff Coefficient ⁴ = _____ [E]

Pre-Construction Runoff Coefficient

$$\frac{[B \times C] + [D \times E]}{[A]} = \text{This is your pre-construction runoff coefficient.}$$

Proposed Site Conditions (after construction)

Impervious Site Area ¹ = _____ Acres [F]

Impervious Site Area Runoff Coefficient ^{2, 4} = _____ [G]

Pervious Site Area ³ = _____ Acres [H]

Pervious Site Area Runoff Coefficient ⁴ = _____ [I]

Post-Construction Runoff Coefficient

$$\frac{[F \times G] + [H \times I]}{[A]} = \text{This is your post-construction runoff coefficient.}$$

1. Includes paved areas, areas covered by buildings, and other impervious surfaces.
2. Use 0.95 unless lower or higher runoff coefficient can be verified.
3. Includes areas of vegetation, most unpaved or uncovered soil surfaces, and other pervious areas.
4. Refer to local Hydrology Manual for typical C values.

ARR150000 Inspection Form

Appendix B

Inspector Name: _____

Date of Inspection: _____

Inspector Title: _____

Date of Rainfall: _____

Duration of Rainfall: _____

Days Since Last Rain Event: _____ days

Rainfall Since Last Rain Event: _____ inches

Description of any Discharges During Inspection: _____

Location of Discharges of Sediment/Other Pollutant (specify pollutant & location): _____

Locations in Need of Additional BMPs: _____

Information on Location of Construction Activities

Location	Activity Begin Date	Activity Occuring Now (y/n)?	Activity Ceased Date	Stabilization Initiated Date	Stabilization Complete Date

Information on BMPs in Need of Maintenance

Location	In Working Order?	Maintenance Scheduled Date	Maintenance Completed Date	Maintenance to be Performed By

Changes required to the SWPPP: _____

Reasons for changes: _____

SWPPP changes completed (date): _____

"I certify under penalty of law that this document and all attachments such as Inspection Form were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Responsible or Cognizant Official: _____ Date: _____

Title: _____

BMP Consideration Checklist

Appendix C

The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP should be checked as "Not Used" with a brief statement describing why it is not being used.

Note: Appendix C and D do not have to be submitted with the SWPPP. These attachments are for use during the development of the SWPPP.

EROSION CONTROL BMPs				
BMP	BMP Considered for project	BMP Used	BMP Not Used	If not used, state reason
EC-1 Scheduling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-2 Preservation of Existing Vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-3 Hydraulic Mulch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-4 Hydroseeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-5 Soil Binders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-6 Straw Mulch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-7 Geotextiles & Mats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-8 Wood Mulching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-9 Earth Dikes & Drainage Swales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-10 Velocity Dissipation Devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-11 Slope Drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EC-12 Stream bank Stabilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SEDIMENT CONTROL BMPs				
BMP	BMP Considered for project	BMP Used	BMP Not Used	If not used, state reason
SE-1 Silt Fence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-2 Sediment Basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-3 Sediment Trap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-4 Check Dam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-5 Fiber Rolls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-6 Gravel Bag Berm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-7 Street Sweeping and Vacuuming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-8 Sand Bag Barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-9 Straw Bale Barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-10 Storm Drain Inlet Protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SE-11 Chemical Treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WIND EROSION CONTROL BMPs				
BMP	BMP Considered for project	BMP Used	BMP Not Used	If not used, state reason
WE-1 Wind Erosion Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

BMP Consideration Checklist

Appendix C

TRACKING CONTROL BMPs				
BMP	BMP Considered for project	BMP Used	BMP Not Used	If not used, state reason
TR-1 Stabilized Construction Entrance/Exit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
TR-2 Stabilized Construction Roadway	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
TR-3 Entrance/Outlet Tire Wash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NON-STORM WATER MANAGEMENT BMPs				
BMP	BMP Considered for project	BMP Used	BMP Not Used	If not used, state reason
NS-1 Water Conservation Practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-2 Dewatering Operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-3 Paving and Grinding Operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-4 Temporary Stream Crossing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-5 Clear Water Diversion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-6 Illicit Connection/ Discharge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-7 Potable Water/Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-8 Vehicle and Equipment Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-9 Vehicle and Equipment Fueling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-10 Vehicle and Equipment Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-11 Pile Driving Operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-12 Concrete Curing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-13 Concrete Finishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-14 Material and Equipment Use Over Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-15 Demolition Adjacent to Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NS-16 Temporary Batch Plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL BMPs				
BMP	BMP Considered for project	BMP Used	BMP Not Used	If not used, state reason
WM-1 Material Delivery and Storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-2 Material Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-3 Stockpile Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-4 Spill Prevention and Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-5 Solid Waste Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-6 Hazardous Waste Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-7 Contaminated Soil Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-8 Concrete Waste Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-9 Sanitary/Septic Waste Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WM-10 Liquid Waste Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

SWPPP Completion Checklist

Appendix D

Yes = Complete

No = Incomplete/Deficient

N/A = Not applicable to project

Yes	No	N/A	A. A site description, including:	Permit Section
			1. Project description, intended use after NOT	Part II.A.4.A.1
			2. Sequence of major activities	Part II.A.4.A.2
			3. Total & disturbed acreage	Part II.A.4.A.3
			B. Responsible Parties: All parties dealing with the SWPPP and the areas they are responsible for on-site.	Part II.A.4.B
			C. Receiving Water.	Part II.A.4.C
			-MS4 Name	Part II.A.4.C
			-Ultimate Receiving Water	Part II.A.4.C
			D.Site Map --- See End of Evaluation Form	Part II.A.4.F
			E. Description of Controls:	
			1. Erosion and sediment controls, including:	
			a. Initial site stabilization	Part II.A.4.G.1.a
			b. Erosion and sediment controls	Part II.A.4.G.1.b
			c. Replacement of inadequate controls	Part II.A.4.G.1.c
			d. Removal of off-site accumulations	Part II.A.4.G.1.d
			e. Maintenance of sediment traps/basins @ 50% capacity	Part II.A.4.G.1.e
			f. Litter, construction debris and chemicals properly handled	Part II.A.4.G.1.f
			g. Off-site storage areas and controls	Part II.A.4.G.1.g
			2. Stabilization practices:	
			a. Description and schedule for stabilization	Part II.A.4.G.2.a
			b. Description of buffer areas	Part II.A.4.G.2.b
			c. Records of stabilization	Part II.A.4.G.2.c
			d. Deadlines for stabilization	Part II.A.4.G.2.d
			3. Structural Practices:	
			-Describe structural practices to divert flows, store flows, or otherwise limit runoff	Part II.A.4.G.3
			a. Sediment basins	Part II.A.4.G.3.a.1
			-Are more than 10 acres draining to a common point? If so, are sediment basins included?	Part II.A.4.G.3.a.1
			-Sediment basin dimensions and capacity description and calculations	Part II.A.4.G.3.a.1
			-If a basin wasn't practicable, are other controls sufficient?	Part II.A.4.G.3.a.1
			b. Velocity dissipation devices concentrated flow from 2 or more acres	Part II.A.4.G.3.b
			F. Other controls including:	
			1. Solid waste control measures	Part II.A.4.H.1
			2. Vehicle off-site tracking controls	Part II.A.4.H.2
			3. Compliance with sanitary waste disposal	Part II.A.4.H.4
			4. Does the site have a concrete washout area controls?	Part II.A.4.H.5
			5. Does the site have fuel storage areas, hazardous waste storage and/or truck wash areas controls?	Part II.A.4.H.6
			G. Identification of allowable non-storm water discharges	Part II.A.4.I
			-Appropriate controls for dewatering, if present	Part I.B.12.C
			H. State or local requirements incorporated into the plan.	Part II.A.4.K

SWPPP Completion Checklist

Appendix D

Yes = Complete

No = Incomplete/Deficient

N/A = Not applicable to project

Yes	No	N/A	I. Inspections	Permit Section
			1. Inspection frequency listed?	Part II.A.4.L.1
			2. Inspection form	Part II.A.4.L.2
			Ours.	
			If not ours, does it contain the following items:	
			a. Inspector name and title	Part II.A.4.L.2.a
			b. Date of inspection.	Part II.A.4.L.2.b
			c. Amount of rainfall and days since last rain event (14 day only)	Part II.A.4.L.2.c
			d. Approx beginning and duration of storm event	Part II.A.4.L.2.d
			e. Description of any discharges during inspection	Part II.A.4.L.2.e
			f. Locations of discharges of sediment/other pollutants	Part II.A.4.L.2.f
			g. BMPs in need of maintenance	Part II.A.4.L.2.g
			h. BMPs in working order, if maintenance needed (scheduled and completed)	Part II.A.4.L.2.h
			i. Locations that are in need of additional controls	Part II.A.4.L.2.i
			j. Location and dates when major construction activities begin, occur or cease	Part II.A.4.L.2.j
			k. Signature of responsible/cognizant official	Part II.A.4.L.2.k
			3. Inspection Records	Part II.A.4.L.3
			4. Winter Conditions	Part II.A.4.L.4
			5. Adverse Weather Conditions	Part II.A.4.L.5
			J. Maintenance Procedures	Part II.A.4.M
			K. Employee Training	Part II.A.4.N
			Signed Plan Certification	Part II.A.7. and Part II.B.10
			D. Site Map showing:	
			1. Pre-construction topographic view	Part II.A.4.F.1
			2. Drainage flow	Part II.A.4.F.2
			3. Approximate slopes after grading activities	Part II.A.4.F.2
			4. Areas of soil disturbance and areas not disturbed	Part II.A.4.F.3
			5. Location of major structural and non-structural controls.	Part II.A.4.F.4
			6. Location of main construction entrance and exit.	Part II.A.4.F.5
			7. Areas where stabilization practices are expected to occur.	Part II.A.4.F.6
			8. Locations of off-site materials, waste, borrow area or storage area.	Part II.A.4.F.7
			9. Locations of areas used for concrete wash-out.	Part II.A.4.F.8
			10. Locations of surface waters on site.	Part II.A.4.F.9
			11. Locations where water is discharged to a surface water or MS4.	Part II.A.4.F.10
			12. Storm water discharge locations.	Part II.A.4.F.11
			13. Areas where final stabilization has been accomplished.	Part II.A.4.F.12

SECTION 02280

TERMITE TREATMENT

GENERAL

- A. Protection against subterranean termites shall comply with Section R320 of the 2006 International Residential Code.
- B. All buildings shall be protected.
- C. Applicable provision of the "General Conditions" and "Supplementary Conditions" of the contract apply to this section.

SCOPE OF WORK

- A. Furnish all labor, materials, equipment, transportation and facilities necessary for a complete termite treatment for all buildings as herein specified.

MATERIALS

- A. Preconstruction subterranean termite treatment shall be provided in accordance with the following, utilizing water emulsions of Prevail FT, Dragnet SFR, Tribute, or equivalent EPA approved termiticide mixed and applied in accordance with the specific manufacturer's written instructions.

APPLICATION

- A. Horizontal Barriers - Create horizontal barriers beneath all building slab-on-grade floors and porch slabs, or other slabs abutting the building.
- B. Vertical Barriers - Create vertical barriers around plumbing, utility services, and along the inside and outside of the foundation walls.
- C. Termite treatment shall be applied by an individual licensed by the state in which the work is performed, and certification of the termite treatment application shall be given to the Owner at the project completion.
- D. All safety precautions and instructions of the termiticide manufacturer shall be adhered to by the applicator - both for his safety and the safety of others who might come in contact with chemicals.
- E. Reapply soil termiticide treatment solution to areas disturbed by subsequent excavation or other activities following application.

WARRANTY

- A. Upon completion of treatment, contractor shall issue written guarantee against termite infestation for a period of 5 years from date of completion.

END OF SECTION

SECTION 02900

LANDSCAPING

GENERAL

1.1 Scope

- A. Contractor shall sod all disturbed areas of site within the property lines and as otherwise designated on the plans. Sodded areas shall be watered daily as required until project is accepted, and mowed if necessary

PRODUCTS

2.1 Landscaping Materials

- A. Sod shall be turf type fescue.
- B. Contractor shall furnish and install shrubs and trees as per landscaping plan. Trees shall be 1-1/2" caliper minimum (except evergreens, which shall be 6' height) and be placed at a minimum of one tree every 2 units. Shrubs shall be 1 gallon min. and be placed six per unit minimum.

EXECUTION

3.1 Installation

- A. All landscaping shall be performed in accordance with the following:
- B. Procedure - Contractor shall contact the Owner or Architect prior to seeding.. Contractor shall save all tags and planting information from seed bags, fertilizer, shrubs, trees, etc., and give this information to the Architect.
- C. Maintenance and Upkeep - Contractor shall water and tend all plantings - including keeping grass mowed - while project is under construction. Upon acceptance and/or occupancy of the project, either as a whole or partially, the Owner shall tend all plantings and be responsible for their care.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

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, reinforcing, mix design, placement procedures, and finishes.
- B. Cast-in place concrete includes the following:
 - 1. Foundations and footings.
 - 2. Slab-on-grade.
 - 3. Foundation walls.
 - 4. Equipment pads and bases.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 2 Section "Portland Cement Concrete Paving" for concrete paving and walks.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching, compounds, water-stops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
- C. Shop drawings for formwork indicating fabrication and erection of forms for specific finish concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
 - 1. Architect's review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.

- D. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:
 - 1. Normal weight aggregates
 - 2. Vapor retarder/barrier.
 - 3. Form liners.
- E. Laboratory test reports for concrete materials and mix design test.
- F. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 - 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 - 3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- A. Concrete Testing Service: Engage a testing agency acceptable to Architect to perform material evaluation tests and to design concrete mixes.
- B. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.
- C. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings" and the following:
 - 1. At least 35 days prior to submitting design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:
 - a. Contractor's superintendent.

- b. Agency responsible for concrete design mixes.
- c. Agency responsible for field quality control.
- d. Ready-mix concrete producer.
- e. Concrete subcontractor.
- f. Primary admixture manufacturers.

PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
 - 1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.
 - 2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIAL

A. Portland Cement: ASTM C 150, Type I.

1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Fly Ash: ASTM C 618, Type F.

1. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

C. Lightweight Aggregates: ASTM 330.

D. Water: Potable.

E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Air-Tite, Cormix Construction Chemicals.
 - b. Air-Mix or Perma-Air, Euclid Chemical Co.
 - c. Darex AEA or Daraviar, W.R. Grace & Co.
 - d. MB-VR or Micro-Air, Master Builders, Inc.
 - e. Sealtight AEA, W.R. Meadows, Inc.
 - f. Sika AER, Sika Corp.

G. Vapor Retard: Provide vapor retard that is resistant to deterioration when tested according to ASTM E 154, as follows:

1. Polyethylene sheet not less than 6 mil thick.

2.4 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method,

use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

1. Do not use the same testing agency for field quality control testing.
 2. Limit use of fly ash to not exceed 25 percent of cement content by weight.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete (garages and patios) with the following properties as indicated on drawings and schedules:
1. 3500-psi, 28-day compressive strength; water cement ratio, 0.57 maximum (non-air-entrained), 0.45 maximum (air entrained).
- D. Design mixes to provide normal weight concrete (duplex and community building floor slabs) with the following properties as indicated on drawings and schedules:
1. 3000-psi, 28-day compressive strength; water cement ratio, 0.57 maximum (non-air-entrained), 0.45 maximum (air entrained).
- E. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
1. Subjected to freezing and thawing: W/C 0.45.
 2. Subjected to deicers/watertight: W/C 0.40.
 3. Subjected to brackish water, salt spray, or deicers: W/C 0.40.
- F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
 2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
 3. Concrete containing high-range water-reducing admixture (super-plastic-izer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
 4. Other concrete: Not more than 4 inches.
- G. 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, 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.

2.5 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (super-plasticizer) in concrete, as required, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 4.5 percent (moderate exposure) 5.5 percent (severe exposure) for 1-1/2 inch maximum aggregate.
 - b. 4.5 percent (moderate exposure) 6.0 percent (severe exposure) for 1- inch maximum aggregate.
 - c. 5.0 percent (moderate exposure) 6.0 percent (severe exposure) for 3/4 inch maximum aggregate.
 - d. 5.5 percent (moderate exposure) 7.0 percent (severe exposure) for 1/2 inch maximum aggregate.
 - 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
- D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
 - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C) reduce mixing and delivery time to 60 minutes.

2.7 VAPOR BARRIER

- A. Impervious 6 mil plastic sheeting or equal.

EXECUTION

3.1 GENERAL

A. GEOTECHNICAL REQUIREMENTS

1. See Geotechnical Report
- B. Coordinate the installation of joint materials, vapor retard/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 1. Provide Class A tolerances for concrete surfaces exposed to view.
 2. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sink-ages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking. Foundation block-outs for utility services, etc. are not allowed.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyway reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Place vapor retard/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
 - 1. Avoiding cutting or puncturing vapor retard/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position reinforcement so that it is in the top half of the slab's thickness. In foundation walls position the reinforcement so that it has a minimum distance of 3" between it and the earth. Support and secure reinforcement using chairs, runners, bolsters, spacers, and hangers designed for such and as approved by the Architect. Materials not specifically designed for reinforcement support are prohibited.
- D. Place reinforcement to maintain minimum coverage as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. 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.

3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.

- B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Water-stops: Provide water-stops in construction joints as indicated. Install water-stops to form continuous diaphragm in each joint. Support and protect exposed water-stops during progress of Work. Field fabricated joints in water-stops according to manufacturer's printed instructions.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."
- G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
 - 1. Form contraction joints by inserting pre-molded plastic, hardboard, or fiberboard strips into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
 - 3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
 - 4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use

setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

- B. Install dovetail anchor slots in concrete structures as indicated on drawings.
- C. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting type screeds.

3.7 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, non-residual, low-VOC, form coating compound before placing reinforcement.
 - 1. Coat steel forms with a non-staining, rust preventative material.

3.8 CONCRETE PLACEMENT

- A. Testing Subgrades – Each unit shall have the bottom of its footings (minimum 2 locations) and each slab's subgrade (unit and garage) tested by a qualified Soils Engineer prior to concrete placement.
- B. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other trades to permit installation of their work.
- C. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Cold joints in the foundation are not allowed. Deposit concrete to avoid segregation at its final location.
- E. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 - 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 machine. Place vibrators to rapidly penetrate placed layer and

at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. 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 to segregate.

- F. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
 - 1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or derbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position on chairs during concrete placement.
- G. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- H. When air temperature has fallen to or is expected to fall below 40 deg F (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.
 - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen sub-grade or on sub-grade containing frozen materials.
 - 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- I. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled 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 reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 - 3. Fog spray forms, reinforcing steel, and sub-grade just before placing concrete. Keep sub-grade moisture uniform without puddles or dry areas.
 - 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9 FINISHING FORMED SURFACES

- A. Rough Formed Finish: Provide a rough formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding ¼ inch in height rubbed down or chipped off.
- B. Smooth Formed Finish: Provide a smooth formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- 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.

3.10 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand bed terrazzo; and where indicated.
 - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power driven floats, or both. Consolidate surface with power driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.
- B. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surface to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film finish coating system.
 - 1. After floating, begin first trowel finish operation using a power driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand troweling operation, free

of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

C. Non-slip Broom Finish: Apply a non-slip broom finish to exterior concrete pads, walks, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filing In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, 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 shown 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: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture retaining cover curing, or by combining these methods, as specified.

D. Provide moisture curing by the following methods:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 2. Use continuous water-fog spray.
 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

3.13 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, 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 sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.14 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.15 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms.
 - 1. Correct high areas in uniformed surfaces by grinding after concrete has cured at least 14 days.
 - 2. Correct low areas in uniformed surfaces 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. Proprietary underlayment compounds may be used when acceptable to Architect.
 - 3. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least $\frac{3}{4}$ inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- B. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- C. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- D. Repair methods not specified above may be used, subject to acceptance of Architect.

QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Contractor will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 413; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. Yd. more than the first 25 cu. Yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 3. When total quantity of a given class of concrete is less than 50 cu. Yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
 4. When strength of field-cured cylinders is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test results falls below specified compressive strength by more than 500 psi.
- C. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name for concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

- E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

SECTION 04000

MASONRY

GENERAL

1.1 Section Includes

- A. Facebrick units.
- B. Reinforcement, anchorage, and accessories.

1.2 Related Sections

- A. Section 06100 - Rough Carpentry
- B. Section 07900 - Joint Sealers: Rod and sealant at control and expansion joints.

1.3 Submittals

- A. Samples: Submit four samples of face brick units to illustrate color, texture and extremes of color range.

1.4 Environmental Requirements

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F (10 degrees C) prior to, during, and 48 hours after completion of masonry work.,
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work..

PRODUCTS

2.1 Masonry Units

- A. Face Brick: King size (3" x 2-3/4" x 9-5/8") or as size as selected by owner and approved by architect. Brick shall conform to ASTM C-216, Type FBS, grade SW.

2.2 Reinforcement and Anchorage

- A. Wall Ties: Corrugated formed sheet metal, 1-1/2 x 4 inch size x 22 gage thick, adjustable, hot dip galvanized to ASTM A123. Install 12"o.c., vertically and 16"o.c. horizontally. Stagger vertical rows spacing.

2.3 Mortar and Grout

- A. Mortar and Grout: Type "N" 1 part Portland cement, 1 part Type S hydrated lime, and 5 parts sand. Color to be selected by Architect.

2.4 Flashings

- A. Plastic/Kraft Paper Flashings: 3 mil (0.8) mm) thick sheet polyethylene bonded to layer of fiber reinforced asphalt and backed with Kraft paper. "Nervastrol" 20 mil or equivalent.
- B. Lap Sealant: Butyl type as specified in Section 07900.

2.5 Accessories

- A. Preformed Control Joints: Neoprene material. Provide with corner and tee accessories, cement fused joints.
- B. Joint filler: Closed cell polyethylene; oversized 50 percent to joint width; self-expanding.
- C. Building Paper: 15# asphalt saturated felt or DuPont Tyvek housewrap or approved equal.
- D. Nailing Strips: Softwood, preservative treated for moisture resistance, dovetail shape, sized to masonry joints.
- E. Weeps: Cotton rope.
- F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials. Sure Kleen No. 600 cleaner or equivalent.
- G. Silicone Sealant: Sure Kleen Weather Seal SS.

EXECUTION

3.1 Examination

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify items provided by other sections of work are properly sized and located.

3.2 Preparation

- A. Direct and coordinate placement of metal anchors supplied to other sections.

- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 Coursing

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: 5 courses equal to 15-5/8" vertical
 - 3. Mortar Joints: 3/8" concave.

3.4 Placing and Bonding

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- D. Remove excess mortar as Work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Isolate top joint of masonry walls from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 Weeps

- A. Install weeps in veneer at 24 inches oc horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.6 Cavity Behind Veneer

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.

3.7 Reinforcement and Anchorage

- A. Install horizontal joint reinforcement 16 inches (400 mm) oc.
- B. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place joint reinforcement continuous in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Secure wall ties to stud framed back-up and embed into masonry veneer at maximum 12 inches (400 mm) oc vertically and 16 inches (900 mm) oc horizontally. Place at maximum 3 inches (75 mm) oc each way around perimeter of openings, within 12 inches (300 mm) of openings.

3.8 Masonry Flashings

- A. Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps, and at bottom of walls.
- B. Turn flashing up minimum 8 inches (200 mm) and seal to sheathing over wood framed back-up.
- C. Lap end joints minimum 6 inches (150 mm) and seal watertight.
- D. Turn flashing, fold, and seal at corners, bends, and interruptions.

3.9 Lintels

- A. Install loose steel lintels over masonry openings.
- B. Maintain minimum 6 inch bearing on each side of opening.

3.10 Control and Expansion Joints

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

- C. Size control joint in accordance with Section 07900 for sealant performance.
- D. Form expansion joint as detailed.

3.11 Tolerances

- A. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3m) and 1/2 inch in 20 ft (13 mm/6m) or more.
- B. Maximum variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- C. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3m); 1/2 inch in 30 ft (13 mm/9m).
- D. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft (3 mm/m).

3.12 Cutting and Fitting

- A. Cut and fit for conduit and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 Cleaning

- A. Clean work upon completion.
- B. Remove excess mortar and mortar smears.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.

3.14 Protection of Finished Work

- A. Protect finished Work from damage from construction operations.
- B. Apply silicone sealer to dry veneer after cleaning, Sure Kleen Weather Seal SS as per manufacturer's printed instructions

END OF SECTION

SECTION 05000

METALS

GENERAL

1.1 Scope

- A. Provide miscellaneous metal fabrications as required for a complete project. Furnish inserts and anchoring devices to be built into other work for installation of miscellaneous metal items, coordinate delivery to job site to avoid delay.
 - 1. Loose Steel Lintels
 - 2. Anchors
 - 3. Inserts
- B. Quality Standards
 - 1. Codes and Standards: AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings"; AWS "Structural Welding Code"; comply with applicable provisions unless otherwise indicated.

PRODUCTS

2.1 Materials

- A. Loose Steel Lintels: Steel angle (sized per plan), hot dipped galvanized, conforming to ASTM A 36. **Prior to ordering, coordinate with Owner, Architect, and GC regarding brick selected for adequate lintel coverage.**
- B. Anchors, Bolts, Fastenings, etc.: Type shown on drawings or as required. Anchor bolt spacing and location shall be 10" in length spaced at 4' o.c., at each side of the door, two bolts per piece of plate and within 1' of corners.
- C. Truss Anchors: Simpson H 2.5 or equal, 18 gauge galvanized anchor @ each truss at exterior walls.
- D. Plywood Clips – Kant-Sag PC Series or equal 18 gauge galvanized clip @ roof deck panel joints (centered between adjacent roof trusses/rafters).
- E. Shop Paint: FS TT-P-86, Type II or SSPC-Paint 14 or 13. Apply to cleaned and degreased steel surfaces at rate to provide a 2.0 mil dry film thickness.

2.2 Fabrication

- A. General: Use materials of size and thickness shown or if not shown, of required size, grade and thickness to produce strength and durability in finished product. Shop paint all items not specified to be galvanized after fabrication.
 - 1. Weld corners and seams continuously; grind exposed welds smooth and flush.
 - 2. Form exposed connections with hairline, flush joints; use concealed fasteners where possible.
- B. Loose Steel Lintels: Fabricate to sizes shown.
 - 1. Shop Prime after fabrication.

EXECUTION

3.1 Installation

- A. Perform cutting, drilling and fitting required for installation; set work accurately in location, alignment and elevation, measured from established lines and levels. Provide anchorage devices and fasteners where necessary for installation to other work.
 - 1. Set loose items on cleaned bearing surfaces, using wedges or other adjustments as required. Solidly pack open spaces with bedding mortar, consisting of 1 part Portland cement to 3 parts sand and only enough water for packing and hydration, or use commercial non-shrink grout material.
- B. Touch-up shop paint after installation. Clean field welds, bolted connections and abraded areas, and apply same type paint as used in shop. Use galvanizing repair paint on damaged galvanized surfaces.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

GENERAL

1.1 SCOPE

- A. Work included under this section shall include all materials and labor necessary to fully complete all rough carpentry, including, but not necessarily limited to, blocking, bracing and exterior trim, sub-trim and plates.

1.2 GENERAL

- A. Evidence of Grade: Grade mark and trademark of association having jurisdiction shall appear on each piece of material, or a certificate of inspection accompany each shipment.
- B. Maximum Permissible Moisture Content: At time of delivery to job site all lumber specified as kiln-dried material shall have a moisture content not in excess of 15% for Southern Pine KD, and all remaining lumber shall be kiln-dried material and shall have moisture content not in excess of 19%.
- C. Rough Hardware: Provide all necessary for installation of work specified herein, sizes and quantities required by Building Code and approved by A/E. Hardware exposed to moisture shall be hot-dip galvanized steel or approved type of non-ferrous metal.
- D. Attachments for Wood Engaging Masonry or Concrete: Approved type metal plugs or inserts, spaced as directed. Wood embedded in masonry or concrete not permitted unless shown on Drawings. (If permitted kiln dry and preservation treat as specified).
- E. Storage and Protection: Protect lumber, plywood, millwork, and casework from weather. Be sure that building is thoroughly dry before finish woods are placed in it.

1.3 SUBMITTALS

- A. Shop Drawings: Six (6) clearly legible copies, sealed by an engineer registered in the State of Kansas, of roof trusses shall be submitted prior to fabrication of any trusses. Fax copies are not acceptable.

1.4 ROUGH CARPENTRY STANDARDS

- A. The grades of lumber shall be as defined by the rules of the recognized association of lumber manufacturers producing the material specified, and the maximum defects and blemishes permissible on any specified grade shall not exceed the limitation of American Lumber Standard Lumber, unless otherwise specified, shall be surfaced four sides and shall bear the grade and trademark of the Association under whose rules it is produced, and shall contain a mark of mill identification.
- B. All lumber shall be live, sound stock, thoroughly seasoned and kiln dried. "Green" or unseasoned lumber will not be acceptable.
- C. Plywood: Plywood material furnished shall comply with all requirements of U.S. Product Standard PS-166 Grading Rules for Softwood. Plywood-Construction and Industrial, as published by the American Plywood Association.
- D. General Workmanship: Carefully layout, cut, fit, and install rough carpentry items. Use sufficient nails, spikes, screws, and bolts to insure rigidity and permanence. Provide for installation and support of plumbing, heating and ventilating work. Install work to the lines, plumb and level, unless indicated otherwise.

PRODUCTS

2.1 FRAMING MATERIALS

- A. Dimension Lumber: Framing lumber shall be sound, kiln-dried, S4S boards, free from warp or twist with maximum moisture content of 19%.

Grade shall be as follows:

<u>USE</u>	<u>GRADE</u>	<u>SPECIES</u>
Bracing and Blocking	UTILITY	DFL, SPF, HF, SYP
Non-Load Bearing Headers	UTILITY	DFL, HF, SPF, SYP
Load Bearing Headers & Beams	#2	DFL, HF, SYP
Plates	#3	Treated SYP, DFL, SPF, HF
Studs (Non-loadbearing)	STUD GRADE	SPF, DFL, HF, SYP
Studs (Loadbearing)	STUD GRADE	SPF, DFL, HF, SYP
Deck Framing	#2	Treated SYP

1. All wood embedded in concrete, in contact with concrete or foundation or exposed to weather shall be pressure treated SYP. Treatment shall be in accordance with the standard specifications of the American Wood Preservers Association for treating as specified.
2. All dimension lumber shall meet American Lumber Standards PS 20 and conform to Standard 15 Grading and Dressing Rules of the West Coast Lumber Inspection Bureau.

2.2 PLYWOOD

- A. Plywood: Provide APA graded panels complying with PS 1/ANSI A199.1 for type of applications indicated.
- B. Roof Sheathing: Roof sheathing shall be 19/32" OSB 4 X 8 APA rated sheathing with 40/20 Exposure I identification index. Lay with face grain perpendicular to framing members. Stagger end joints and abut over bearing. Nail as recommended by APA with nails. Install Kant-Sag S-56 clips or approved equal, to provide level surfaces at adjoining edges between trusses.
- C. Wall Sheathing: Wall sheathing to be 7/16" OSB 4 X 8 APA rated sheathing with 24/16 Exposure I identification index. Nail as recommended by APA with nails.

2.3 ACCESSORIES

- A. Fasteners and Anchorages: Of size, type, material and finish suited to application shown and complying with applicable standards including FS FF-N-105 and FF-W-92 and ANSI B 18.6.1. Provide metal hangers and framing anchors of size and type recommended for intended use by manufacturer. Hot-dip galvanized fasteners and anchorages for work exposed to weather, in ground contact and high relative humidity to comply with ASTM A 153.
- B. Building Paper: 15# asphalt saturated felt, non-perforated ASTM D226 or Tyvek building wrap.

2.4 PREFABRICATED STRUCTURAL WOOD

- A. Roof Trusses: Fabricator shall design, fabricate, and warrant trusses to be in accordance with 2006 Arkansas Fire Prevention Code. Design for roof live load of 30 PSF, 10 PSF dead load for top and bottom chords for a total design load of 50 PSF. Truss design shall be submitted prior to fabrication, stating all design conditions, including grade and size of all members, and bearing the stamp of an engineer registered in the State of Arkansas. Provide anchors, hangers, and plates as required. Chord mem-

bers shall be #2 minimum and web members #3 minimum. Install Simpson H 2.5, 18 gauge galvanized hurricane clips at each truss/plate connection.

EXECUTION

3.1 INSTALLATION

- A. Install rough carpentry work to comply with “Manual for Wood Frame Construction” by American Forest and Paper Association (A.F.P.A.) and with recommendations of American Plywood Association (APA), unless otherwise indicated. For sheathing, underlayment and other products not covered in above standards, comply with recommendations of manufacturer of product involved for use intended. Set carpentry work to required levels and lines, with members plumb and true and cut to fit.
- B. Securely attach carpentry work to substrates and supporting members using fasteners of size that will not penetrate members where opposite side will be exposed to view or receive finish materials. Install fasteners without splitting wood; fasten panel products to allow for expansion at joints unless otherwise indicated.
- C. Provide wood framing members of size and spacing indicated; do not splice structural members between supports. Firestop concealed spaces with wood blocking not less than 1-1/2” thick, if not blocked by other framing members.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

GENERAL

1.1 SCOPE

- A. Provide miscellaneous wood trim and custom and/or manufactured casework as shown on the plans and specified herein.

1.2 RELATED SECTIONS

- A. Section 09200 – Plaster and Gypsum Board

1.3 QUALITY STANDARDS

- A. Woodworking Standard: AWI “Quality Standard”.
- B. WIC “Manual of Millwork”.
- C. All lumber shall be live, sound stock, thoroughly seasoned and kiln dried. “Green” or unseasoned lumber will not be acceptable for use in millwork.

1.4 SUBMITTALS

- A. Shop Drawings: Submit six (6) clearly legible copies of complete details and instructions for fabrication, assembly, and installation of custom and/or manufactured casework and countertops prior to ordering and delivery. Fax copies are not acceptable.

PRODUCTS

2.1 MATERIALS

- A. Fasteners and Anchors: Provide nails, screws and other anchoring devices of type, size, material and finish suitable for intended use and as required to provide secure attachment, concealed where possible.
- B. Hardwood Lumber: Comply with referenced woodworking standards for quality of materials and fabrication and with requirements indicated.
 - 1. Woodworking Standard: AWI “Quality Standard”.
 - 2. All interior casework and shelving trim for transparent finish shall be red oak with clear vertical grain (quarter sawn), custom grade (Stain to match solid core wood doors).

- C. Wall Base and Interior Trim: Primed white pine (field finished) ½" X 3" colonial, solid or finger jointed wood, color as selected by Owner and Architect. Vinyl wrapped wood is not acceptable.
- D. Kitchen, laundry cabinets and bath vanities shall be stock design from manufacturer's standard line bearing the Certification Seal of the National Kitchen Cabinet Association (or other approved independent testing laboratory) showing compliance with ANSI A161.1, and meeting with the following specifications. Cabinets shall be equal to Cardel-FP Advantage in either birch or beech wood species, color as selected by Owner.
 - 1. Face frames (Rails, Stiles): ¾" x 1-¾" hardwood with modified urethane finish. Frameless units may be used upon approval of owner and architect.
 - 2. Cabinet ends: ½" particle board with hardwood veneer to match face frames.
 - 3. Cabinet doors/drawer fronts: Hardwood frame with veneer covered flat panel insert.
 - 4. Cabinet floors, tops, bottoms: ½" particle board with melamine finish.
 - 5. Drawers: 3/8" plywood sides, 1/8" plywood bottom.
 - 6. Hardware: Self-closing concealed hinges on doors and dual side mount drawer suspension. Provide 3" x 1" accessible wire pulls on all cabinet doors and drawers. Cabinet Backs: 1/8" hardboard.
 - 7. Finish: All surfaces exposed to view shall have factory applied finish. Finish color and that of countertops and pulls (as applicable) shall be contrasting.
- E. Kitchen Counter Tops: Post-formed with rolled edge and integral backsplash, with high-pressure laminate by Formica, Wilson Art, or Nevamer, on 44 lb. particle board. Color/pattern to be approved by Owner and Architect prior to manufacture.
- F. Shop Drawings for cabinetry shall include all specifications as outlined above, floor plan layouts, sizes, and color samples.
- G. Exterior trim, quarter round, brick mould, etc., shall be clear fir or pine (unless otherwise specified on plans).
- H. Window Stools – Cultured marble with integral rolled front edge.
- I. Vanity Tops - Cultured marble with integral rolled front edge and integral bowl.

EXECUTION

3.1 INSTALLATION

- A. Install finish carpentry work plumb, level, true and straight with no distortions. Shim as required using concealed shims.

END OF SECTION

SECTION 06445

SIMULATED WOOD ORNAMENTS

GENERAL

1.1 SCOPE

- A. Furnish all labor, materials, equipment and services to install decorative trim, shutters, louvers, etc.

1.2 SUBMITTALS

- A. Provide characteristics on all materials.
- B. Provide one copy of manufacturer's installation instructions.
- C. Mfgr. Warranty
- D. Provide color samples to the Architect & Owner for selection.

PRODUCTS

2.1 MATERIALS

- A. Gable Louvers: Russell Enterprises "Like-Wood" or equivalent, primed polyurethane, field finished in color selected by Owner.

EXECUTION

3.1 PROCEDURES

- A. All materials and workmanship shall be in compliance with manufacturer's written instructions.
- B. The Contractor shall take and verify all dimensions at the job site, and shall be responsible for the accurate fitting of all work included in this Section.

3.2 WORKMANSHIP

- A. All work shall be performed by qualified installers.

3.3 WARRANTY

- A. Provide warranty on all workmanship.

B. Provide manufacturer's warranty.

END OF SECTION

SECTION 06630

PVC RAILINGS AND HANDRAILS

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish all labor, materials, equipment and services to install PVC railing and posts as called for on drawings or specified herein.

1.2 SUBMITTALS

- A. Provide characteristics on all materials.
- B. Provide one copy of manufacturer's installation instructions.
- C. Manufacturer Warranty
- D. Provide color samples to the Architect & Owner for selection.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS / SYSTEMS

- A. Amerimax Home Products, Inc. – Pro Deck
- B. Kroy Building Products, Inc. – Contour Rail
- C. Moulite Manufacturing Company - PVC Railing Systems Series 200
- E. Or approved equal

2.2 MATERIALS

- A. Community Building railings – shall be White PVC; 42” height; 2” x 4” top and bottom rails with steel “U” channel reinforcing; ¾” x 1 ½” pickets with 3 1/8” precut snap-in spacers; 3 ½” x 3 ½” square corner, line and end posts with top cap and bottom trim ring; universal steel anchor for post bottom; wall bracket for attachment to solid wall (such as brick veneer) and columns; and lifetime limited warranty. Center bottom rail support is to be used on all railing.

PART 3 - EXECUTION

3.1 PROCEDURES

- A. All materials and workmanship shall be in compliance with manufacturer's written instructions.
- B. The Contractor shall take and verify all dimensions at the job site, and shall be responsible for the accurate fitting of all work included in this Section.

3.2 WORKMANSHIP

- A. All work shall be performed by qualified mechanics.

3.3 WARRANTY

- A. Provide warranty on all workmanship.
- B. Provide manufacturer's warranty.

END OF SECTION

SECTION 07100

DAMP PROOFING & WATERPROOFING

GENERAL

1.1 WORK INCLUDED

- A. Provide Dupont Tyvek Housewrap or equal
- B. Provide 20 mil Nervestrol behind wall sheathing and lapped over brick veneer.
- C. Provide 6 mil sheet membrane underneath concrete floor slabs.

1.2 RELATED WORK

- A. Section 02000 – Site Construction
- B. Section 03300 – Cast-in-Place Concrete
- C. Section 04000 - Masonry
- D. Section 06100 - Rough Carpentry

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver waterproofing materials to the jobsite in original, unbroken containers with labels intact.
- B. Store materials as recommended by the manufacturer.

1.4 GUARANTEE

- A. Provide manufacturer's standard warranties for all materials installed.

PRODUCTS

2.2 MEMBRANE WATERPROOFING MATERIALS

- A. Air infiltration/secondary moisture barrier system – DuPont Tyvek Housewrap or equal shall be installed on outside of sheathing at all exterior walls per manufacturer's installation instructions.
- B. Flashing - 20 mil nervestrol behind wall sheathing and lapped over brick veneer (see plan details).

- C. Vapor Barrier – 6 mil polyethylene vapor barrier to be installed over clean limestone base below all building floor slabs, with 6" min overlap at all joints.

EXECUTION

3.1 MEMBRANE WATERPROOFING INSTALLATION

- A. Install per plans and per manufacturer's written installation instructions.
- B. Joints shall be taped with the manufacturer's approved flashing tape. Duct tape or any other general tape shall not be used.
- C. Damaged membranes shall be replaced or taped with the manufacturer's approved flashing tape. Duct tape or any other general tape shall not be used.

END OF SECTION

SECTION 07200

THERMAL PROTECTION

GENERAL

1.1 SCOPE

- A. Contractor shall furnish all labor, material and equipment necessary to do all insulation work as hereinafter specified and as shown on drawings. The work shall include but shall not be necessarily limited to the following:
 - 1. Insulation in Attic
 - 2. Exterior and Interior Stud Wall Insulation
 - 3. Rigid Board Insulation, foundation walls

1.2 RELATED WORK

- A. Section 03300 - Cast-In-Place Concrete (below grade installation)
- B. Section 06100 - Rough Carpentry (Furring)
- C. Section 09200 – Plaster and Gypsum Board

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver insulation products with original wrapper intact.
- B. Store and handle rigid insulation materials as required to avoid damage to edges and/or facing.
- C. Store insulation materials away from moisture or high humidity to avoid moisture penetration into the insulation.

PRODUCTS

2.1 MATERIALS

- A. Perimeter Foundation Insulation - DOW Styrofoam SM or equal 2” x 24” width, R-10. No “beadboard” is allowed.
- B. Rigid Slab Edge Insulation as noted on plans (Energy Star).

C. Exterior Wall Insulation

1. 5-1/2" thick friction batts (R-19 minimum), fiberglass Kraft-backed, installed in stud space at exterior walls per plans.
2. 3-1/2" thick friction batts (R-11 minimum), fiberglass Kraft-backed, installed in stud space at exterior garage walls.
3. Fiberglass, foam, or equal roll type sill sealer insulation beneath bottom plate of all exterior walls in contact with concrete.

D. Ceiling (Attic) Insulation - R-50 (Energy Star) total insulation: Fiberglass insulation to comply with FS HH-I-515 (blown).

1. Install cardboard air baffles stapled to trusses.

E. Sound Control Insulation

1. Walls - 3-1/2" thick x 16" unfaced fiberglass sound batts installed vertically. Insulation shall be equal to R-11 minimum.

F. Insulation Certification - Contractor shall post in the attic of each building (near the attic access) Certification of Insulation Type, "R" value, conformance to applicable Federal Specifications, plus the date of installation and the name of the installer. Installer shall also install measuring "tape" for each 300 SF of attic area stapled to side of truss webbing.

EXECUTION

3.1 INSTALLATION

- A. Comply with insulation manufacturer's printed instructions and recommendations for the installation for each type of thermal insulation. Provide adequate anchorage or support for each unit.

END OF SECTION

SECTION 07300

SHINGLES, ROOF TILES & ROOF COMPOSITION

GENERAL

1.1 SCOPE

- A. This section includes all labor, materials and equipment to furnish and install lapped asphalt roofing shingles and accessories as indicated on the drawings. It also includes underlayment and fastening methods.
- B. Delivery, Storage and Handling: Deliver materials in manufacturer's unopened, labeled containers. Store materials to avoid water damage, and store rolled goods on end. Comply with manufacturers recommendations for job site storage and protection.
- C. Job Contents: Proceed with shingle installation only when all penetrating work has been completed, substrate is dry and weather conditions are favorable. Provide asphalt shingles produced by a single manufacturer.

1.2 SUBMITTALS

- A. Manufacturer's Data: For information only, submit one copy of manufacturer's technical data installation instruction for asphalt shingle. Transmit a copy of installation instruction to the installer.

PRODUCTS

2.1 MATERIALS

- A. Shingles - Laminated seal-down, anti-fungal, fiberglass shingles meeting UL Class A label. Furnish ridge shingles and metal starter strip and drip as required and/or noted on plans. Shingle tabs to align on a 5 course pattern. Shingle warranty shall be 30 year minimum.
- B. Underlayment - One layer 15 lb. asphalt-saturated felt underlayment with 6" end lap and 2" head lap for roof slopes 4" in 12" or greater. Provide 2 layers of 15 lb. felt with 6" end lap and 19" head lap for roof slopes less than 4" in 12".
- C. Asphalt Plastic Cement: Fibrated asphalt cement complying with ASTM D 2822, designed for trowel application.
- D. Nails: Aluminum or hot-dip galvanized 11 or 12 gauge sharp pointed conventional roofing nails with barbed shanks, minimum 3/8" diameter head, and of sufficient

length to penetrate minimum 3/4" into solid decking or to penetrate through plywood sheathing.

- E. Staples: Minimum 16-gauge zinc-coated steel roofing staples with minimum crown width of 15/16" and of sufficient length to penetrate 3/4" into deck lumber or through plywood deck.
- F. Metal Drip Edge: Pre-finished aluminum, 3" wide. Furnish in 10' lengths. Color to be selected by Owner.
- G. Metal Flashing: .024" sheet aluminum color to be selected by Architect. Job-cut to sizes and configurations required.
- H. Attic Radiant Barrier (required per Energy Star): Ultra Touch 30000-11475 or equal. Install per manufacturer's instructions.

EXECUTION

3.1 GENERAL

- A. Comply with published recommendations of shingle manufacturer details and recommendations of NRCA Steep Roofing Manual for installation of underlayment and shingles, using number of nails and coursing of shingles in accordance with manufacturer's standards. Installer must examine the areas and conditions under which asphalt shingles are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer. Roofing shall not be laid until all sheet metal work which extends into and under roofing is satisfactorily installed and all defects in roof decks have been satisfactorily corrected.
- B. Ice Dam Membrane shall be installed at all valleys and eaves extending up the roof 36" or the width of material, but not less than 36".
- C. Shingles shall be laid with true horizontal and vertical lines, and according to manufacturer's instructions.
- D. Underlayments: For roof slopes 4" or more per lineal foot, cover decks with one layer of 15# asphalt saturated felt, laid with 3" horizontal joints; double felts as valleys, hips and ridges. Nail felt to sheathing through metal discs at 12" centers.
- E. Starter Strips to be field cut from shingles used for roof field.
- F. Each tab of seal-down strip shingles shall be securely sealed to the undercourse by means of an approved adhesive applied at the factory.

- G. Hips and Ridges shall be covered with preformed hip and ridge shingles laid with 5" exposure and nailed with 2 nails per shingle. Nails shall be located 5 1/2" from exposed ends and 1" from edge of shingle. Nails shall penetrate full thickness of roof decking.
- H. Install sheet metal edge member under asphalt shingles at eaves and gable rakes. These strips shall be nailed to deck at 8" centers along upper edge of metal and to form a drip at outer edge. Shingles shall extend over gable rakes 1/2".
- I. Final adjustment: Replace any damaged shingles and remove shingle installation debris from site.
- J. Roofing shall be weather and watertight.
- K. The roof, exclusive of sheet metal work, shall be guaranteed by the Contractor against leaks due to defects in material, workmanship, and installation for a period of 5 years.

END OF SECTION

SECTION 07460

FIBER CEMENT SIDING

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish all labor, materials, equipment and services to install fiber cement siding, trim and related flashings and sealants as called for on Drawings or specified herein.

1.2 RELATED WORK

- A. Section 06100 – Rough Carpentry
- B. Section 06445 – Simulated Wood Ornaments
- C. Section 07600 – Flashing and Sheet Metal
- D. Section 07900 – Joint Sealants
- E. Section 08500 – Windows
- F. Division 15 – Mechanical Systems
- G. Division 16 – Electrical Systems

1.3 SUBMITTALS

- A. Provide Product Data Sheets.
- B. Provide one copy of manufacturer's installation instructions.
- C. Documentation of Manufacturer's Warranty
- D. Provide color samples to the Architect & Owner for selection.

1.4 WORKMANSHIP

- A. All work shall be performed by qualified installers with a minimum of five years experience working with and successfully installing system on other projects of similar scale and detail.

1.5 STORAGE

- A. Store flat and in dry conditions – keep material dry and covered prior to installation
- B. Take care to protect edges and corners from breakage.

1.6 WARRANTY

- A. Provide 50 year manufacturer's warranty.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. James Hardie International
- B. Approved Equals

2.2 MATERIALS

- A. Prefinished "ColorPlus" Textured Fiber cement horizontal lap siding system (with 7" exposure) including corner trim and required flashings for complete installation. Texture and Color to be selected by Owner/Architect from manufacturer's standard selections.
- B. Substrate shall comply with ANSI/AHA 135.6.

2.3 ACCESSORIES

- A. Caulk – Elastomeric Joint Sealant that complies with ASTM C920 Grade NS, Class 25 or higher OR Latex Joint Sealant that complies with ASTM C834 OR as recommended by fiber cement siding manufacturer.
- B. Provide prefinished, pre-sized boxes with trim for mounting exterior lighting fixtures, hose bibs, etc.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All materials and workmanship shall be in compliance with manufacturer's written instructions.
- B. The Contractor shall take and verify all dimensions at the job site, and shall be responsible for the accurate fitting of all work included in this Section.
- C. Siding to be blind nailed. (Siding to be per manufacturer's recommended width to obtain 7" exposure requirement.)
- D. Installation shall be in strict accordance with manufacturer's written instructions. Improper installation that results in damage to siding shall result in full removal of complete section and re-installation of new siding material.

- E. Caulk, paint or prime all field cut edges.
- F. Installing Contractor shall review and apply all applicable construction details provided by manufacturer. Coordinate requirements with related trades.
- G. Locations of exterior penetrations including, but not limited to: window openings, electrical rough openings, mechanical unit rough openings, mechanical vents and plumbing vents shall be verified, coordinated and provided for in finish system. Necessary trim boards shall be provided where applicable to provide a clean and finished opening for equipment. Smaller openings shall be made with proper cutting tools (as allowed by manufacturer) with consistent and minimal gap (1/8" to 1/4") to allow for sealant.
- H. Caulk/Sealant shall be installed in accordance with caulk/sealant manufacturer's written instructions or per ASTM C1193.

3.2 CLEANING

- A. Finish surfaces shall be cleaned of any construction or wind borne residue in accordance with manufacturer's written instructions. Cleaning agents not approved by manufacturer shall be used in cleaning finish surface of material.

END OF SECTION

SECTION 07464

VINYL SIDING AND VENTED SOFFITS

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish all labor, materials, equipment and services to install vinyl siding, vinyl ceiling, perforated vinyl soffit, trim, and flashings as called for on drawings or specified herein.

1.2 RELATED WORK

- A. Section 06100 – Rough Carpentry
- B. Section 06445 – Simulated Wood Ornaments
- C. Section 07600 – Flashing and Sheet Metal
- D. Section 07900 – Joint Sealers
- E. Section 08500 – Windows
- F. Division 15 – Mechanical Systems
- G. Division 16 – Electrical Systems

1.3 SUBMITTALS

- A. Provide characteristics on all materials and flashings.
- B. Provide one copy of manufacturer's installation instructions.
- C. Manufacturer Warranty
- D. Provide color samples to the Architect & Owner for selection.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Vinyl Siding – Exterior siding shall be Certainteed Corp. Monogram, Owens Corning Supreme Plus, Rollex Corporation Spectrum or Royal Group Technologists Limited Journeyman pre-finished double 5” horizontal vinyl siding, .044” minimum thickness. Siding shall comply with BOCA 83-40, ASTM D 3679-88, ASTM D

1435, 4 NBS PS55-72, flame spread index – 25 or less and smoke development = 450 or less per ASTM E 84. Siding shall be installed as per manufacturer's instructions, including the use of all required accessories ("J" channel, starter strip, etc.), and shall be from the same manufacturer's lot number. Accessories shall also include "wedge blocks" (light fixture) bases for mounting wall light fixtures to siding and attaching properly. Siding color shall be selected by the Owner or Architect.

- B. Perforated Vinyl Soffit - shall be Certainteed Corp. Monogram, Owens Corning Supreme Plus, Rollex Corporation Spectrum or Royal Group Technologists Limited Journeyman pre-finished fully vented 5" double soffit panels, .038" minimum thickness. Net Free Air Space per Sq. Ft. shall be as required per calculations shown on drawings. Soffit material shall comply with ASTM D 3679-88, ASTM D 1435, 4 NBS PS55-72, flame spread index – 25 or less and smoke development = 390 or less per ASTM E 84, ASTM D 1929, ASTM E119, ASTM D635, UBC 26-4 and NFPA 268. Soffit material shall be installed as per manufacturer's instructions, including the use of all required accessories ("J" channel, starter strip, etc.), and shall be from the same manufacturer's lot number. Accessories shall also include items for mounting light fixtures in and/or onto soffit and attaching properly. Soffit color shall be selected by the Owner or Architect.
- C. Vinyl Ceiling - shall be Certainteed Corp. Monogram, Owens Corning Supreme Plus, Rollex Corporation Spectrum or Royal Group Technologists Limited Journeyman pre-finished solid 5" double soffit panels, .038" minimum thickness. Vinyl ceiling material shall comply with ASTM D 3679-88, ASTM D 1435, 4 NBS PS55-72, flame spread index – 25 or less and smoke development = 390 or less per ASTM E 84, ASTM D 1929, ASTM E119, ASTM D635, UBC 26-4 and NFPA 268. Vinyl ceiling material shall be installed as per manufacturer's instructions, including the use of all required accessories ("J" channel, starter strip, etc.), and shall be from the same manufacturer's lot number. Accessories shall also include items for mounting light fixtures in and/or onto ceiling and attaching properly. Soffit color shall be selected by the Owner or Architect.
- D. Provide prefinished, pre-sized boxes with trim for mounting exterior lighting fixtures, hose bibs, etc.

PART 3 - EXECUTION

3.1 PROCEDURES

- A. All materials and workmanship shall be in compliance with manufacturer's written instructions.

- B. The Contractor shall take and verify all dimensions at the job site, and shall be responsible for the accurate fitting of all work included in this Section.

3.2 WORKMANSHIP

- A. All work shall be performed by qualified mechanics.

3.3 WARRANTY

- A. Provide warranty on all workmanship.
- B. Provide 15-year manufacturer's warranty.

END OF SECTION

SECTION 07600

FLASHING AND SHEET METAL

GENERAL

1.1 SCOPE

- A. Furnish all labor, materials, equipment, facilities, transportation, and services necessary for and reasonably incidental to the fabrication, delivery and installation of all sheet metal work as shown on the drawings and/or as specified herein including, but not limited to the following:

PRODUCTS

2.1 MATERIALS

- A. Roof Edges - prefinished aluminum preformed starter strip and drip at all overhang and rakes.
- B. Gutters and Downspouts - 5" prefinished aluminum gutters and 3" x 4" prefinished downspouts, .027" thickness (nominal). Locate downspouts as shown on exterior building elevation drawing. Provide gutter screens at all gutters. Color to be selected by Owner and Architect. Provide suitable means of protection where dissimilar metals come in contact, such as galvanized drip and aluminum gutter or fascia.
- C. Roof Louvers - Ridge Filtervent by Air Vent, Inc., or equal that provide 18 square inches of net free area per lineal foot. Vent shall have internal dust/insect filter. See plans for size and location.
- D. Soffit Vents - Pre-finished aluminum by Air Vent, Inc., or equal. System shall include starter strip, vented soffit panels with miter dividers as required, fascia cover, brick trim, general utility trim, overhanging drip edge, and aluminum nails. Provide intermediate support of soffit panels as per manufacturer's recommendations or undereave vents by Air Vent, Inc., or approved equal. Vents shall be sized and located to satisfy code. Color shall be as selected by Owner and Architect.

2.2 FABRICATION AND MANUFACTURE

- A. Counterflashing shall be fabricated to the lines and levels shown.

EXECUTION

3.1 PROCEDURES

- A. All materials and workmanship shall be in strict accordance with the recommendations of the Sheet Metal contractor's National Association, Inc., as set forth in the current edition of Standard Practices in Sheet Metal work, Manuals #1 and #2. Fabrication, in-so-far as possible, shall be done in the shop for field installation.
- B. The Contractor shall take and verify all dimensions at the job site, and shall be responsible for the accurate fitting of all work included in this Section.

3.2 WORKMANSHIP

- A. All work shall be performed by qualified installers.
- B. All slip joints shall be water tight.

END OF SECTION

SECTION 07900

JOINT SEALERS

GENERAL

1.1 REFERENCE

- A. Requirements of the General Conditions and Division One of these specifications shall govern the work of this section.

1.2 WORK INCLUDED

- A. Preparation of surfaces to receive sealants.
- B. Protection of adjacent surfaces.
- C. Installation of backing material at all sealant joints.
- D. Installation of sealants in areas shown on the plans and as required to insure a complete, watertight job.
- E. Installation of sealants between window/door frames and rough framing, between multiple rough framed studs on exterior wall, all penetrations (HVAC, etc.) of exterior walls/ceilings.

1.3 RELATED WORK

- A. Section 03300 – Cast In Place Concrete
- B. Section 04000 - Masonry
- C. Section 07600 - Flashing and Sheet Metal
- D. Section 09200 – Plaster and Gypsum Board
- E. Section 09900 – Paints and Coatings

1.4 SUBMITTALS

- A. Section 01100 – General Requirements: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

- C. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- D. Warranty: Include coverage for installed sealants and accessories failing to achieve watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

1.5 JOB CONDITIONS

- A. Verify compatibility of sealant with building components.

1.6 GUARANTEE

- A. Guarantee that specified work will be free from defects of materials and workmanship for one (1) year from date of final certificate.
- B. Repair and replace such defective work and other work damaged thereby which becomes defective during guarantee term, without extra cost to the Owner.

PRODUCTS

2.1 MATERIALS

- A. Sealant - Silicone manufactured by:
 - 1. Dow Corning
 - 2. G.E. Silicones
 - 3. Or equal
- B. Joint Backing (where applicable): Closed cell polyethylene.
- C. Primer: Type recommended by manufacturer for each different material.
- D. Bond Breakers: Pressure sensitive polyethylene tape.

2.2 MIXING

- A. Mix in accordance with approved manufacturer's specification data sheets.

2.3 PRODUCT USAGE

- A. Exterior Joint Types:
 - 1. Masonry Expansion Joints Two-part polyurethane
 - 2. Metal to Masonry Two-part polyurethane

- | | |
|---|-----------------------|
| 3. Metal to Metal | Two-part polyurethane |
| 4. General Flashing and Flashing to Brick | One-part polyurethane |
| 5. Sleeves in wall | One-part polyurethane |

B. Interior Joint Types:

- | | |
|--|-----------------------|
| 1. Gypsum Board or Plaster to Masonry or Wood | Acrylic |
| 2. Interior Hollow Metal frames in Masonry Walls | Acrylic |
| 3. Metal to Drywall, plaster, masonry | Acrylic |
| 4. Metal to Brick | Two-part polyurethane |
| 5. Perimeter of Plumbing Fixtures | Silicone Base |

EXECUTION

3.1 SURFACE PREPARATION

- A. Surfaces to be sealed shall be smooth, dry, sound. Brush and wipe surfaces dust free. Remove oil, grease, release agents, coatings or other contaminants from surfaces.
- B. Prime and prepare surfaces in strict accordance with sealant manufacturer's written recommendations.

3.2 JOINT SIZES

- A. Sealant: Use joint backing material where applicable to control depth of joints. In joints 1/2" and wider, depth equal to 1/2 width with minimum depth of 1/4".

3.3 APPLICATION

- A. Joint Backer: Where applicable. Install joint backer to achieve required depth of joints. Where not used, install a bond preventive material in joint.
- B. Sealant: Mask surface areas adjacent to joint with masking tape as required to assure a neat job. Apply sealant to joints prior to water repellent or clear coating operations. Apply sealant within 8 hours after primer has dried. Gun-apply sealant, completely filling joint. Tool joints smooth and wrinkle free to form slight concave surface. Allow curing time as recommended by clear coating manufacturer.

3.4 CLEANING

- A. Remove excess sealant and caulking materials and smears from adjacent surfaces as work progresses.
- B. Repair joints which have shrunk, sagged, run or have thin spots.

END OF SECTION

SECTION 08000

DOORS AND WINDOWS

GENERAL

1.1 REFERENCE

- A. Requirements of the General Conditions and Division One of these specifications shall govern the work of this section.

1.2 RELATED WORK

- A. Section 04000 - Masonry
- B. Section 06100 – Rough Carpentry
- C. Section 06200 – Finish Carpentry
- D. Section 08700 - Hardware

1.3 SUBMITTALS

- A. Product Data – Provide six (6) copies of the complete manufacturer's product data to Architect for approval, consisting of complete product description, specifications, installation instructions, and other pertinent technical data required for product use information.

PRODUCTS

2.1 WOOD DOORS

- A. All interior doors shall be 1-3/8" thick, hollow core Lifetime primed door units (raised 2 panel style with bead board panels as indicated on plans). Jambs and casing shall be primed white pine solid or finger joint wood. Casing shall be Colonial style. Vinyl-wrapped wood is not acceptable. All doors shall be painted on all sides to prevent moisture infiltration.
- B. Swinging Closet doors – Pair of raised 2 panel style doors with bead board panels as indicated on plans. Include door pulls, spring-loaded bullet latches, hinges, and door stops. Case openings with wood jambs and colonial door trim. See plans for locations.

2.2 METAL COVERED DOORS

- A. Exterior entrance doors and door from garage shall be per elevation profiles, metal-clad with foamed urethane core, magnetic weatherstripping, and aluminum thermal break threshold, equal to Stanley and glazing requirements. See Door Schedule of plans for specific door descriptions. Air infiltration rate shall not exceed 0.5 CFM per square foot of door area per NFRC 400, wood frames.

2.3 WINDOWS

- A. Vinyl Window - Windows shall be prefinished vinyl, tilt, single hung style, with rigid vinyl frame, and sashes glazed with low-"E" rating, 2 panes of argon gas filled insulated glass (with interior muntins), and aluminum screen cloth, meeting the following:
 - 1. A maximum "U" value of 0.30 in a 15 mile per hour wind, as tested in accordance with NFRC 200. A maximum solar heat gain coefficient (SHGC) of .29.
 - 2. The air infiltration rate shall not exceed 0.3 CFM per square foot of window area as tested in accordance with AAMA/WDMA 101/I.S.2 and NFRC 400.
 - 3. All window frames and glazing seals must be warranted for at least 5 years. Window submittals shall be provided by the Contractor for review prior to installation and shall include certification from the manufacturer, and independent laboratory report, or printed manufacturer's literature showing compliance with the above. In addition, the Contractor will be required to furnish a signed manufacturer's warranty at the Final Inspection covering the frame and glazing seals as noted above.
 - 4. Bedroom windows shall meet minimum egress requirements of 5.7 sq. ft. total opening and 20" min. width x 24" min. height. Contractor shall provide Architect with proof of compliance from window manufacturer.
 - 5. Windows shall be Energy Star Rated.
- B. Sill and jamb extensions - Sill shall be cultured marble. Jamb and head extensions shall be gypsum board with plastic "j" channel edging.

2.4 WEATHERSTRIPPING AND THRESHOLDS

- A. Thresholds - Thermal Break aluminum sill - threshold. Threshold must be approved accessible type at all unit doors.
- B. Jamb and Head Weatherstrip - Compression weatherstrip.
- C. Hinge Side Weatherstrip - Compression weatherstrip.
- D. Bottom Weatherstrip - Triple seal bottom weatherstrip.

- E. Installation - Set all thresholds with anchors to floor and caulk.

EXECUTION

3.1 INSTALLATION

- A. Materials shall be installed as per manufacturers printed instructions.
- B. Anchor thresholds to the concrete slab. Prior to setting threshold, caulk the underside of the threshold's exterior edge with a continuous 1" wide bead. Set and anchor threshold. Apply a continuous bead of caulk to the exposed exterior edge of threshold.

END OF SECTION

SECTION 08360

SECTIONAL OVERHEAD DOORS

PART 1 – GENERAL

1.1 SCOPE

- A. This section includes all labor, material, and equipment required to furnish and install aluminum, residential overhead doors and automatic overhead door opener system including:

- 1. Sectional Overhead Doors.
- 2. Electric Operators and Controls.
- 3. Operating Hardware, tracks, and support.

1.2 RELATED SECTIONS

- A. Section 05000 - Metals
- B. Section 06100 – Rough Carpentry
- C. Section 07900 - Joint Sealers
- D. Section 08700 - Door Hardware
- E. Section 09900 - Paints and Coatings
- F. Division 16 - Electrical

1.3 REFERENCES

- A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.
- B. Wiring Connections: Requirements for electrical characteristics.
 - 1. 115 volts, single phase, 60 Hz (to be verified with provided manufacturer/equipment and coordinated with related trades)
- C. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one

manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01100.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F. Operation and Maintenance Data.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, ventilated weathertight location.

1.8 PROJECT CONDITIONS

- A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Overhead Door Corp., which is located at: 2501 S. State Hwy. 121 Suite 200 ; Lewisville, TX 75067; Toll Free Tel: 800-929-3667; Tel: 469-549-7100; Fax: 972-906-1499; Email: info@overheaddoor.com; Web: www.overheaddoor.com
- B. Requests for substitutions will be considered in accordance with provisions of Section 01100.

2.2 STEEL SECTIONAL OVERHEAD DOORS

- A. Steel Sectional Overhead Doors: 290 Series, Residential-grade, Traditional Non-Insulated Steel Doors by Overhead Door Corporation. Units shall have the following characteristics:
 - 1. Door Assembly: hot-dipped galvanized steel with two coats of baked-on polyester paint and wood-grain embossed texture.
 - a. Hot-dipped galvanized steel
 - b. Wood-grain embossed texture
 - c. Two coats of baked-on polyester paint
 - d. Galvanized steel center stiles
 - e. Standard Springs: 10,000 cycles. (High cycles.)
 - f. 15 – year warranty
 - 2. Finish and Color: Two coat baked-on polyester with white exterior and white interior color.
 - 3. Windload Design: ANSI/DASMA 102 standards to meet applicable code.
 - 4. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races, provide decorative hardware elements as noted on drawings.
 - 5. Lock:
 - a. Interior mounted slide lock.
 - b. Optional keyed lock.
 - 6. Weatherstripping: EPDM rubber bulb-type strip at bottom. (Header seal and jamb weatherstripping.)
 - a. EPDM rubber bulb-type strip at bottom.
 - b. Flexible Jamb seals.
 - c. Flexible Header seal.
 - 7. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
 - 8. Manual Operation: Pull rope.
 - 9. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot not more than 1 foot per second. Approved manufacturers – Genie, Chamberlain, LiftMaster or approved equal.
 - a. Entrapment Protection:
 - 1) Pneumatic sensing edge up to 18 feet (5.5 m) wide.
 - 2) Electric sensing edge.
 - 3) Photoelectric sensors.

- b. Operator Controls:
 - 1) Push-button operated control stations with open, close, and stop buttons.
 - 2) Key operated control stations with open, close, and stop buttons.
 - 3) Push-button and key operated control stations with open, close, and stop buttons.
 - 4) Flush mounting.
 - 5) Surface mounting.
 - 6) Interior location.
 - 7) Exterior location.
 - 8) Both interior and exterior location.
- c. Special Operation:
 - 1) Pull-rope release automatic opening device.
 - 2) Vehicle detector operation.
 - 3) Radio control operation.
 - 4) Photocell operation.
 - 5) Door timer operation.
 - 6) Light package.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until openings have been properly prepared.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- C. Verify electric power is available and of correct characteristics.
- D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.
- B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- C. Anchor assembly to wall construction and building framing without distortion or stress.

- D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- E. Fit and align door assembly including hardware.
- F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.4 CLEANING AND ADJUSTING

- A. Adjust door assembly to smooth operation and in full contact with weatherstripping.
- B. Clean doors, frames and glass.
- C. Remove temporary labels and visible markings.

3.5 PROTECTION

- A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.
- B. Protect installed products until completion of project.
- C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION

SECTION 08700

HARDWARE

GENERAL

1.1 REFERENCE

- A. Requirements of the General Conditions and Division One of these specifications shall govern the work of this section.

1.2 WORK INCLUDED

- A. Provide Hardware Items designated as specified.

1.3 RELATED WORK

- A. Section 06200 - Finish Carpentry
- B. Section 08000 – Doors and Windows

PRODUCTS

2.1 PRODUCT DESIGNATIONS

- A. Product designations indicating hardware items are those of the manufacturer listed. Furnish any manufacturer's product, which is equivalent in quality, design and function (as judged by the Architect) to the indicated product.
- B. Finish and Base Material Designations: Numbers indicate the BHMA Code, or the nearest traditional U.S. Commercial finish.
- C. All hardware to be brushed nickel residential grade 2, unless otherwise specified on hardware schedule, doors and hardware. Function descriptions based on ANSI A156.2 Weslock or equal. All handles to be lever type.

2.2 HARDWARE PRODUCTS

- A. Butts – Brushed nickel on cold rolled steel butts 3-1/2" x 3-1/2" Lawrence SC2558 or equal.
- B. Locks – Weslock, Tylo, Better Home Products or equal. Lever handle with brushed nickel finish. Master key all door locks to on key design (minimum of four master

keys required by the Owner). Provide one extra lockset for Owner at job completion, operating from same master key.

C. Schedule:

1. Unit Exterior Doors – 3 butts, 1 Weslock 600 lever handle passage set, 1 Weslock 496 deadbolt, 1 peephole viewer at typical houses (front main entry only), 2 peephole viewers at accessible houses (front main entry only), 1 wall mounted door stop. Note: Peephole viewers may be eliminated if clear glass is used in upper panel as specified in drawings.
2. Unit Bedroom, Toilet Bath and Garage Entry Doors, – 3 butts, 1 Weslock 610 lever handle privacy set (push button type lock), 1 wall mounted door stop or hinge stop as appropriate.
3. Unit Double Closet Doors (sliding) – top and bottom sliding tracks, accessible hardware
4. Unit Other Interior Doors – 3 butts per door, 1 Weslock 600 lever handle passage set, 1 wall mounted door stop per door.
5. Community Building Mop & Mechanical Room Door - 3 butts per door, 1 Weslock storeroom function-lever handle per door, 1 closer per door (spring hinges at mechanical room),
6. Community Building Main Entry Door - 3 butts, 1 Weslock exterior lever handle passage set, Weslock thumbturn deadbolt, closer and panic device. Signage shall be provided "This door to remain unlocked during all normal business hours."
7. Community Building Laundry Room Door - 3 butts, 1 Weslock exterior store-room function-lever handle set, closer and panic device.
8. Community Building Restrooms - 3 spring loaded butts, 1 Weslock lever handle privacy set (push button type lock), 1 wall mounted door stop or hinge stop as appropriate.
9. Community Building Office - 3 butts, 1 Weslock 600 lever handle passage set, Weslock thumbturn deadbolt, 1 hinge stop.
10. Community Building Closet - 3 butts per door, 1 Weslock 600 lever handle passage set, 1 hinge stop.
11. Community Building Maintenance Doors - 3 butts per door, 1 Weslock exterior

storeroom function-lever handle per door, 1 closer per door, astragal and dust proof strike top and bottom.

- D. Note: UFAS Retrofit Manual by the USATBCB shall be recognized as a guide for all ADA requirements.

EXECUTION

3.1 INSTALLATION

- A. Hardware Mounting Heights: Door and Hardware Institute “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames”, except as noted otherwise.
- B. Install each hardware item to comply with manufacturer’s instructions and recommendations.
- C. Hardware Adjustment: Return to project one month after Owner’s occupancy and adjust hardware for proper operation and function. Instruct Owner’s personnel in proper maintenance and adjustment.

END OF SECTION

SECTION 09200

PLASTER AND GYPSUM BOARD

GENERAL

1.1 REFERENCE

- A. Requirements of the General Conditions and Division One of these specifications shall govern the work of this section.

1.2 WORK INCLUDED

- A. Provide gypsum board systems as detailed and specified.

1.3 RELATED WORK

- A. Section 06100 - Rough Carpentry

PRODUCTS

2.1 MATERIALS

- A. 1/2" thick gypsum wallboard on walls, except 5/8" thick type "x" on 1-hour dwelling unit separation walls. 5/8" thick gypsum wallboard on ceilings. (Tapered edges on all gypsum board.) Nail with ring-shank nails as per Architect's directions at wood framing.
- B. Use standard joint tape and compound and corner beads as needed. Tape joints, fill, sand, and prepare for painting of walls and spraying texture finish on ceilings. All ceilings and walls shall receive texture finish as noted on plans. Sand all joints prior to wall texture application.
- C. 1/2" thick moisture resistant (MR) gypsum wallboard to be applied on all walls in bathrooms, except 5/8" thick type "x" moisture resistant on 1-hour dwelling unit separation walls in bathrooms.
- D. 1/2" thick moisture resistant (MR) gypsum wallboard to be applied on all kitchen and laundry walls to a height of 48" A.F.F.

EXECUTION

3.1 DRYWALL INSTALLATION AND FINISHING

- A. The concrete slab shall be covered prior to the beginning of work to protect it from debris and drywall mud. At completion of work the cover shall be removed and the slab cleaned as necessary.
- B. Install gypsum board on all studs shown on drawings.
- C. Screw gypsum board to metal supports.
- D. Apply joint tape and joint compound at joints (both directions) between gypsum boards. Apply compound at accessory flanges, penetrations, fastener heads, and surface defects. Install compound in three coats (plus pre-fill of cracks where recommended by manufacturer), sand after last two coats.
- E. Form control joints with 1/2" space between boards if shown on drawings. Install sealant at base of space, and apply trim accessory at face.
- F. Form "floating" construction for gypsum boards at internal corners, except where special isolation or edge trim is indicated.
- G. Isolate drywall work from abutting structural and masonry work; provide edge trim and acoustical sealant as recommended by manufacturer.

END OF SECTION

SECTION 09600

CARPETING

GENERAL

1.1 SECTION INCLUDES

- A. Carpet placed with glue down method
- B. Carpet placed with stretch method.
- C. Accessories

1.2 REFERENCES

- A. ASTM D2859 - Test Method for Flammability of Finished Textile Floor Covering Materials.
- B. ASTM E84 - Surface Burning Characteristics of Building Materials.
- C. ASTM E648 - Critical Radiant Flux of Floor Covering Systems Using A Radiant Heat Energy Source.
- D. NFPA 253 - Test for Critical Radiant Flux of Floor Covering Systems.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate seaming plan, method of joining seams, and direction of carpet.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two samples 12 x 12 inch in size illustrating color and pattern for each carpet material specified.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing specified carpet with minimum three years experience.

1. Installer: Company specializing in installing carpet with minimum three years documented experience. (Qualified/certified to install brand specified.)

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame/smoke rating requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for 3 days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 70°F (21°C) ambient temperature 1 day prior to, during and 24 hours after installation.

PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCT LINE - CARPETING

- A. Shaw “This Is It”, 720 Charred Hickory, or equal.

2.2 MATERIALS - CARPET

- A. Typical Units

1. Carpet shall be first quality and shall bear certification showing compliance with HUD UM 44d Type I, Class 1. Color shall be approved by Owner and Architect, with all carpeting being from the same manufacturer’s dye lot.
2. Pad shall be FmHA approved 3/8” minimum 6# rebond foam, complying with HUD UM 72.

- B. Accessible Units & Community Building

1. Carpet shall be level loop construction 20 oz. per square yard with no pad at the community building. Carpet, at the accessible units, shall be the same as the typical units with no pad. Carpeting shall comply with HUD Use of Materials Bulletin No. (UM44d).

2.3 ACCESSORIES

- A. Adhesive: Compatible with carpet material and as recommended by carpet manufacturer.
- B. Edge Strips: type, finish, and color as selected.

EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft. (6 mm in 3m), and are ready to receive work.
- B. Verify concrete floors are dry to a maximum moisture content of 7 percent; and exhibit negative alkalinity, carbonization, or dusting.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.

3.3 INSTALLATION

- A. Installation shall be by experienced carpet layers with at least three years documented experience in accordance with carpet manufacturer's instructions. Carpet seams shall be consistent with the run of the carpet and unnoticeable to the casual observer. Provide adequate tack strips and stretch the carpet as necessary. Typical carpet installation shall be over a separate pad; accessible house carpet installation shall be direct glue-down method.
- B. All carpeting shall be back-stamped in accordance with requirements of UM Bulletin No. 44D. Certification of compliance to be given to Owner at project completion.
- C. All carpeting shall be per the following: Pass the DOC FF-1-70 "pill test", be Class II, 0.22 watts/cm² per ASTM E 648-86; and have a smoke density less than 450 per ASTM per ASTM E84-84.
- D. Apply carpet and adhesive in accordance with manufacturers' instructions.
- E. Verify carpet match before cutting to ensure minimal variation between dye lots.
- F. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true, and unfrayed. Edge seam carpet at public areas.
- G. Locate seams in area of least traffic. Form seams straight, not overlapped or peaked, and free of gaps.

- H. Lay carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance. Provide monolithic color, pattern, and texture match within any one area.
- I. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- J. Cut and fit carpet around interruptions.
- K. Fit carpet tight to intersection with vertical surfaces without gaps.
- L. Where wall bases are scheduled, cut carpet tight to walls. Fit carpet tight to vertical interruptions, leaving no gaps.

3.4 CLEANING

- A. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09610

RESILIENT FLOORING

GENERAL

1.1 SCOPE

- A. Furnish all materials, labor, and equipment required to complete all composition flooring. Tile work shall occur in all areas as noted on plans and schedules.
- B. Samples sheet vinyl along with color charts shall be submitted to the Architect/Owner for approval of the material and selection of the colors.

1.2 RELATED SECTIONS

- A. Section 06200 – Finish Carpentry
- B. Section 07900 – Joint Sealers

PRODUCTS

2.1 MATERIALS

- A. Sheet Vinyl – Shall be Mannington Bechmark – Muirs Point 3844 or equal, conforming to HUD Minimum Property Standards, Federal Specifications L-F-001641, ASTM E648-86, and ASTM E84-84. Width shall be 6', 9', or 12' to provide minimum seams and have a .063" minimum overall thickness. Install at unit baths, laundry, mechanical, pantry and garage storage.
- B. Adhesives - As recommended by flooring manufacturer for specific use. Submittals shall be sent to Architect and shall be approved prior to installation.
- C. Sheet vinyl and adhesives shall be stored in a protected, dry area. Room temperatures and adhesives shall be at a minimum 65⁰F for at least 48 hours before installation, during installation, and for 48 hours after installation.
- D. Vinyl Plank Flooring-MetroFlor "Engage" Select or equal meeting performance of material including
 1. Flooring: .197" thickness
 2. Size: 7"x49"
 3. Wear Layer: 20 mil
 4. Warranty: Lifetime Limited (residential)
 5. ASTM E648 Critical Radiant Flux: Class 1
 6. Static Co-efficient of Friction: 0.60

- E. Cleaning - Contractor shall clean and protect after installation per manufacturer's instruction.

EXECUTION

3.1 WORKMANSHIP

- A. Before starting installation of the finish floor and base the flooring contractor shall thoroughly inspect surfaces to be covered and shall notify the Architect in writing of any defects. Failure to do so will constitute acceptance of the subsurface and he will be held responsible for any irregularities, which appear in the finished work and will be required to repair same.
- B. The Contractor will be held responsible for correcting all imperfections in the slab and/or existing underlayment.
- C. It is the intention to have smooth, even floors fitting neatly to the wall, and the Contractor will be held responsible to that end.
- D. At the completion of the work the Contractor shall replace all broken or defective tile.
- E. Install sheet vinyl according to manufacturer's direction for installation over concrete slab on grade, using waterproof paste.
- F. After floors have been laid the Contractor shall thoroughly clean floors of all paste and debris. Any defective work found at this time shall be replaced by Contractor immediately.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

GENERAL

1.1 SCOPE

- A. Furnish all labor, materials and equipment to complete the painting and wood finishing as follows:
 - 1. All exposed interior surfaces of the new building except: floors, prefinished materials, and other items as noted, see application schedule.
 - 2. Exposed Exterior - ferrous metal, plastic pipe and wood surfaces.
- B. The contractor shall examine the specifications for the various other trades and shall thoroughly familiarize himself with all their provisions regarding their painting. All surfaces that are left unfinished by the requirements of other specifications shall be painted or finished as a part of this contract.
- C. All materials used on the job shall be stored in a single place designated by the Owner or Architect. Such storage place shall be kept neat and clean and all damage there to or its surroundings shall be made good. Any soiled or used rags, waste, etc., must be removed from the buildings every night, and every precaution taken to avoid the danger of fire.
- D. All paints, varnish, enamels, lacquers, stains, paste fillers, and similar materials must be delivered in the original containers and with seals unbroken and labels intact.

PRODUCTS

2.1 MATERIALS

- A. All materials shall be called out on the application schedule. All application shall be in accordance with manufacturer's recommendations. No claim of the contractor as to the unsuitability or unavailability of any materials specified, or his inability to produce first class work with same, will be entertained unless such claims are made in writing.
- B. The contractor shall be responsible for inspecting the work prior to application of any paint or finishing materials. If any surface to be finished cannot be put in proper condition by customary cleaning, sanding and puttying operations, the contractor shall assume responsibility for and rectify any unsatisfactory finish resulting.

EXECUTION

3.1 PREPARATION

- A. Clean all surfaces free of loose dirt and dust; touch up all knots and sappy spots with shellac where the finish calls for paint and enamel. After the first coat of putty all necessary puttying of nail holes, cracks, etc. shall be done in a color to match that of the finish. Treat all galvanized metal surfaces chemically with a compound designed for this purpose in accordance with the manufacturer's directions before applying the first coat of paint.
- B. All coats shall be thoroughly dry before applying succeeding coats.
- C. The workmanship shall be of the very best, all material evenly spread and smoothly flowed on without runs or sags. Only skilled painters shall be employed.
- D. Exterior paint shall not be done while the surface is damp, or during rainy weather, or when the temperature is below 45 degrees F or is likely to drop to freezing. Surfaces shall not be painted while they are exposed to hot sun.
- E. Floors and adjacent surfaces, as well as all surfaces to be painted, shall be clean before painting.
- F. All metal surfaces shall be washed with mineral spirits to remove any dirt, oil or grease, before applying materials. Remove rust or scale by air brushing or sanding clean before painting. Shop coats of paint that become marred shall be cleaned and touched up with primer specified.
- G. Backprime all wood trim before installation.
- H. All work where a coat of material has been applied must be inspected and approved by the Architect before the application of the succeeding specified coat, otherwise no credit for the coat applied will be given and the contractor will automatically assume the responsibility to recoat the work in question. The contractor shall furnish the Architect with a report of each coat applied when completed for inspection and approval to comply with the above.
- I. All work to be finished with enamel or varnish shall be sanded smooth and the surface cleaned before proceeding with the application of the first coat, and sanded between coats with fine sandpaper to produce an even, smooth finish.

- J. Tops of all upper sash and bottoms of all lower sash shall be finished same as interior finish. Tops, bottom and edges of doors shall be finished same as balance of doors after they are fitted.
- K. All scratches, cracks and abrasions in drywall surfaces and openings adjoining trim shall be cut out as required, then filled with a spackling compound or approved patching plaster, flush with adjoining surface, and when dry shall be sanded smooth and sealed before application of priming coat.
- L. Paste wood filler, applied on open grain wood, when "set" shall be wiped across the grain of the wood, then with the grain to secure a clean surface.
- M. Surfaces to be stained shall be covered with a uniform coat of stain and wiped off if required.
- N. All closets shall be finished with the same as adjoining rooms, unless otherwise specified. All other surfaces shall be finished the same as nearest of adjoining surfaces unless otherwise specified or directed by the Architect.
- O. Closed cabinet interior shall be finished with one coat of sealer and interior of open cabinets shall be finished same as exterior.
- P. The contractor shall not only protect his work at all times, but shall also protect all adjacent work and materials by suitably covering or other method during progress of his work.
- Q. Upon completion of the work, he shall remove all paint spots from the floors, glass and other surfaces. He shall remove from the premises all rubbish and accumulated material of whatever nature not caused by other trades and shall leave his part of the work in clean, orderly and acceptable condition.
- R. In accordance with the Lead-based Paint Poisoning Prevention Act Section 401, as amended by the National Consumer Health Information and Health Promotion Act of 1976, PL 94-317, no lead-based paint containing more than .5 of 1 percentum lead by weight (calculated as lead metal) in the total nonvolatile content of the paint, or the equivalent measure of lead in the dried film of paint already applied, or both, with respect to paint manufactured after June 22, 1977, no lead-based paint containing more than .06 or 1 percentum lead by weight (calculated as lead metal) in the total nonvolatile content of the paint, or the equivalent measure of lead in the dried film of paint already applied, or both, shall be used in the construction or rehabilitation of structures under this contract or any subsequent contract.

3.2 WORKMANSHIP

- A. Paint colors selected may require mixing, but paint shall be used as it comes from the can without thinners or other additives. Panels for finish and color shall be prepared by the contractor in advance, with the materials as specified, for the approval of the Architect.
- B. All suction spots or hot spots in block or cement, which are noticeable after the application of the first coat shall be touched up before applying the second coat to produce an even result in the finishing coat. Priming coat on walls shall be tinted to the approximate shade of the final coat. The Contractor shall secure Color Schedules on rooms before priming walls.

3.3 APPLICATION SCHEDULE

- A. Paint used shall be the following or equal style and manufacturer (as determined by the Owner and Architect) and shall be readily available from local sources for future purchase and use by the Owner:
 - 1. Interior Paint
 - a. Sherwin Williams PMC (Property Management Coating) Low Sheen Enamel, color shall be determined by Owner.
 - b. Sherwin Williams PMC Oil based enamel.
 - c. High build primer.
 - 2. Exterior Paint
 - a. Sherwin Williams Weatherperfect or Classic 99.
 - b. Sherwin Williams Weatherperfect or Classic 99 (Semi-gloss enamel).
- B. Furnish samples for selection of color by Owner and Architect of items to be painted or otherwise finished.
 - 1. Exterior - Paint the following: All wood items including frieze boards, door-jambs and trim, window trim, etc. All items of unfinished or primed metal including roof flashing, exterior doors, exposed masonry lintels, roof starter strip/drip (if galvanized), catch basin grates, sidewalk drains, stair handrails, parking lot striping, handicap logo, and sidewalk ramps.
 - 2. Interior - Paint the following: All walls and items of wood not prefinished or field stained, including doors, door trim, door casing, etc.. (Doors shall be painted on all surfaces).
 - 3. Interior Doors – Doors shall be painted on all surfaces.

4. Exterior Doors – Covered semi gloss enamel.

C. Paint/Stain Schedule

1. Exterior:

- a. Door jambs, door and window trim, and miscellaneous wood and moulded trim - 1 coat primer and 1 coat latex house paint, or 2 coats of "solid color" pigmented stain, as selected by Owner and Architect.
- b. Unfinished metals - 1 coat rust inhibitive primer on unprimed steel and 1 coat galvanized metal primer on galvanized surfaces. Apply 2 finish coats of exterior latex paint to all primed exterior metals.

2. Interior:

- a. Gypsum drywall - Spray texture finish with knock down. Apply 1 coat high build primer. 1 coat PMC low sheen enamel.
- b. Bathroom walls - Spray texture finish with knock down. Apply 1 coat high build primer. 1 coat semi gloss.
- c. Ceiling - Spray texture finish with knock down. Apply 1 coat.
- d. Doors – 1 coat PMC oil based enamel.

D. Cleaning - Remove all spots, spatters, and stains. Remove all debris from premises.

END OF SECTION

SECTION 10400

IDENTIFICATION DEVICES

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish all materials, labor, and equipment required to install complete all interior and exterior signage as shown on Drawings and specified herein.

1.2 QUALITY ASSURANCE

- A. Installation shall be performed by installer specialized and experienced in work similar to that required for this project.
- B. All Signage shall comply with the most stringent requirements of the current edition of the ANSI 117.1, ADAAG and/or any local amendments.

1.3 SUBMITTALS

- A. Product Data: Submit product data for specified products. Include material details for each sign specified.
- B. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.
- C. Samples: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.
- D. Installation: Submit supplier's installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
- C. Handle products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Accessibility: All interior signs at Community building to meet ADA Requirements. Letters raised 1/32" with raised Braille 1/32" (Grade 2). Letters to be 5/8" minimum height.
- B. Mounting Panel - 0.080 inch thick matte finished acrylic.
- C. Background Appearance - Solid color(s) selected by Owner/Architect from manufacturer's standard color range.
- D. Tactile Lettering and Graphics Color - Selected by Owner/Architect from standard vinyl colors.
- E. Overall panel size - As required to accommodate required copy/text. Maintain consistent size throughout building.
- F. Shape – Selected by Owner/Architect from manufacturer's standard shapes.
- G. Subject to compliance with requirements, provide products of one of the following or an approved equal:
 - 1. Advance Corp.
 - 2. ASI Sign Systems
 - 3. Best Manufacturing
 - 4. Best Sign Systems, Inc.
 - 5. National Signage Affiliates
 - 6. Supersine Co.
- H. Signage: Furnish and install ADA compliant signage (where applicable) in the quantities listed below, in locations and at heights per the requirements of the ADA. All physical characteristics of the signage shall be per ADA requirements. Signage colors shall be per the selection by the Owner. Exterior signage shall have 6" minimum height letters/numbers.

Sign Schedule

Signage	Number
Duplex Units (exterior)	36
Laundry (exterior)	1
Mechanical	1
Men's Restroom	1
Women's Restroom	1
Office	1

- D. Exterior Community Building Identification Signage: Furnish 24"x18"x1 1/2" thick acrylic/fiberglass signage. Acrylic/fiberglass sign shall have a "pebble" textured field surface with 1/32" raised lettering and 3/32" raised border. Field, border and letter shall be of different colors – selected from manufacturer's standard color selection by Owner. Letter font shall be Microsoft® True Type Font "High Tower Text" in sizes shown or sized to fit application.

2.2 FABRICATION – GENERAL

- A. Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.
- C. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.
- D. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.
- E. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.
- B. Scheduling of installation by implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 INSTALLATION

- A. Locate and install exterior house numbering below exterior garage light (closest to main front entry door). Install centerline at 60" AFF, install level and plumb.

- B. Install centerline of interior signage at Community Building at 60" AFF on latch side of door or adjacent wing walls as applicable.
- B. Provide temporary coverings to protect adjacent work surfaces.
- C. Install product in accordance with supplier's instructions.
- D. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.
- E. Acceptable Installation Methods:
 - 1. Double-sided foam tape for smooth, non-porous surfaces
 - 2. Liquid silicone adhesive for irregular, porous or vinyl-covered surfaces. Use double-sided vinyl tape to hold sign in place until adhesive has fully cured.
 - 3. Countersunk mechanical fasteners (exterior installation only)

3.3 CLEANING, PROTECTION, AND REPAIR

- A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet.
- B. Remove temporary coverings and protection to adjacent work surfaces. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Protect from damage until Owner's acceptance. Remove construction debris from project in an appropriate manner.

END OF SECTION

SECTION 10500

MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 SCOPE

- A. Provide post-mounted mailboxes in locations and quantities as shown on the drawings and specified.

PART 2 - PRODUCTS

2.1 Mailboxes

- A. Located in parkway – Rubbermaid, “The Gentry” All-in-One Mailbox & Post Combo model #GC1B0000 (or approved equal) – 50” x 11.5” x 21.77”, tough polymer, double wall construction with a front and rear door at accessible units, postal flag, built in compartment for newspapers or small parcels. Post constructed to slide over 4x4 wood post (to be provided for complete installation). Color as selected by Owner from manufacturer’s standard color selection.
- B. Through wall rent drop box by AF Florence model #LD12 with 120SM Collection Box or equal @ Community Building Office. See plans for location.

PART 3 - EXECUTION

3.1 Installation

- A. Install mailboxes in accordance with regulations of the U.S. Postal Services, verifying said regulations prior to ordering mailboxes, and in accordance with manufacturer’s written installation instructions.
- B. Position mailbox for wheelchair accessibility per UFAS requirements.

END OF SECTION

SECTION 10670

STORAGE SHELVING

GENERAL

1.1 WORK INCLUDED

- A. Provide storage shelving in location designated as specified.

1.2 RELATED WORK

- A. Section 06200 - Finish Carpentry

PRODUCTS

2.1 MATERIALS

- A. Closet Shelving: Epoxy coated wire shelving shall be Schulte, Lee-Rowan, or equivalent and shall include all hardware and installation per manufacturer's instructions. Provide brackets at each end of shelf and intermediate support bracket for shelves over 36" long. Brackets to be spaced 32" o.c. maximum or as required by manufacturer for proper installation.

EXECUTION

3.1 INSTALLATION

- A. Install storage shelving in accordance with manufacturer's instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations indicated.
- B. Clean all exposed surfaces after removing protective coatings.

END OF SECTION

SECTION 10800

TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE

- A. Provide toilet and bath accessories in location shown on Drawings or as specified.
- B. Accessible toilet and bath accessories shall be provided, located and installed as shown on Drawings and in accordance with requirements of the 2006 Arkansas Fire Prevention Code, ANSI 117.1 Accessibility Code.

1.2 RELATED WORK

- A. Section 06100 – Rough Carpentry
- B. Section 06200 – Finish Carpentry

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Better Home Products
- B. Bobrick
- C. Bradley
- D. Approved Equal

2.2 MATERIALS

- A. All Units – each bathroom shall contain the following accessories (accessories listed based on Better Home Products Candlestick Park Collection, 2200 Series model numbers, unless noted otherwise):
 - 1 – Surface mounted toilet paper holder
 - 1 – 24" towel bar (see finish plan for locations)
 - 1 – 30" towel bar (see finish plan for locations)
 - 1 – Shower curtain rod per shower and tub fixture- Shower curtain rod shall be type 304, 20-gauge stainless steel with satin finish. It shall have an outside diameter of 1". Flanges shall be 1-3/8" diameter. Unit shall be equipped with concealed mount-

ing brackets. Bobrick model #B-207. Include shower curtains - opaque, matte white vinyl 0.008" thick, containing antibacterial and flame-retardant agents and shall have nickel-plated brass grommets along top. Bottom and sides shall be hemmed. Bobrick model #204-2 (42" wide), model #204-3 (70" wide). Include shower curtain hooks - Shower curtain hooks shall be 0.09" diameter, type-304. Hooks shall be usable with 1" and 1-1/4" diameter shower curtain rods. Bobrick model #204-1.

- 1 - 24"W x 36"H mirror w/sanded edge
- 1 - 24" Shower/Tub grab bar, 18 gauge, type 304 stainless steel tubing, 1-1/4" dia., "snap-on" flange cover 22 gauge stainless steel with satin finish, concealed mounting flange, anchors and fasteners.

B. At Accessible Units- in addition, each accessible bathroom shall contain the following accessories:

- 1 - Wall mounted accessible shower seat: frame constructed of type-304, satin-finish stainless steel that consists of 16-gauge, 1-1/4" square tubing and 18-gauge, 1" diameter seamless tubing. Seat cushion shall be 2" thick consisting of 1-1/2" closed cell polyurethane foam padding mounted on 1/2" thick plywood and covered in white naugahyde (water-resistant reinforced vinyl fabric). Shower seat shall be equipped with two 3" diameter mounting flanges constructed of type-304, 3/16" thick, satin-finish stainless steel; a guide bracket constructed of type- 304, 16-gauge, satin-finish stainless steel; and a spring constructed of type-301, 24-gauge stainless steel that is spot-welded to a baseplate of type-304, heavy-gauge stainless steel. Shower seat shall be able to lock in upright position when not in use. Shower seat shall comply with barrier-free accessibility guidelines (Illinois Accessibility Code) for structural strength. Bobrick model #B-517 (right hand) or #B518 (left hand).
- 4 - 24" Shower/Tub grab bar, 18 gauge, type 304 stainless steel tubing, 1-1/4" dia., "snap-on" flange cover 22 gauge stainless steel with satin finish, concealed mounting flange, anchors and fasteners (see interior bath elevations for locations)
- 1 - 36" Toilet back wall grab bar, 18 gauge, type 304 stainless steel tubing, 1-1/4" dia., "snap-on" flange cover 22 gauge stainless steel with satin finish, concealed mounting flange, anchors and fasteners (see interior bath elevations for locations)
- 1 - 42" Toilet side wall grab bar, 18 gauge, type 304 stainless steel tubing, 1-1/4" dia., "snap-on" flange cover 22 gauge stainless steel with satin finish, concealed mounting flange, anchors and fasteners (see interior bath elevations for locations)

C. Public Toilet Rooms - each Public Toilet Room shall contain the following accessories (accessories listed based on Better Home Products Candlestick Park Collection, 2200 Series model numbers, unless noted otherwise):

- 1 - Double robe hook -
- 1 - Surface mounted paper towel dispenser - Cabinet sides and back shall be fabricated from 20 gauge steel, with 18 gauge steel on top, pre-treated and finished with baked enamel. The door will be transparent and the throat an opaque high impact plastic.

The front cover shall be fabricated of smoked transparent high-impact plastic. Cabinets shall have a lever-operated dispensing mechanism. The operating lever is to be located on the front of the dispenser. Cabinet will be provided with a key activated spring lock, which can easily be converted to push-button operation. Each cabinet will be provided with a key and push-button. Cabinets shall include a transfer system which will automatically start feeding the paperweb of the top roll when the lower roll is nearly depleted. The drive mechanism, transfer system, roll holders and door shall be field replaceable. Bradley model #2491 or approved equal.

1 – Surface mounted toilet paper holder -

1 – 24"W x 36" H mirror

1 - 36" Toilet back wall grab bar, 18 gauge, type 304 stainless steel tubing, 1-1/4" dia., "snap-on" flange cover 22 gauge stainless steel with satin finish, concealed mounting flange, anchors and fasteners (see interior bath elevations for location)

1 - 42" Toilet side wall grab bar, 18 gauge, type 304 stainless steel tubing, 1-1/4" dia., "snap-on" flange cover 22 gauge stainless steel with satin finish, concealed mounting flange, anchors and fasteners (see interior bath elevations for location)

1 – 18" Vertical grab bar, 18 gauge, type 304 stainless steel tubing, 1-1/4" dia., "snap-on" flange cover 22 gauge stainless steel with satin finish, concealed mounting flange, anchors and fasteners (see interior bath elevations for location)

D. All toilet and bath accessories shall come with brushed nickel finish or as approved by owner.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install toilet accessory units in accordance with manufacturer's instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations indicated.
- B. Towel bars and shower curtain rods shall be secured to solid blocking or studs.
- C. Grab bars shall be secured to solid blocking, anchored to sustain a 250 lb. load for 5 minute duration.
- D. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly.
- E. Clean and polish all exposed surfaces after removing protective coatings.

END OF SECTION

SECTION 11000

EQUIPMENT

GENERAL

1.1 SCOPE

- A. Furnish all material, labor and equipment as required to complete installation of all appliances as shown on plans and as hereinafter specified.

1.2 RELATED WORK

- A. Section 06200 - Finish Carpentry
- B. Section 07900 - Joint Sealers

PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. The Contractor shall furnish and install (1) fire extinguisher equal to Larsen's #MP-2 1/2 (2 1/2#), UL rating 1A-10B:C, multi-purpose dry chemical fire extinguisher and standard bracket in the kitchen in each unit. Exact locations shall be verified by the Owner, but units shall be mounted with top at 48" AFF max.

2.2 APPLIANCES (all appliances shall be black. Verify with Owner.)

- A. Refrigerator
 - Typical Unit, Accessible Unit & Community Building
 - GE Model GTH17DBDBB 16.5 cubic ft., Energy Star, ADA with ice maker
- B. Range
 - Typical Unit
 - Accessible Unit & Community Building
 - GE Model JDS07MBB
 - GE Model JDP15DMBB
- C. Range Hoods
 - Accessible Unit & Community Building
 - Broan 41000 Series, non-vented, light, black on black, with remote switches at the accessible units and community building
- D. Dishwasher
 - Typical Unit
 - GE Model GLD2800VBB

	Accessible Unit & Community Building	GE Model GLDA690PBB
E.	Microwave Accessible Unit & Community Building	GE Model JEM25DMBB
F.	Microwave/Hood Typical Units	GE Model JVM1540DMBB

EXECUTION

3.1 INSTALLATION

- A. All appliances to be installed as shown on construction documents and per manufacturer's recommendations.

END OF SECTION

SECTION 12505

WINDOW BLINDS

GENERAL

1.1 Reference

- A. Requirements of the General Conditions and Division 01100 of these specifications shall govern the work of this section.

1.2 Work Included

- A. Provide new window blinds on new window units specified.

1.3 Submittals

- A. Submit manufacturer's standard colors for Architects color selection.
- B. Submit manufacturer's installation instruction.

PRODUCTS

2.1 Materials

- A. Mini Blinds - Contractor shall furnish and install horizontal mini blinds inside head of each window and at doors with glazing - Grand Openings, San Antonio, Texas. or equal per the following: Blinds shall be full height and width of finished opening (in nominal 3'-0" wide sections to match multiple windows in any single opening) with 1" horizontal prefinished aluminum or vinyl slats, slat tilting wand, lift or pull cord, head channel, and brackets. Color to be selected by Owner and Architect.

EXECUTION

3.1 Installation

- A. Installation shall be per manufacturer's instructions and color selection shall be by Owner. Provide solid blocking for attachment below window head. Only lead-free blinds shall be installed.

END OF SECTION

SECTION 15400

PLUMBING FIXTURES AND EQUIPMENT

1. REQUIREMENTS INCLUDED:

- A. The preceding General Conditions, Modifications to the General Conditions and Special Conditions be a part of these specifications and the Plumbing Contractor shall consult them, in detail, relative to this part of the work.
- B. The work covered by this Section of the Specifications consists in furnishing all labor, equipment, supplies and materials (except as otherwise specified herein or noted on the Drawings) and in performing all operations necessary for the installation of complete Plumbing Systems, in strict accordance with this Section of the Specifications and the applicable Drawings and subject to the terms and conditions of the Contract.
- C. Notwithstanding any reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, such reference shall be interpreted as having established a standard of quality and shall not be construed as limiting competition; and the Plumbing Contractor in such cases may, at his option, use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing, is equal to that specified.

2. APPLICABLE STANDARDS AND SPECIFICATIONS:

- A. All Plumbing Work, equipment and apparatus shall be in conformity with the applicable provisions of the Local, State and Uniform Plumbing Codes, The 2006 Arkansas Fire Prevention Code, 2006 Arkansas Plumbing Code (2006 IPC with State Amendments), National Fire Protection Association, Occupational Safety and Health Act, Municipal and Statutory Requirements, ADFA, and other Standard Codes or Laboratory Reports hereafter specified. **PUBLIC LAW 102-486 OCTOBER 24, 1992 about energy and water conservation.**

3. GENERAL:

- A. The Plumbing Contractor shall BE RESPONSIBLE to visit the site and shall verify the conditions affecting the work to be done, PRIOR TO BIDDING.
- B. The Contract Documents indicate the extent and general arrangement of the Plumbing Systems. Work indicated but having details obviously omitted shall be furnished complete to provide a system which functions in accordance with the Drawings and Specifications. The Plumbing Contractor shall be responsible for referring to Architectural, Structural, Mechanical, Electrical Drawings, CABINET

SUPPLIERS and Specifications and in coordinating his work with the various Trades involved. Any equipment which is defective or which is damaged in the course of the installation or test shall be replaced or repaired in a manner meeting the approval of the Architect and the Owner.

4. BIDS:

- A. Where materials, equipment, apparatus and other products are specified by manufacturer, brand name, type or catalog number, such designations are to establish standard of quality and style and shall be the Basis for the Bid.
- B. Products so specified shall be furnished under this Contract unless substitutions are made in accordance with these specifications. Where two or more designations are listed, the choice shall be optional with the Plumbing Contractor.

5. SUBSTITUTIONS:

- A. Refer to the "Special Conditions" Section.
- B. Substitutions must have 7 day written approval prior to bidding.

6. MATERIALS AND WORKMANSHIP:

- A. Unless otherwise approved, in writing, all materials furnished under this Specification shall be new and shall be standard products of manufactures regularly engaged in the production of such equipment and shall be the manufacture's latest standard design. All work shall be done by experienced mechanics in accordance with First Class Practice and it shall be complete to perform the intended function and shall be neat in appearance.

7. MEASUREMENT VERIFICATION:

- A. The Plumbing Contractor shall be responsible for verification of measurements as shown on the Drawings and all other measurements pertinent to the work covered by this Specification.

8. COORDINATION OF WORK:

- A. The plumbing contractor shall coordinate his work with all other contractors and trades involved, in order to prevent conflicts causing unnecessary expense or delays in the installation of work under other contracts. Where conflicts arise due to negligence on the part of the plumbing contractor, he shall remove and relocate any plumbing items causing such conflicts, including all costs in connection therewith.

9. PERMITS:

- A. The plumbing contractor shall obtain and pay for all permits required in connection with the work covered by this section of the specifications.

10. SHOP DRAWINGS AND EQUIPMENT DATA:

- A. As soon as practicable and within sixty (60) days after the award of the General Contract and before any material or equipment is purchased, the plumbing contractor shall submit to the architect for approval, five (5) complete brochures; listing materials, fixtures and equipment which are to be incorporated into the work. Brochures shall include catalog numbers, cuts, diagrams and other data which may be required in order to describe and identify the equipment. On each page of the shop drawings submitted, indicate the appropriate "symbol" from the "Plumbing Schedule" which has been assigned to that particular item.
- B. Any materials, fixtures and equipment listed, which do not conform to the specifications or which are not readily identifiable, may AND WILL be rejected.
- C. In addition to the above, Shop Drawings shall be submitted as soon as practicable for any alternate bids or substitutions which required deviations from the contract drawings.
- D. **All equipment shall be specifically marked, and highlighted to eliminate misrepresentation of proposed equipment to be supplied.**

11. RESPONSIBILITY:

- A. It is not within the scope of this specification to define the extent of work to be done by each trade union, but rather to define the responsibility of supervision and the scope of work to be paid for under this contract. Any reference to work to be done under this contract means the plumbing contractor is responsible for getting the work done by competent craftsmen (as determined by prevailing jurisdictional agreement) and all costs in connection therewith.

12. SAFETY:

- A. The plumbing contractor shall provide proper warning lights, signs and guards for safety.

13. "RECORD" DRAWINGS:

- A. At the completion of the project, the plumbing contractor shall submit to the architect a complete set of "Record" drawings. Reproducible copies of the contract drawings will be the responsibility of the contractor for making minor alterations. All

reproducible sepias shall be purchased by the contractor. Where major changes are made, substitutions allowed or alternates accepted, the contractor shall furnish reproducible tracings showing the "record" conditions of the areas. (When shop drawings have been submitted for approval, the original tracings of the shop drawings may be used for this purpose provided proper notations for reference are made on the contract drawings.)

14. GUARANTEE:

- A. The plumbing contractor shall leave the entire installation in complete working order and free from any and all defects in material, workmanship and finish. In addition to any specific guarantees mentioned in these specifications, he shall guarantee to repair or replace, at his own expense, any part which may develop defects due to faulty workmanship or materials within a period of one (1) year after the work is accepted.
- B. He shall also guarantee to repair or replace, with like materials, any existing work of the building or equipment installed by others which is damaged by him during the repairing of any such defective apparatus, materials and workmanship. The acceptance of the Contract for the work covered by these specifications shall become a written guarantee on the part of the plumbing contractor to carry out the provisions of this section of the specifications.

15. OPERATING AND MAINTENANCE INSTRUCTIONS:

- A. The plumbing contractor shall prepare and furnish to the Owners Maintenance Engineer, or a designated representative, two (2) indexed manuals containing operating instructions for all equipment furnished under this contract. These manuals shall also include all diagrams, cuts, parts lists, etc. which may be required for proper operating and maintenance.
- B. This contractor shall also instruct the owner's maintenance engineer, or a designated representative, regarding the operating and servicing of all equipment furnished under this contract. This contractor shall certify to the architect, in writing, that he has performed the above services.

16. ADJUSTMENT:

- A. Automatic control devices shall be adjusted for proper operation.
- B. Defective work shall be replaced with new materials.
- C. Water lines shall have free circulation of water without noise or hammer. (add air chambers or shock-stop devices if PEX piping is not installed.)
- D. Lubricate all motors, pumps, etc. as required for the equipment furnished and maintain until final acceptance of the building.

17. CLEANING:

- A. Keep the premises broom clean at all times from foreign materials created under this contract and provide tarpaulins to protect all finished surfaces and equipment.

18. PROTECTION OF EXISTING UTILITIES:

- A. The plumbing contractor shall verify the location of existing utilities and shall be responsible for protecting these utilities during the installation of his work. Any existing utility which is damaged by him shall be repaired at his expense.

19. ROUGHING-IN:

- A. All piping and roughing-in is to be concealed in walls, floors and furred spaces, except where otherwise shown. Provide steel pipe sleeves for all pipes passing through concrete or masonry work and caulk tight with Termofiber between sleeve and pipe.
- B. Plumbing contractor to make all final connections to all domestic fixtures and kitchen fixtures (equipment) either supplied by others; or as shown or noted.
PROVIDE WHEEL HANDLE STOPS ON ALL HOT AND COLD WATER LINES PRIOR TO CONNECTING TO EACH FIXTURE.

20. ESCUTCHEON PLATES:

- A. All pipes passing through walls or floors in finished areas shall be provided with brushed nickel hinged escutcheon plates.

21. FLASHING:

- A. Vent Openings: Openings in roof for vent pipes shall be flashed with pre-fabricated rubber boot. Flashing shields shall extend from vent in all directions and shall be made watertight.
- B. Contractor shall coordinate flashing with the roofing contractor to ensure flashing material used is compatible with the roof system being installed.

22. CUTTING AND PATCHING:

- A. The plumbing contractor shall do all cutting, channeling and patching. All cutting, channeling and patching shall be done under the supervision of the General Contractor.
- B. Structural members shall not be cut under any circumstances without prior approval of the Architect.

- C. Damage to the building, piping, wiring or equipment, as a result of cutting or channeling, shall be repaired by competent craftsmen.
23. PAINTING: - (See Architectural Section "PAINTING")
- A. Equipment which has damaged finish shall be repainted to match the original factory finish.
 - B. All exposed ferrous metal furnished under this contract, such as hangers, struts, structural steel, etc., shall be given on (1) coat of Tnemec Gray Primer.
24. EXCAVATION AND BACKFILLING:
- A. Trenches shall be uniformly graded and the bottoms shall be free of soft spots and stones with sufficient width for proper installation of pipe and they shall be adequately cribbed and braced to prevent cave-in or settlement.
 - B. The piping systems shall be tested and accepted before backfilling. Piping shall be held in place with dry earth on the sides of the pipe leaving all joints and the tops of the pipes open for inspection. See paragraph in this section for "Testing Requirements".
 - C. Install all underground soil, waste and storm drain lines in a cushion of sand with a minimum of 6 inches of compacted sand over the line. Remaining backfilling shall be in layers not exceeding 12 inches from sand on to grade. All fill shall be well tamped before additional backfilling material is placed. Backfilling (within building wall lines and under concrete walks, slabs and pavements) shall be sand.
 - D. Excess excavated material shall be removed from the premises or disposed of as directed by the architect.
 - E. Paved areas shall be repaired with materials to match the surrounding areas.
25. PIPE INSTALLATION:
- A. General: Ends of pipe shall be reamed and all burrs and cuttings removed before installation. Vertical risers shall be plumb and straight. Horizontal lines shall be parallel to walls and partitions. Pipe openings shall be closed with caps when work is not in progress.
 - 1. Anchor all pipe where required and/or shown on the drawings with steel or copper bands clamped to the pipe and connected to the structure. Piping connections are to be made so also to allow for expansion with spring joints and elbows where shown or required. Cold spring welded joints, one-half calculated

maximum expansion and weld in place for all pipes operating above the city water temperature.

- B. Soil, and Waste Piping: All horizontal piping shall be installed with uniform grade (free of sag) of 1/4" per foot where possible and in no case less than 1/8" per foot, unless specifically called out to the contrary on the drawings. Schedule 40 PVC pipe with solvent welded joints shall be used below grade to points shown on the drawings and up flush with the level of the floors on grade, except as indicated on the drawings. Pipe shall be laid with the hub end upstream and supported on firm ground or masonry supports.
- C. Vent Piping: Vent lines shall be as indicated on the drawings and/or as required by the local plumbing code, and shall be Schedule 40 PVC with solvent welded joints.
- D. Hot and Cold Water Piping:
 - 1. Suitable provisions shall be made to allow for expansion and contraction of pipe.
 - 2. Air chambers shall be provided on all hot and cold water supplies near each faucet, flush valve or control valve and shall consist of a 15 inch length of 1 inch pipe, with cap.
 - 3. All unions shall be of the ground joint type.
 - 4. Water piping (outside building) shall be installed with not less than 4'-0" of cover.
 - 5. Provide "Epco" dielectric fittings, or an approved equal, between dissimilar metals such as copper and brass or steel and iron.

26. PIPE AND FITTINGS:

- A. Soil, Waste, and Vent Lines Above and Below Grade (Inside Building): Shall be Schedule 40 PVC with solvent welded joints to a point 5'-0" outside the building wall line, complying with ASTM D2655.
- B. All waste piping outside the building: Shall be PVC SDR-35, complying with ASTM D3034, and having integral bell spigot joints and rubber gaskets.
- C. PEX PIPING

PEX piping in buildings below floor slab – Piping shall be sized and installed in accordance with manufacturer's specification and building codes.

- The trench shall be dug to a depth sufficient to allow the tubing and the top of trench to remain below the poured slab. The trench's bottom shall be solid with

no hollows, lumps, rock, or other materials and smoothed with good clean fill or granular fill.

- Only continuously-run lengths of tubing without fittings shall be used. All connections shall be outside of the foundation or above the slab. Tubing shall be laid with sufficient slack (snaking) to accommodate any contraction due to cooling prior to backfilling. Minimum bending radius requirements for PEX tubing shall be followed. Inspect tubing for damage and test prior to backfill.
- Backfill shall consist of good clean fill, sand, or river run gravel ½” maximum particle size and be compacted around the tubing. Do not compact the backfill above the tubing.
- At foundation and slab penetrations the tubing shall be protected by a rigid sleeve that spans the distance from the undisturbed soil in the pipe trench to above the slab or outside of the foundation. At the point where the sleeve terminates the space between the tubing and sleeve shall be sealed. Petroleum based caulks/sealants shall not be used.
- PEX tubing and fittings that are exposed shall be wrapped with an opaque covering such as black polyethylene immediately upon exposure.

PEX Piping in buildings above grade – Piping shall be sized and installed in accordance with manufacturer’s specification and building codes.

- Use only continuous-run lengths of tubing without fittings. Support tubing with plastic hangers and straps. Supports shall allow free tubing movement. Do not pull tubing tight during installation. Allow a min of 1/8” slack per lineal foot of installed tubing. Minimum bending radius requirements for PEX tubing shall be followed.
- Place tubing so that it will be a min of 12” vertically and or 6” horizontally from any source of high heat. Tubing connected to the water heater shall be a min of 6” away from the exhaust vent.
- Hose bibs or any other item shall not be supported by the tubing.
- Tubing shall be protected from nail damage with metal nail plates.
- Tubing shall be protected from sunlight with black polyethylene.
- Tubing shall not be run into and or through the attic.
- **All visible PEX water pipes penetrating walls should be transitioned to hard pipe at the wall to the fixture (i.e. toilets)**

D. Joints:

1. The “No-Hub” joints are to consist of gasket, stainless steel sleeve, etc., in order to meet the requirements of ASTM Spec. No. C564-65T.
2. Threaded Pipe (Waste and Vent) – White lead pipe dope shall be applied to all male threads on steel pipe.
3. Copper Pipe – All joints, on above ground pipes, shall be made by soldering with Taramet Sterling East Flow “Lead Free” solder, or equivalent.

- 4. PVC pipe and fittings for DWV use are to be joined by solvent welding. Use type of solvent recommended by the manufacturers of piping used.
- E. Risers and Branches: All connections to soil stacks shall be made with drainage wyes's or long radius bends, with cleanouts properly located and secured to walls and floor construction with steel clamps and hangers. The risers shall be plumb and straight and concealed in walls, unless otherwise shown. Support the risers at base and offset as required to clear beams and/or other obstructions.
- F. Water Hammer Arresters: Not required if PEX piping is used. Similar or equal to J.R. Smith water hammer arresters on hot and cold water lines serving all plumbing fixtures, water coolers, and hose bibs. Sizing and placement of water hammer arresters shall be as established by the plumbing and drainage institute standard "PDI-WH201."
- G. Condensate drains: Schedule 40 PVC with solvent welded joints.

Not all condensate drains are shown or noted, but are to be 1" minimum. Mechanical/plumbing contractor to extend full size insulated condensate drain lines to nearest wet vent, floor drain or turn down inside wall, extend and turn down outside wall to 12" above finished grade.

27. HANGERS AND SUPPORTS:

- A. General: All piping shall be adequately supported against sagging, pocketing, swaying and displacement. The hangers shall be properly spaced at not over 4 foot centers for piping up to and including 1-1/4"; and 8 foot centers for all other piping. Care shall be used to install parallel lines of pipe truly parallel and regularly spaced.
- B. Trapeze Hangers: Where two or more pipes run parallel and at the same level, they must be supported on trapeze hangers. The size of pipes or angle iron shall be proper for the size and number of pipes supported thereon. For pipes supported on trapeze hangers, use cork insulation at the hanger (same thickness as other insulation) with cork protector similar and equal to Michigan Hanger Company No. 125. Where multiple pipes are carried on trapeze hangers, the hanger spacing shall be for the smallest pipe in the group.
- C. Riser Clips: All vertical piping shall be supported on substantial pipe clamps. Clamps shall be similar and equal to Michigan Hanger Company Model No. 510.
- D. Perforated Strap Hangers: The use of perforated strap hangers will **not** be acceptable.
- E. Pipe Braces: Furnish and install all pipe braces required to eliminate vibration in piping systems. All pipes run in pipe spaces and furred walls shall be rigidly supported so as to eliminate all vibration.

- F. Use copper clad pipe hangers wherever copper pipe is used.
 - G. Wood plugs and “shot-studs” may not be used.
 - H. Roller Hangers: Where horizontal movement is in excess of 1” or a 4” deviation of the hanger rod from the vertical, provide roller hangers similar and equal to Michigan Hanger Company Model No. 610.
28. UNIONS:
- A. Unions shall be used for connection of all equipment and at such points requiring lines to be broken for maintenance. Where lines are installed without unions, such that they may not be maintained, in the opinion of the Engineer, unions shall be installed at the plumbing contractor’s expense. Unions 2 inches and smaller shall be of the ground joint type, malleable iron with screwed ends for steel piping. For copper piping, unions 2 inches and smaller shall be of the cast brass ground joint type.
29. VALVES:
- A. General: Valves shall be provided on all supplies to fixtures. The plumbing contractor shall furnish and install valves on water lines as indicated on the drawings and as specified. All valves shall be the product of one manufacturer, unless otherwise noted, and shall be suitable for the service intended. All valves shall be installed with their stems not lower than horizontal.
 - B. Ball Valves for Water Lines Up To and Including 1 Inch: shall be Jenkins J-1100T, with a working pressure of 200 psig on water service. (Provide extended stems insulated on all valves).
30. VALVE IDENTIFICATION:
- A. Brass valve tags with ½” high numerals shall be furnished and installed on all main and branch shut-off valves. Furnish the Owner with three (3) complete typed lists of such valves; indicating their tag number, service, and their location relative to the nearest room and listing what room or rooms are controlled by each valve. One (1) list shall be mounted, unless glass, in a frame and shall be located as directed by the Architect or the Owner. Valve all be the product of the Seton Name Plate Company, or an approved equal.
31. COLOR CODING OF PIPES:
- A. Piping shall be color coded with self-sticking temperature proof pipe marking bands with directional markers adjacent to pipe bands. Band at points of entry or departure from view in open areas, at points behind access panels, at intervals of not more than

30 feet in exposed runs. Apply banding after completion of all insulation and painting.

32. CLEANOUTS:

- A. Cleanouts shall be installed where indicated on the drawings and at the foot of each waste or vent stack, 2'-0" above the floor, unless otherwise noted, using "Wye and Eighth Bend Stach Fittings with Integral Cleanouts" wherever practicable.

Cleanouts shall be full size of the pipe up to 4 inches. The following numbers are those of Wade. Equivalent products of Josam, Zurn or J.R. Smith will be acceptable.

- B. Cleanouts in finished floors shall be Wade W-600 with scoriated cover and nikaloy top.
- C. Cleanouts in finished walls shall be Wade 845OR with stainless steel cover plates. Install 2'-0" above the floor, unless otherwise noted on the drawings.

33. TRAPS:

- A. All fixtures shall be supplied with traps. Traps shall be PVC.

34. INITIAL CLEANING OF THE SYSTEM:

- A. All equipment and piping shall be thoroughly cleaned of cuttings of iron and other refuse during assembly and installation. When the installation is complete, all lines shall be thoroughly flushed.

35. TESTS FOR THE PLUMBING SYSTEMS:

- A. General: All soil, waste, storm drain, vent, and water piping shall be tested by the plumbing contractor before they are concealed. All equipment required for these tests shall be furnished by the plumbing contractor without additional cost to the owner. Tests shall be made with air or water, as indicated by the types of systems and weather conditions, and/or as directed by the engineer. Portable water shall be used for all water tests.
- B. Certification of Tests: All piping tests required by these specifications shall be certified, in writing, in quadruplicate to the architect's office when they have been completed and it shall also be noted in this certification by whom the test was witnessed. If the test is made in several parts, each part shall be so Certified and Dated.
- C. Drainage System (Including Soil, Waste, Drain and Vent):

1. Testing shall be in accordance with the IPC and City requirements.

D. Water System (Including Hot Water, and Cold Water):

1. Testing shall be in accordance with the IPC and City requirements.

36. INSULATION:

- A. Piping: All domestic water piping at concrete slab penetration shall be insulated with Manville "FLAME-SAVE" fiberglass insulation with APT jacket. The insulation shall have an average thermal conductivity not to exceed .22 BTU per inch, per square foot, per degree F., per hour, at a mean temperature of 75 degrees F, and shall be ½" thick.

37. PLUMBING FIXTURES:

- A. All fixtures as scheduled on the drawings, or specified herein, shall be connected to required piping, thoroughly cleaned, ready for use, set true and firm and protected against damage at all times.
- B. See Fixtures P1.0 for the "Fixture Schedule". NOTE: ALL FIXTURES MUST MEET GPF (gallons per flush) requirements for water energy conservation, Public Law Jan 1, 1997.

38. STERILIZATION OF PIPE:

- A. The entire water distribution system shall be thoroughly sterilized before connecting to service. Sterilization shall be in accordance with the 2000 IPC and City requirements.

END OF SECTION

SECTION 15600

HEATING, VENTILATING AND AIR CONDITIONING

1. REQUIREMENTS INCLUDED:

- A. The preceding General Conditions, Modifications to the General Conditions and Special Conditions are a part of these specifications and the Heating and Air Conditioning Contractor shall consult them, in detail, relative to this part of the work.
- B. The work covered by this Section of the Specifications consists in furnishing all labor, equipment, supplies and materials (except as otherwise specified herein or noted on the Drawings) and in performing all operations necessary for the installation of complete Heating and Air Conditioning Systems in strict accordance with this Section of the Specifications and the applicable Drawings, and subject to the terms and conditions of the Contract.
- C. Notwithstanding any reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, such references shall be interpreted as having established a standard of quality and shall not be construed as limiting competition; and the Heating and Air Conditioning Contractor in such cases may, at his option, use any article, device, product, material, fixture, form or type of construction which, in the judgment of the Architect expressed in Writing, is equal to that specified.

2. APPLICABLE STANDARDS AND SPECIFICATIONS:

- A. All Heating and Air Conditioning Work, equipment and apparatus shall be in conformity with the applicable provisions of the National Fire Protection Association, Occupational Safety and Health Act, Underwriters' Laboratories, Inc., The Americans with Disabilities Act (ADA) Public Law 101-336, Local, State and National Codes, Municipal and Statutory Requirements, 2010 Arkansas Mechanical Code (mirrors 2010 IMC), ADFA, and other Standard Codes or Laboratory Reports hereafter specified.

3. GENERAL:

- A. The Heating and Air Conditioning Contractor shall visit the Site and shall verify conditions affecting the work to be done.
- B. The Contract Documents indicate the extent and general arrangement of the Heating and Air Conditioning Systems. Work indicated but having details obviously omitted shall be furnished complete to provide a system which functions in accordance with the Drawings and Specifications. The Heating and Air Conditioning Contractor shall be responsible for referring to Architectural, Structural, Plumbing and Electrical Drawings and Specifications, and in coordinating his work with the various Trades

involved. Any equipment which is defective or which is damaged in the course of the installation or test, shall be replaced or repaired in a manner meeting the approval of the Architect and the Owner.

4. BIDS:

- A. Where materials, equipment, apparatus and other products are specified by manufacturer, brand name, type or catalog number, such designations are to establish standards of quality and style, and shall be the Basis for the Bid.
- B. Products so specified shall be furnished under this Contract unless substitutions are made in accordance with these Specifications. Where two or more designations are listed, the choice shall be optional with the Heating and Air Conditioning Contractor.

5. SUBSTITUTIONS:

- A. Refer to the "Special Conditions" Section.
- B. Written submitted approval 7 days prior to bid date is mandatory.

6. MATERIALS AND WORKMANSHIP:

- A. Unless otherwise approved, in Writing, all materials furnished under this Specification shall be new and shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. All work shall be done by experienced mechanics in accordance with First Class Practice and it shall be complete to perform the intended function and shall be neat in appearance.

7. MEASUREMENT VERIFICATION:

- A. The Heating and Air Conditioning Contractor shall be responsible for verification of measurements as shown on the Drawings and all other measurements pertinent to the work covered by this Specification.

8. COORDINATION OF WORK:

- A. The heating and Air Conditioning Contractor shall coordinate his work with all other contractors and trades involved in order to prevent conflicts causing unnecessary expense or delays in the installation of work under other contracts. Where conflicts arise due to negligence on the part of the Heating and Air Conditioning Contractor, he shall remove and relocate any items causing such conflicts, assuming all costs in connection therewith.

9. PERMITS:

- A. The Heating and Air Conditioning Contractor shall obtain and pay for all Permits required in connection with the work covered by this Section of the Specifications.

10. SHOP DRAWINGS AND EQUIPMENT DATA:

- A. As soon as practicable and within sixty (60) days after the award of the General Contract and before any material or equipment is purchased, the Heating and Air Conditioning Contractor shall submit to the Architect, for approval, eight (8) complete brochures; listing material, fixtures and equipment which is to be incorporated into the work. Brochures shall include catalog numbers, cuts, diagrams and other data which may be required in order to describe and identify the equipment. On each page of the Shop Drawings submitted indicate the appropriate "symbol" from the "Equipment Schedule" which has been assigned to that particular item. The Shop Drawings shall show the actual capacities of the equipment submitted, including all data necessary to evaluate the performance of the equipment, including such information as coil face velocity, pressure drops, outlet velocity of air handling units, sound ratings, sheet metal gauge, etc.

For all lined or wrapped insulation of ductwork; a specific schedule of ductwork/piping etc. to be insulated must be submitted.

- B. Any materials, fixtures and equipment listed which do not conform to the Specifications or which are not readily identifiable, may be rejected.
- C. In addition to the above, Shop Drawings shall be submitted as soon as practicable for any accepted Alternate Bids or substitutions which require deviations from the Contract Drawings.
- D. All equipment shall be specifically marked, and highlighted to eliminate misrepresentation of proposed equipment to be supplied.

11. RESPONSIBILITY:

- A. It is not within the Scope of this Specification to define the extent of work to be done by each Trade Union, but rather to define the Responsibility of Supervision and the Scope of Work to be paid for under this Contract. Any reference to work to be done under this Contract means the Heating and Air Conditioning Contractor is responsible for getting the work done by competent craftsmen (as determined by prevailing jurisdictional agreement), and all costs in connection therewith.

12. SAFETY:

- A. The Heating and Air Conditioning Contractor shall provide proper warning lights, signs and guards for safety.

13. “RECORD” DRAWINGS:

- A. At the completion of the Project, the Heating and Air Conditioning Contractor shall submit, to the Architect, a complete set of “Record” Drawings. Reproducible sepia of the Contract Drawings will be the responsibility of the Contractor for making minor alterations. Where major changes are made, substitutions allowed or Alternates accepted, the Contractor shall furnish reproducible tracings showing the “Record” Conditions of the Areas. (When Shop Drawings have been submitted for approval, the original Tracings of the Shop Drawings may be used for this purpose, provided proper notations for reference are made on the Contract Drawings.)

14. GUARANTEE:

- A. The Heating and Air Conditioning Contractor shall leave the entire installation in complete working order and free from any and all defects in material, workmanship and finish. In addition to any specific guarantees mentioned in these Specifications, he shall guarantee to repair or replace, at his own expense, any part which may develop defects due to faulty workmanship or materials within a period of One (1) Year after the work is accepted.
- B. He shall also Guarantee to repair or replace, with like materials, any existing work of the building or equipment installed by others which is damaged by him during the repairing of any such defective apparatus, materials and workmanship. The acceptance of the Contract for the work covered by these Specifications shall become a Written Guarantee on the part of the Heating and Air Conditioning Contractor to carry out the provisions of this Section of the Specifications.

15. OPERATING AND MAINTENANCE INSTRUCTION:

- A. The Heating and Air Conditioning Contractor shall prepare and furnish to the Maintenance Engineer, or a Designated Representative, two (2) Indexed Manuals containing operating Instructions for all equipment furnished under this Contract. These Manuals shall also include all diagrams, cuts, parts lists, etc. which may be required for proper operating and maintenance. A Schedule shall also be furnished by this Contractor giving the intervals at which each piece of equipment shall be inspected, cleaned and serviced. Space shall be provided in the Schedule for servicing dates.
- B. This Contractor shall also instruct the Maintenance Engineer, or a Designated Representative, regarding the operating and servicing of all equipment furnished

under this Contract. This Contractor shall certify, to the Architect in writing, that he has performed the above services.

16. ADJUSTMENT:

- A. Defective work shall be replaced with new materials.
- B. Lubricate all motors, etc. as required for the equipment furnished and maintain until Final Acceptance of the Building.

17. CLEANING:

- A. Keep the premises broom clean at all times from foreign materials created under the Heating and Air Conditioning Contract, and provide tarpaulins to protect all finished surfaces and equipment.

18. PROTECTION OF EXISTING UTILITIES:

- A. The Heating and Air Conditioning Contractor shall verify the location of Existing Utilities and shall be responsible for protecting these Utilities during the prosecution of his work. Any Existing Utility which is damaged by him shall be repaired at his expense.

19. ROUGHING-IN:

- A. All piping and roughing-in is to be concealed in walls, floors and furred spaces, except where otherwise shown. Provide steel pipe sleeves for all pipes passing through concrete or masonry work, and caulk tight with Thermofiber between sleeve and pipe

20. PLATES:

- A. All pipes passing through walls or floors in finished areas shall be provided with chrome plated hinged escutcheon plates. Seal with 3M-CP-25 fire caulk thru fire rated walls, floors, or ceilings.

21. FLASHING:

- A. Flashing for Exhaust Fans, etc. shall be furnished and installed by the Heating and Air Conditioning Contractor. If any changes are required for openings shown on the Drawings, approval must be secured from the Architect.

22. CUTTING AND PATCHING:

- A. The Heating and Air Conditioning contractor shall do all cutting, channeling and patching. All cutting, channeling and patching shall be done under the supervision of the General Contractor.

- B. Structural members shall not be cut under any circumstances without prior approval of the Architect.
 - C. Damage to the building, piping, wiring or equipment, as a result of cutting or channeling, shall be repaired by competent craftsmen.
23. PAINING: (See Architectural Section “PAINTING”)
- A. All items of equipment requiring a touch-up shall receive a minimum of One (1) coat of finish paint.
 - B. All exposed ferrous metal furnished under this Contract, such as struts, hangers, structural steel, etc., shall have One (1) coat of primer and One (1) coat of finish paint.
24. ELECTRICAL WORK FOR MECHANICAL EQUIPMENT:
- A. The Mechanical Contractors (Heating, Ventilating, Air Conditioning and Plumbing) will furnish all equipment pertinent to their work, including motors, relays, all pressure and temperature control devices and electrically operated valves and dampers; and all motor starters which are not furnished as an integral part of the mechanical equipment.
 - B. The Mechanical Contractors shall be responsible for installing all equipment and pneumatic controls which are required for the air conditioning and heating systems and all low voltage electrical (digital) temperature control devices, and control panels. **Provide a one-source electrical connection for all fans, furnaces, condensing units, etc. either shown or noted.**
 - C. The Electrical Contractor shall install all disconnect switches, motor starters and start-stop stations, except as otherwise specified and shall furnish and install all power wiring, CONTROL WIRING FROM AIR HANDLER TO THERMOSTAT, and start-stop control wiring. He shall also install any miscellaneous controls and furnish and install temperature control wiring (programmable t’sats control wiring is by E.C.) and interlock wiring from t’sat. to respective air handling equipment shown or noted.
25. DUCTWORK:
- A. General (Low Velocity Ductwork): The Heating and Air Conditioning Contractor shall furnish and install a complete sheet metal ductwork system as shown on the Plans and hereinafter specified.

1. All ductwork shall be in accordance with the recommendations as outlined in the latest edition of the SMACNA HVAC Duct Standards and the SMACNA HVAC Air Duct Leakage Manual and as further specified within these Specifications.
2. All ductwork shall be neat, accurate, mechanically tight and rigidly constructed. All uninsulated panels wider than twelve inches (12") shall be cross-broken. Turning vanes shall be supplied at all abrupt changes in direction of ductwork.
3. Sizes of ductwork shown on the Plans are sheet metal duct dimensions and where ductwork is acoustically lined or insulated with inside duct liner, the ductwork is oversized accordingly.
4. Joints shall be made airtight and horizontal runs shall be supported by strap hangers on not to exceed 10'-0" centers.
5. Provide insulated access doors in sheet metal ductwork for fire and/or smoke dampers, as indicated in latest BOCA specifications.
6. Flexible connectors shall be pre-assembled 24 gauge metal edges fastened to six inches (6") of exposed coated fiberglass cloth, secured by means of a double lock seam. Fabric shall withstand exposure to 250 degrees F. constant temperature and shall meet Underwriters' Laboratories, Inc. Standard #214. Connection shall be "Silent Duct" as manufactured by the Elgen Manufacturing Corporation.
7. Splitter dampers shall be as shown on the Drawings, with Elgen No. EQR-5 damper quadrant sets. Concealed regulator covers shall be painted to match the ceiling.
8. Exhaust and return air ducts shall not require turning vanes, unless noted on the Plans. Radius turns shall be installed in duct where shown on the plans.
9. Flexible Duct – Flexible duct to be constructed of zinc coated, high carbon steel helix, permanently bonded to the duct core, insulated with a nominal one-pound per cubic foot density fiberglass that is completely shielded from seamless exterior vapor barrier jacket, with a vapor cuff, both ends. Duct shall be designed to withstand up to 6" w.g. pressures. **The maximum length of flexible duct to be used for connection from rigid supply or return mains or branches shall be 6'-0" maximum.** Flexible duct to be ATCO 70 Series.
10. Spin-in fittings shall be ATCO SM-1DEL with volume damper.
11. Access doors shall be provided at all fire dampers and/or smoke dampers.
12. Sealants – One of the following materials shall be used to seal, make airtight and waterproof duct connections, joints, equipment connections, etc. for all low velocity supply, return and exhaust systems: Hard Cast Type, Type DT or JT,

used with adhesive concentrate, type FTA-20 (Underwriters' Laboratories, Inc. Listed) and applied per the manufacturer's recommendations.

13. All round (hard) ducts, take-offs, above and/or below (exposed) ductwork including gyms, multi-purpose, or industrial arts, etc. shall be 1 ½" – ¾ lbs. foiled FSK wrapped fiberglass.

26. REGISTERS, DIFFUSERS AND GRILLES:

- A. Registers, diffusers and grilles shall be installed where shown on the Drawings and shall be of the air conditioning type. They shall have a net free area in excess of 60 percent and shall be complete with volume control. See "Register, Diffuser and Grille Schedule" on the Drawings.
- B. Exterior Venting Termination - Exhaust fan soffit vents shall be equal to Fanco UEV N4 or equal. Center all soffit exhaust vents on soffit. Dryer exhaust damper and exterior cover shall be equal to Lambro #1775.

27. PIPE AND FITTINGS:

- A. Condensate piping shall be Schedule 40 PVC with solvent welded joints.

Not all condensate drains are shown or noted. Mechanical contractor to extend full size insulated condensate drain lines to nearest wet vent, floor drain or turn down inside wall, extend and turn down outside wall to 12" above finished grade.

- B. Waste water piping shall be Schedule 40 PVC with solvent welded joints.
- C. Dielectric fittings shall be furnished between dissimilar metals such as copper and brass or steel and iron. Dielectric fittings shall be "Epc".
- D. Welded joints shall be as manufactured by Crane, Walworth, Grinnell or Tube-Turn.
- E. Threaded Joints: White pipe dope shall be applied to all male threads on steel pipe.
- F. Air Handling Unit Trap: Provide a running trap on the drain line of each Air Handling Unit with cleanout in one bend. Trap is to be of sufficient depth to hold water seal. See condensate drain piping notes on these specs.

28. CLEANING AND TESTING DUCT SYSTEMS:

- A. Upon completing the installation of ventilating ducts, clean the entire system of rubbish, plaster, dirt, etc. before installing any grilles, outlets, or registers.
- B. After installation of grilles, registers and outlets, and connections made on the fan, blow out the entire system with all dampers, grilles, outlets and registers wide open.

The Owner, or his Designated Representative, shall be advised prior to testing so he may be present, if desired.

C. Duct Testing (See SMACNA Air Duct Leakage Test Manual:

1. 3" w.g.; 2" w.g. and 1" w.g. (low pressure) construction. NO testing required.

29. TEST AND BALANCE ANALYSIS:

- A. The Heating and Air Conditioning shall, upon completing the items of work required by his Contract, thoroughly clean all dirt and debris from equipment, ducts, etc. as stated above. All bearings, gear boxes, wearing surfaces or other equipment components requiring lubrication shall be properly serviced as recommended by the equipment manufacturer, and shall be tagged with the date of service and the type of lubricant used. All specified cleaning and protective devices shall then be placed in continuous operation. All fans shall have been in operation for at least twenty-four (24) hours prior to the start of testing and balancing so that the initial stretch of drive belts will have taken place and all other mechanical equipment, including all temperature and operating control devices, shall have been adjusted and calibrated for complete and functional operating service.
- B. The Heating and Air Conditioning Contractor shall be thoroughly experienced in balancing and performance testing of air and water distribution and heat exchange systems, subject to the approval of the Architect, within six (6) weeks from the award of the Mechanical Contract. The Contractor shall give seventy-two (72) hour notice to the Owner, or his Designated Representative, before testing and balancing begins.
- C. As a minimum requirement, the following instrumentation shall be employed in the performance of balancing and testing of the mechanical systems; Swinging vane or hot wire type anemometer, low range (0 – 0.25" water column), inclined tube manometer and high range (0 – 20" water column), U-tube manometer, pitot tube, ammeter, voltmeter, self-timing tachometer (medium scale division 2 rpm), pyrometer, test thermometers, test pressure gauges, swing or electric powered psychrometer and other instruments, tools and devices as required to accurately balance and test the mechanical systems and components.
- D. Air Distribution Systems Balancing: Total air delivery of all major supply, return and exhaust and air fans shall be established by means of a velocity traverse in accordance with the AMCA Procedures. Fan and drive assembly nameplate data, including manufacturer, size, model number, type, class, design, serial number, motor data (manufacturer, type, horsepower, volts and amps) and design RPM shall be recorded together with field measured final conditions required or established, including horsepower, volts, amps, RPM, starter and heater sizes, fan inlet and discharge pressures, air temperatures, condition of equipment, and other information of importance to the future life of the equipment.

Return and minimum OSA dampers shall be adjusted for proper design air volume. Each item of air handling equipment shall have recorded its design and established mixed air delivery quantities at the minimum and maximum damper position, together with static pressures at each extreme of operation. Dampers shall be adjusted for approximately constant air delivery throughout the range of damper positions.

Each room air distribution device (grilles, registers, diffusers, etc.) shall be identified by system, area and location, manufacturer, type and size, and shall be set for the proper air delivery pattern, and shall have recorded the design and established CFM.

Other air flow rates as required by Contract Documents shall be identified, established and recorded in the same manner as described above for similar systems or apparatus.

- E. Upon completion of all air balance requirements described above, the following tests shall be performed and recorded, in order to verify that all items of mechanical equipment and distribution systems (refrigerant system shall operate continuously for at least seventy-two (72) hours before testing) as installed, will perform as required by the Contract Documents.
- F. Operate and set all fire and/or smoke dampers as described on the Drawings and in the Specifications OR as specific area codes describe.
- G. Data Records: All balancing, testing and operating data records shall be compiled in Indexed Binders with divider sheets and extension tabs for quick reference. Any critical deviation of equipment capabilities or performance from design and specification requirements shall be noted under Section 1 of the Testing and Balancing Results Data Brochure, together with any recommendations for efficient and economical correction of the deficiency. It shall also be the responsibility of the Heating and Air Conditioning Contractor to include the cost of any opposite season check-out of all system components which might be required and to modify air distribution delivery and/or temperature to any room, area or zone, which may require adjustment during the first year of system operation. All manual valves, dampers or other control devices shall be neatly and clearly marked in a permanent manner at the correct setting.

30. INSULATION:

- A. General: All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as rested by Procedure ASTM E-84, NFPA #255 and Underwriters' Laboratories, Inc. Standard #723, not exceeding:

Flame Spread	25
Smoke Developed	50

Accessories, such as adhesives, mastics, cements, tapes and cloth for fittings, shall have the same component ratings as listed above. All products or their shipping cartons shall bear a label indicating flame and smoke ratings do not exceed the above requirements. Any treatment of jackets or facings to impart flame and smoke-safety shall be permanent. The use of water soluble treatments is prohibited. The Insulation Contractor shall Certify, in writing prior to the installation, that all products to be used will meet the above criteria.

Insulation shall only be applied on clean, dry surfaces and after inspection and release for insulation application. All insulation shall be continuous through wall or ceiling openings and sleeves. Insulation on all cold surfaces where vapor barrier jackets are used, will be applied with a continuous unbroken vapor seal. Hangers, supports, anchors, etc., which are secured directly to cold surfaces must be adequately insulated and vapor sealed to prevent condensation. Pipe saddles shall be insulated as required o complete a continuous unbroken insulation of pipe as specified for the piping being supported. Specified adhesives, mastics and coating shall be applied at the manufacturer's recommended minimum coverage per gallon.

Insulation shall be Manville, CertainTeed/Saint Gobain (C.S.G.), or Owens-Corning Fiberglass. Tank and Vessel wrap shall be Ramwrap Co-insulation, Joplin, Missouri.

- B. Duct Liner: Insulate ductwork as indicated with ½" thick fiberglass duct liner, Manville "LINA-COUSTIC". The liner shall meet the Life Safety Standards as established by NFPA 90A. The duct liner shall have a surface roughness that gives an Air Friction Correction Factor not greater than 1.2 at velocities of 4000 FPM> Duct liners have a rougher surface that produces a greater Air Friction Correction Factor shall be oversized accordingly by the Sheet Metal Contractor.

Based upon a No. 6 mounting, the liner shall have the following Noise Reduction Coefficients Frequency:

<u>FREQUENCY</u>	<u>COEFFICIENT</u>
125	.25
250	.54
500	.63

The duct liner shall have a K Factor of .23 at 75 degree F mean temperature.

The duct liner shall be cut to assure snug corner joints and installed so the black surface of the liner faces the air stream. Duct liner shall be applied to the flat sheet with a 100% coverage of Benjamin Foster 85-20 adhesive. On horizontal runs, tops of ducts over 12 inches in width and/or sizes over 16 inches in height shall be additionally secured with Gripnail or welded pins and speed clips on a maximum of 15 inch centers. On vertical runs Gripnail or welded pins and seed clips shall be spaced on a maximum of 15 inch centers on all width dimensions over 12 inches. Mechanical fasteners shall start within 2 inches of the leading edge of each section and within 3 inches of the leading edge of all cross joints within the duct sections. Mechanical fasteners shall be flush with the liner surface.

Clips should be drawn down flush only and not so as to compress the liner and cause the leading edge to raise up.

All exposed edges and the leading edge of all cross joints of the liner shall be coated with Benjamin Foster 30-36.

Insulate all low pressure supply duct, all return air ductwork, all outside air ductwork, and relief air ductwork with duct liner specified above.

- C. Round duct take-offs, hard above ceiling and exposed ductwork in rooms, gyms etc. to be 1 ½" – ¾ lbs. foiled FSK wrapped fiberglass; **with Ramwrap tank and vessel wrap on all round exposed ductwork.**

- D. Ductwork outside: (unconditioned and weather exposed)

ROUND	2" thick 3-lb. density fiberglass board – mitered tank and pipe wrap. Factory applied all surface jacket.
RECTANGULAR	1 ½" thick, ¾ lb. density board with factory applied FSK facing; covered with membrane glass fabric embedded in 2 coats of Benjamin Foster cp-35, white coating.

- E. **Heating Equipment:**

1. Insulate all external surfaces with Manville 1001 "SPIN-GLAS" blanket filler, 3 pound density, with field applied AP jacket. The insulation shall have an average thermal conductivity not to exceed .20 BTU per inch. Per square foot, per degree F., at a mean temperature of 200 degrees F.
2. All insulation shall be applied with the edges tightly butted. Insulation shall be applied with mechanically welded fasteners to the duct and secured with speed clips. Pins shall be clipped off close to clip. Spacing of pins shall be as required to hold insulation firmly against duct surfaces but not less than one pin per 1.5

square feet. All joints and speed clips shall be sealed with a 3" wide strip of same facing adhered with Benjamin Foster 85-20, or CMC 17-465 adhesive.

32. CONTROL IDENTIFICATION:

- A. All items of equipment, such as Air Handling Units, Fans, etc. shall be identified by approved nameplates which are to be provided by the Contractor furnishing the equipment. Nameplates shall be securely affixed to each individual piece of equipment and also to each starter, relay, switch and transformer which controls the equipment. The nameplates shall bear notations corresponding to the same notations on the framed Wiring Diagram and/or Operating Instructions.

33. APPROVED EQUAL MANUFACTURERS:

EXHAUST FANS: NUTONE, FASCO.

LOUVERS AND DAMPERS: RUSKIN MFG., LOUVERS & DAMPERS INC., AIR STREAM, CESCO PRODUCTS, ENVIRO-AIRE, AMERICAN WARMING & VENTILATING.

FIRE AND SMOKE DAMPERS: RUSKIN MFG, UNITED AIRE, PREFCO PRODUCTS, AIR BALANCE, ENVIRO-AIRE, LOUVERS & DAMPERS INC.

REGISTER & DIFFUSERS: TITUS, TUTTLE & BAILEY, J&J REGISTER CO., ENVIRO-AIR, E.H. PRICE CO.

FURNACE/CONDENSING UNITS: LENNOX, TRANE CO., COMFORTMAKER, AND YORK.

END OF SECTION

SECTION 16000

ELECTRICAL

1. REQUIREMENTS INCLUDED:

- A. The preceding General Conditioning, Modifications to the General Conditions and Special Conditions are a part of these specifications and the electrical contractor shall consult them, in detail, relative to this part of the work.
- B. The work covered by this Section of the specifications consists in furnishing all labor, equipment, supplies and materials (except as otherwise specified herein or noted on the drawings) and in performing all operations necessary for the installation of complete electrical systems in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the contract.
- C. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, such references shall be interpreted as having established a standard of quality and shall not be construed in such cases may, at his option, use any article, device, product, material, fixture, form or type of construction which, in the judgment of the Architect expressed in writing, is equal to that specified.

2. APPLICABLE STANDARDS AND SPECIFICATIONS:

- A. All electrical work, equipment and apparatus shall be in conformity with the applicable provisions of the 2011 National Electrical Code/2006 Arkansas Fire Prevention Code and regulations and amendments, National Electrical Manufacturers' Association, Underwriters' Laboratories, Inc., Municipal and Statutory Requirements and the Requirements of the Local Power Company and other standard codes or laboratory reports hereafter specified.

3. GENERAL:

- A. The electrical contractor shall visit the site and verify conditions affecting the work to be done.
- B. The contract documents indicate the extent and general arrangement of the conduit and wiring systems. Work indicated but having details obviously omitted shall be furnished complete to provide a system which functions in accordance with the drawings and specifications. The electrical contractor shall be responsible for referring to architectural, structural, mechanical and plumbing drawings and specifications and in coordinating his work with the various trades involved. Any equipment which is defective or which is damaged in the course of the installation or

test shall be replaced or repaired in a manner meeting the approval of the Architect and the Owner.

4. BIDS:

- A. Where materials, equipment and apparatus and other products are specified by manufacturer, brand name, type or catalog number, such designations are to establish standard of quality and style, and shall be the Basis for the Bid.
- B. Products so specified shall be furnished under this Contract unless substitutions are made in accordance with the provisions of these Specifications. Where two or more designations are listed, the choice shall be optional with the Electrical Contractor.

5. SUBSTITUTIONS:

- A. Whenever an article or material required as specified or shown on the plans by using the name of the proprietary product, or if a particular manufacturer or vendor is designated, any article or material which will perform adequately the duties imposed by the general design will be considered equal and satisfactory, providing the article or material is proposed is of equal substance and function and that it is approved prior to the submission of bids.
- B. Where substitutions alter the design or space requirements indicated on the drawings, the electrical contractor shall include all items of cost of the revised design and construction, including all costs of allied trades involved.
- C. Acceptance or rejection of the proposed substitution shall be subject to the approval of the Architect. If requested by the Architect, the electrical contractor shall submit for inspection samples of both the specified and proposed substitution.

6. MATERIALS AND WORKMANSHIP:

- A. Unless otherwise approved, in writing, all materials furnished under this specification shall be new and shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. All work shall be done by experienced mechanics in accordance with First Class Practice and shall be complete to perform the intended function and shall be neat in appearance.

7. MEASUREMENT VERIFICATION:

- A. The Electrical Contractor shall be responsible for the verification of measurements as shown on the drawings and all other measurements pertinent to the work covered by these specifications.

8. COORDINATION OF WORK:

- A. The electrical contractor shall coordinate his work with all other contractors and trades involved in order to prevent conflicts causing unnecessary expense or delays in the installation of work under other contracts. Where such conflicts arise due to negligence on the part of the electrical contractor, he shall remove and relocate any electrical equipment causing such conflicts, including all costs in connection therewith.

9. PERMITS:

- A. The electrical contractor shall obtain and pay for all permits required in connection with the work covered by this section of the specifications.

10. SHOP DRAWINGS AND EQUIPMENT DATA:

- A. As soon as practicable and within sixty (60) days after the award of the General Contract and before any material or equipment is purchased, the Electrical Contractor shall submit, to the Architect for approval, five (5) complete brochures; listing material, fixtures and equipment which are to be incorporated into the work. Brochures shall include catalog numbers, cuts, "symbol" as used on the drawings, diagrams, shop drawings and other data which may be required in order to describe and identify the equipment. No consideration will be given partial lists submitted from time to time.
- B. Any materials, fixtures and equipment listed, which do not conform to the Specifications of which are not readily identifiable, may be rejected.
- C. In addition to the above, Shop Drawings shall be submitted as soon as practicable for any accepted Alternate Bids or substitutions which required deviations from the Contract Drawings.
- D. On each page of the Shop Drawings submitted, indicate the appropriate "symbol" or designation from the Electrical Drawings used for that particular item.

11. RESPONSIBILITY:

- A. It is not within the Scope of this Specification to define the extent of work to be done by each Trade Union, but rather to define the responsibility of supervision and the scope of work to be paid for under this contract. Any reference to work to be done under this contract means the electrical contractor is responsible for getting the work done by competent craftsmen (as determined by prevailing jurisdictional agreement) and all costs in connection therewith.

12. SAFETY:

- A. The Electrical Contractor shall provide proper warning lights, signs and guards for safety.

13. GROUNDING:

- A. The conduit systems, equipment enclosures, motors, neutral conductors and other equipment required by Article 250 of the 2002 National Electrical Code and regulations and amendments, shall be grounded in accordance with the applicable provisions of the latest National Electrical Code and regulations and amendments and/or the local inspecting authority. Where practicable grounding connections shall be made to the point of entrance of the main water supply to the building, to concrete encased driven (or buried) grounding electrodes, and to building steel. All grounding connections must be accessible. Ground resistance shall not exceed 25 ohms. The size of grounding conductor shall be not less than that which is required by the latest National Electrical Code and regulations and amendments. Ground conductors shall be provided in all conduit systems.

14. “RECORD” DRAWINGS:

- A. At the completion of the project the electrical contractor shall submit, to the Architect, a complete set of “Record” Drawings. Reproducible sepias of the contract drawings will be made available to the contractor for his use in making minor alterations. All reproducible sepias shall be purchased by the contractor. Where major changes are made, substitutions allowed or alternates accepted, the contractor shall furnish reproducible tracings showing the “Record” conditions of the reproducible tracings showing the “Record” conditions of the areas. (When shop drawings have been submitted for approval, the original tracings of the shop drawings may be used for this purpose provided proper notations for reference are made on the contract drawings.)

15. GUARANTEE:

- A. The electrical contractor shall leave the entire installation in complete working order and free from any and all defects in workmanship, material and finish. In addition to any specific guarantees mentioned in these specifications, he shall guarantee to repair or replace, at his own expense, any part which may develop defects due to faulty workmanship or materials within a period of One (1) year after the work is accepted.
- B. He shall also guarantee to repair or replace, with like materials, any existing work of the building or equipment installed by others which is damaged by him during the repairing of any such defective apparatus, materials and workmanship. The acceptance of the Contract for the work covered by these specifications shall become a written guarantee on the part of the electrical contractor to carry out the provisions of this section of the specifications.

16. PAINING:

- A. All unfinished material and equipment furnished under this Section, including structural supports, hangers, etc. shall be painted under the General Contract as outlined in the general requirements. Factory painted equipment shall be touched-up by the electrical contractor as required.

17. CLEANING:

- A. Keep the premises broom clean at all times from foreign materials created under this contract and provide tarpaulins to protect all finished surfaces and equipment. Clean and vacuum construction dust and debris from all electronic and electrical panels, starters, relays, equipment cabinets, etc. prior to installing covers.

18. CUTTING AND PATCHING:

- A. The masonry contractor shall cut all openings in exterior wall. Interior plaster patching shall be by the general contractor.
- B. Structural members shall not be cut under any circumstances without prior approval of the Architect.
- C. Where conduit passes through masonry or concrete floors, core drill and provide protection on opposite side of floors and walls from debris.
- D. Damage to the building, piping, wiring or equipment as a result of the cutting or channeling shall be repaired by competent craftsmen.

19. EQUIPMENT SERVICING:

- A. The electrical contractor shall be responsible for greasing, oiling and servicing of all electrical equipment furnished under his contract throughout the installation period and up to the date of final acceptance. All equipment shall be left in operating condition. Any special servicing instructions pertinent to the equipment shall be given the owner.

20. IDENTIFICATION OF EQUIPMENT:

- A. All service entrance equipment, disconnect switches, panelboards, relays, motor starters, contractors, telephone terminal cabinets, equipment cabinets and riser junction boxes, and other electrical equipment shall be provided with proper identification as indicated on the drawings. Identification shall be by the use of engraved color coded plastic nameplates with white lettering screwed to the cover of the equipment. Use of embossed plastic "tape" labels as prepared by "typewriter" type equipment shall NOT be used.

21. SERVICE AND CONTROL EQUIPMENT MOUNTING PANELS:

- A. Where two or more devices such as magnetic starters, disconnect switches, relays, etc. are installed in one location, a suitable ¾" plywood panel shall be installed for mounting the equipment. When plywood panelboard is indicated on the drawings to be free standing, a rigid framework of unistrut or angle iron shall be furnished so the installation is adequately supported. Plywood panelboard and supporting frame shall be suitable painted with two (2) coats of gray fire-retardant paint before equipment is mounted.

22. ELECTRICAL WORK FOR MECHANICAL EQUIPMENT:

- A. The Mechanical Contractors (Heating, Ventilating, Air Conditioning and Plumbing) will furnish all equipment pertinent to their work, including motors, relays, all pressure and temperature control devices and electrically operated valves and dampers; and all motor starters, controls or protective devices factory wired and installed as an integral part of the mechanical equipment. The electrical contractor shall furnish all disconnect switches, start-stop stations and motor starters which are not furnished as an integral part of the mechanical equipment and which are not specified to be furnished under other sections of these specifications.
- B. The mechanical contractors shall be responsible for installing all equipment and pneumatic controls which are required for the air conditioning and heating systems and all electrical (digital) temperature control devices, control panels and control wiring required, except for thermostat wiring which shall be furnished and installed by the electrical contractor.
- C. The electrical contractor shall install all disconnect switches, motor starters and start-stop stations, except as otherwise specified and shall furnish and install all power wiring and start-stop control wiring. He shall also install any miscellaneous controls and furnish and install miscellaneous control wiring, interlock wiring and thermostat wiring.

23. POWER AND LIGHTING SERVICE:

- A. The electrical service shall be as indicated on the drawings. Coordinate all electrical service entrance with the local electrical utility company.

24. FIXTURES:

- A. General: Lighting fixtures shall be furnished and installed in accordance with the "Fixture Schedule" and the applicable drawings. Where catalog numbers are indicated on the drawings, they are for the purpose of identifying the types of fixtures intended. Fixtures shall be furnished complete with all necessary straps, supports, hangers, frames, etc. which may be required in order to install the fixtures in the

areas indicated, even though the catalog numbers specified do not include all these items. All fixtures shall be mounted to meet seismic requirements of local zone.

- B. Fluorescent: Unless otherwise specified or approved, in writing, all fluorescent fixtures shall conform to the following minimum standards:
1. Every component part of the structural body of the fixture shall be fabricated of 22 gauge minimum cold-rolled steel and all metal parts treated with a phosphate bonding process after fabrication.
 2. All ballasts shall be Premium Class 'P' high power factor type, C.B.M. and E.T.L. approved. Ballasts shall be mounted in such a manner they may be replaced without dismantling the fixture. All fluorescent ballasts shall be energy saving type; Advance Mark III, General Electric Watt-Miser or Universal Watt-Reducer, unless specifically noted otherwise on the "Lighting Fixture Schedule" on the drawings.
 3. 'The entire fixture shall be Underwriters' Laboratories, Inc. approved and completely factory wired.
 4. A complete one (1) year guarantee shall cover the entire fixture and a five (5) year guarantee shall cover any plastic material used.
 5. All light reflecting surfaces shall be coated with baked enamel and shall have a minimum reflection of 86%.
 6. Accredited laboratory reports shall be available to attest photometric characteristics.
- C. Pendant: All pendant mounted fixtures shall be equipped with canopies and stems (supplied with the fixture of the proper length to provide mounting heights indicated and/or as directed.
- D. Bare Lamp Fixtures: All bare lamp fixtures shall have lamps protected with wire guards, except where located in display cabinets and in cove ceiling systems.
- E. Recessed: Where recessed fixtures are installed in fire-rated ceilings they shall be enclosed by suitable housing or plastered recesses in order to maintain the fire rating of the area in which they are to be used. (Coordinate with the General Contractor.)
- F. Incandescent: All incandescent fixtures shall conform to the applicable provisions of Article 410 of the 2002 National Electrical Code and shall be Underwriters' Laboratories, Inc. listed. Installation of recessed fixtures shall meet the requirements of this section of the 2002 National Electrical Code. Where recessed incandescent fixtures are mounted in 'T' grid type ceiling systems, Caddy Type 517, Type 520, or approved equal suspension bar hangers will be provided.

25. LAMPS:

- A. All fixtures shall be equipped with lamps the size indicated, in the Fixture Schedule on Sheet E1.0. In general, all incandescent lamps shall be inside frosted rated 130 volts, with wattages as noted. All fluorescent lamps shall be General Electric Cool White, 3200 lumens, 34 watt, energy saving type, or equal by Sylvania, unless otherwise noted on the "Lighting Fixture Schedule" on the drawings.

26. CONDUIT SYSTEMS:

- A. In general, all wiring in residential spaces shall be type 'NM' Cable and will not need to be installed in conduit. Where conduit is required by these specifications or by the NEC, all installations shall be in accordance with the NEC.
- B. Exterior connections to heat pumps shall be made with liquid-tight flexible steel conduit with approved fittings and ground conductor installed throughout circuit.
- C. Conduit entering panel cabinets, or equipment enclosures, shall be arranged in such a way that conductors can be installed without using short radius bends which may damage conductor insulation. Conduit shall be securely fastened to all sheet metal cabinets, enclosures, junction boxes and pull boxes with lock-nuts and bushings.
- D. Exposed runs of conduit shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right-angle turns consisting of cast metal fittings or symmetrical bends. Bends and offsets shall be avoided where possible, but when necessary shall be made with approved hickey or conduit bending machine.

27. FLOOR STUBS:

- A. Conduits stubbed up through floors away from walls shall consist of couplings set even with the floor and with bushed nipples or conduit extension as required threaded into coupling so conduit may be easily replaced if damaged.

28. PULL, JUNCTION AND SUPPORT BOXES:

- A. All boxes required under this Section shall be substantially and well made galvanized code gauge steel boxes with bolted or screwed covers, except where otherwise indicated or allowed by the NEC. Boxes exposed to weather or used in wet locations shall be equipped with gaskets and conduit hubs and shall meet weatherproof requirements. All cover plates shall be identified with marking pen to indicate the Panel and Circuit Numbers in which the conductors are terminated. Other systems shall be identified to indicate the system connected (i.e. TV, Telephone, Security, etc.). Pull, junction and support boxes shall be sized in accordance with Article 370 of the 2002 National Electrical Code/2006 IRC.

29. OUTLET BOXES:

- A. All electrical outlets, including lighting fixtures, plug receptacles, switches and similar devices, shall be provided with NEC code-approved boxes, U.L. listed, and fire-rated as required.
- B. Boxes for concealed work shall be set flush to walls, ceilings, columns, etc.
- C. Outlet boxes shall not be mounted back-to-back, unless fire protected per Code. Provide minimum of 24" inches between such outlets, except as otherwise required by Code.
- D. Coordinating the mounting (vertical and horizontal) of outlet boxes for electrical temperature controls and thermostats with the Mechanical Contractor to ensure proper direction of outlet boxes for vertical and/or horizontal electric thermostats and other temperature control equipment required to be installed by the electrical contractor.

30. LOCATION OF OUTLETS:

- A. Outlets are approximately located on small scale plans and great care must be used in the actual location of outlets by consulting the various detailed drawings used by other trades and by securing definite locations from the Architect. Switch outlets shall be set so as to clear the door trim and located on the lock side of the door (verify locations with Architectural Drawings and Addendums prior to rough-in). The height of bottom of back box above finished floor shall be as follows, except as otherwise specified or noted on the drawings:

Light Brackets (Interior)	76"
Light Switches (General)	44"
Convenience Outlets	15"
Electric Thermostats	44"
Telephone Outlets	15"

Outlets located on walls have cabinet, casework, etc. shall be coordinated with the Architectural Casework details to avoid conflicts, unless specifically noted.

31. WIRING DEVICES:

- A. Switches: All switches, unless otherwise specified shall be 15 Ampere minimum.
- B. Receptacles and Outlets: All duplex convenience outlets, unless otherwise indicated, shall be 20 Ampere minimum. PROVIDE TAMPER-RESISTANT RECEPTACLES IN DWELLING UNITS AS PER THE 2011 NEC (SECTION 406.12).

- C. Cover Plates: All wiring devices in finished areas shall be equipped with “white” plastic plates for normal power and “orange” for computer power, unless otherwise specified. Galvanized plates may be used in the equipment rooms and unfinished areas.
- D. Weatherproof Receptacles (WP): Weatherproof receptacles shall include “in-use” protective cover.
- E. Ground Fault Circuit Interrupter (GFCI) Provisions: GFCI receptacles shall be 15 Ampere minimum, 125 Volt, unless otherwise noted. GFCI breakers shall be 20 Ampere minimum, 125 Volt, unless otherwise noted.

32. CONDUCTORS:

- A. A complete system of copper conductors shall be installed with the sizes as indicated on the drawings and per the NEC. Wire size smaller than No. 12 AWG shall not be used on lighting, appliance or power circuits. In general, Type NM cable shall be used for branch lighting and convenience outlet circuits, unless otherwise specified or indicated on the drawings. Type THWN wire shall be used for all feeders and motor circuits. All wiring which is installed in conduit, underground or in wiring which is installed in conduit, underground or in concrete slabs which are in direct contact with earth, shall be THWN, except as indicated on the drawings or otherwise specified. The use of aluminum is prohibited. All wiring shall be color coded.
- B. Splices and taps shall be made by means of 600 volt rated solderless mechanical connectors. Connectors shall be ideal “super-nut” or 3-M “Scotchlok” for conductors smaller than no. 6 AWG. Connectors for no. 6 AWG and larger shall be bolted mechanical type insulated with factory made covers, 3-M “Scotch” electrical tapes. All connectors and tapes shall be applied per the manufacturer’s recommendations and shall be Underwriters’ Laboratories, Inc. listed for 600 volt use.

33. DISCONNECT SAFETY SWITCHES:

- A. Disconnecting type safety switches for services, motors, appliances, etc., as shown on the drawings or as required shall be heavy duty type and Underwriters’ Laboratories, Inc. listed. In general, switches shall be fusible and furnished in NEMA-1 enclosures. Weatherproof switches shall be fused NEMA-3R (raintight), unless otherwise indicated.
- B. Switches shall be horsepower rated for voltage applied and shall have visible blades in open position. Switches shall have “quick-make” “quick-break” operating mechanism which shall be an integral part of the box, not the cover, with positive padlocking provisions in the “ON” and “OFF” positions. NEMA-1 switches shall have single cover interlock.

- C. Switches shall have ampacity and number of poles required for specific locations and shall be as manufactured by Square D, General Electric or Westinghouse.

34. PANELBOARDS:

- A. Furnish and install dead-front type automatic circuit breaker panelboards with full copper busses where lighting and distribution panelboards are indicated on the drawings. Panelboards may be load center type. Panelboards shall be in accordance with Underwriters' Laboratories, Inc. "Standard for Panelboards" and "Standard for Cabinets and Boxes" and shall be so labeled. Where panelboards are to be used for service entrance equipment, they shall be so labeled. A complete and accurately type "Circuit Schedule" shall be mounted inside the panel door in a suitable plastic holder. (Coordinate room names and numbers from the drawings.) The electrical contractor shall connect all branch circuits so as to have a minimum of unbalance between phases. Any reconnection of circuits deemed necessary by the architect to balance the system shall be done promptly.
- B. Circuit breakers shall be ambient compensated, "quick-make" and "quick-break" on both manual and automatic operation, thermal magnetic, trip free, trip-indicator, snap-in type breakers. All multi-pole breakers shall be common trip. Minimum interrupting capacity shall be 10,000 AIR. Series rating of circuit breakers shall not be used. NOTE: Circuit breakers and fuses shall be fully selective such that only the circuit breaker or fuse opens the circuit nearest to the load for total selectivity. Series rating of circuit breaker and fuses shall not be allowed. PROVIDE ARC-FAULT CIRCUIT INTERRUPTER COMBINATION TYPE BREAKERS FOR ALL 120 VOLT SINGLE PHASE 15 AND 20 AMP CIRCUITS FEEDING ELECTRICAL DEVICES LOCATED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, DENS, BEDROOMS, SUNROOMS, RECREATION ROOMS, CLOSETS, HALLWAYS, OR SIMILAR ROOMS OR AREAS AS PER THE 2011 NEC (SECTION 210.12).

35. COMMUNICATION SYSTEM:

- A. Telephone outlets - Furnish and install outlet boxes and jacks per apartment electrical plan and white cover plates and conduit indicated or required. Wiring shall be by Electrical Contractor. Electrical Contractor shall contact local Telephone Company (Ritter Communications) to verify all requirements and fees. Refer to Site Utility Plan and Notes for additional information. Each phone line wire shall be labeled at the exterior of the building with the appropriate apartment number and type of line. Telephone, cable and data wiring shall be equal to RG6, 90% braid or higher with tri-shield per Ritter Communications specifications.
- B. Provide proper size and design telephone junction box, located as direct by Telephone Company.

C. Furnish and install 1-1/2" conduit from junction box through exterior wall at location designated by Telephone Co. for connection of underground service.

D. Cable TV Signal Distribution System

1. Furnish and install complete Cable TV Signal Distribution system as specified on drawings.
2. The work is to be performed in strict accordance with following specifications and schedules and all drawings forming parts thereof for construction of the system.
3. Cable wiring shall be done by Electrical Contractor.
4. General: All basic electronic equipment described herein shall be a product of a single installer of established reputation and experience who shall have produced similar apparatus for a reasonable period of time, at least three years or more, and who shall be able to refer to similar installations now rendering satisfactory service. Equipment shall be as manufactured by Blonder-Tongue or approved equal.
5. All equipment, including wiring, cabling, controls and junction boxes furnished and installed, shall be guaranteed for a period of one (1) year from the date of final acceptance thereof against electrical or mechanical defects or failures.
6. All electronic equipment shall carry the label of the Underwriter's Laboratories, Inc., when applicable.
7. The distribution system shall be installed so that additional channels may be added to the installed system with no changes whatsoever except for "Head-End" equipment.
8. The Contractor shall upon request, show satisfactory evidence that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system including replacement parts. The Contractor shall be prepared to offer a service contract for the maintenance of the system after the guarantee period.
9. The system shall provide for reception of all specified channels.
10. The Contractor shall provide a set of operating instructions including circuit diagrams and other information necessary for proper operation and maintenance. In addition, the Contractor shall submit manufacturer's specification sheets covering all components of the system.

11. System Function and Capabilities: The system being install shall be capable of passing Digital High Definition color TV signals (as required by the FCC after February 2009) without the introduction of noticeable effects on color fidelity and intelligence.
12. The system and all equipment shall be rated and capable of twenty-four (24) hour operation.
13. The system shall deliver a minimum signal strength at each outlet on every channel of 0-10dBmV across 75 ohms.
14. The system signal to noise ratio shall exceed 40 db when the signal input at the antenna site is 100 U/V or more (across 75 ohms).
15. No system component shall have a voltage standing wave ratio exceeding 1.0.
16. The system shall meet basic undesired radiation limits as required by the F.C.C.
17. System shall be designed to accept modulated signals from the cable television company.
18. Provide all equipment as required for proper operation.
19. Room outlets shall be Blonder-Tongue V-1PVU 12, 17, or 23. Isolation through loss to be determined by system attenuation to produce a signal level of at least 3000 micro-volts at each outlet. A Bonder-Tongue field strength meter shall be used to test the signal level at each outlet and a written report shall be submitted to the engineer. End runs shall be terminated with proper resistor.
20. Contractor shall provide 8'-0" of additional RG-6 cable from the outlets to the set mounted matching transformer (75 ohm input – 300 ohm output) which is also provided by this Contractor. This includes proper terminations on both ends of the connecting cables. One cable per outlet shall be furnished.
21. Coaxial Cable: Coaxial cable shall be approved sweep cable which has been manufactured within one (1) year of installation. No surplus or a non-tested cable may be used. All cable under this contract shall be by the same manufacturer. Cable shall be Belden RG-6 for interior wiring and Belden RG-6 (flooded type) for underground and exterior wiring, or equivalent products by another manufacturer.

36. FIRE ALARMS

- A. Furnish and install one automatic 120 volt A.C. smoke detector with self-contained fire alarm device and a 9 volt battery backup, (located in hall and each bedroom of each house) equal to Firex 0440, 85 decibel alarm, test switch, LED indication lamp.

These fire alarms shall be interconnected within the respective unit. See A/V unit and Community Building plan specs for smoke detectors with non-strobe activation.

END OF SECTION

ELECTRICAL LOAD CALCULATIONS-UNITS

JOB NAME: Dogwood Cottages
JOB LOCATION: Blytheville, AR
DATE: July 11, 2012

3-BEDROOM UNIT

(2011 NEC ARTICLE 220, SECTION IV)

LIGHTING AND GENERAL USE RECEPTACLES (3 VA / SF):
KITCHEN SMALL APPLIANCE CIRCUITS (2 @ 1500 VA / SF):
RANGE (8000 VA):
HEATING / A/C (HEATING IS LARGER LOAD):
WATER HEATER (NON-SIMULTANEOUS 4500 W ELEMENTS):
DISPOSAL OUTLET (1/2 HP, 1176 VA):
REFRIGERATOR OUTLET (1500 VA):
DISHWASHER OUTLET (1176 VA):
WASHER / LAUNDRY CIRCUIT (1500 VA):
DRYER (6000 VA):

3	VA	X	1704	SF	=	5112	VA
1500	VA	X	2		=	3000	VA
8000	VA	X	1		=	8000	VA
12000	VA	X	1		=	12,000	VA
4500	VA	X	1		=	4500	VA
1176	VA	X	1		=	1176	VA
1500	VA	X	1		=	1500	VA
1176	VA	X	1		=	1176	VA
1500	VA	X	1		=	1500	VA
6000	VA	X	1		=	6000	VA
TOTAL A				=	43964	VA	
						183	A

UNIT SERVICE (2011 NEC SECTION 220.82)

HEATING LOAD @ 100%:

FIRST 10,000 VA @ 100%:

REMAINING LOAD @ 40%: 43964 - 12,000 - 10,000 X 0.40 = 21,964

12,000	VA	X	1.00	=	12000	VA	
10,000	VA	X	1.00	=	10,000	VA	
21,964	VA	X	0.40	=	8786	VA	
TOTAL B				=	30786	VA	
						128	A

SERVICE EQUIPMENT SIZING

(BASED ON 100% LOADING)

TOTAL B / 240 V / 100% (1 PHASE, 60 CYCLE):

30786 / 240 / 1.00 = 128 A

CONCLUSION: USE 150 A SERVICE

Wallace
ARCHITECTS L.L.C.

ELECTRICAL LOAD CALCSDWELLING BLDGS.

JOB NAME: Dogwood Cottages
JOB LOCATION: Blytheville, AR
DATE: July 11, 2012

INDIVIDUAL SPACE LOADING

(2011 NEC ARTICLE 220, SECTION IV)

3-BR UNITS:

43964 VA 183 A EACH

LOADING BY BUILDING

(2011 NEC ARTICLE 220.84)

Calc. 1: DUPLEX (NO HOUSE PANEL):	<u>183</u> X	<u>3</u> X <u>0.45</u> =	247 A +	<u>0</u> A =	247 A
Calc. 2: DUPLEX (NO HOUSE PANEL):	<u>183</u> X	<u>2</u> X <u>1.00</u> =	366 A +	<u>0</u> A =	366 A

SERVICE EQUIPMENT SIZING

(BASED ON 100% LOADING)

DUPLEX (Calc. 1 is smaller): 247 / 1.00 = 247 A (Use 400 A)

Wallace
ARCHITECTS L.L.C.

ELECTRICAL LOAD CALCULATIONS-COMM. BLDG.

JOB NAME: Dogwood Cottages
JOB LOCATION: Blytheville, AR
DATE: July 11, 2012

COMMUNITY BUILDING

(2011 NEC ARTICLE 220, SECTION II)

INTERIOR SPACE LIGHTING (1 VA / SF):
RECEPTACLES (180 VA EACH):
EXTERIOR BLDG. AND SITE LIGHTS (150 VA EACH):
RANGE (8000 VA):
HEATING / A/C (HEATING IS LARGER LOAD):
HEATING (BASEBOARD ELECTRIC):
HEATING / A/C (HEATING IS LARGER LOAD):
WATER HEATER (NON-SIMULTANEOUS 4500 W ELEMENTS):
DISPOSAL OUTLET (1/2 H.P., 1176 VA):
REFRIGERATOR OUTLET (1500 VA):
DISHWASHER OUTLET (1/2 H.P., 1176 VA):
WASHER (1/2 HP, 1176 VA):
DRYER (6000 VA):

1	VA	X	814	SF	=	814	VA
180	VA	X	50	SF	=	9000	VA
150	VA	X	30		=	4500	VA
8000	VA	X	1		=	8000	VA
8000	VA	X	1		=	8,000	VA
0	VA	X	0		=	0	VA
0	VA	X	0		=	0	VA
4500	VA	X	1		=	4500	VA
1176	VA	X	1		=	1176	VA
1500	VA	X	1		=	1500	VA
1176	VA	X	1		=	1176	VA
1176	VA	X	3		=	3528	VA
6000	VA	X	3		=	18000	VA
TOTAL A						60194	VA
						251	VA

SERVICE EQUIPMENT SIZING

(BASED ON 100% LOADING)

TOTAL A / 240 V / 100% (1 PHASE, 60 CYCLE): 60194 / 240 / 1.00 = 251 A

CONCLUSION: USE (1) 320 A SERVICE

Wallace
ARCHITECTS L.L.C.

DUPLEX UNIT – 3 BEDROOM UNIT PANELS

(1) ELECTRICAL CIRCUITS - 120/240V, Single Phase

<u>Description</u>	<u>Voltage</u>	<u>Min. Breaker Size</u>	<u>Min. Copper Wire Size</u>
Main (2)	240V	150A MLO	#1-3 W/G
Kitchen Small Appliance Circuits (2 Circuits)	120V	20A	#12 - 2 W/G (3)
Lighting, Convenience Outlet and Misc. Circuits	120V	20A	#12 - 2 W/G (3) (7)
Furnace Circuits	240V	70A	#4 – 3 W/G (4) (6)
Water Heater Circuit	240V	30A	#10 - 3 W/G (5) (6)
Range Circuit	240V	40A	#8- 3 W/G (6)
Condensing Unit Circuit	240V	30A	#10 - 3 W/G (4)
Washer Circuit	120V	20A	#12 - 2 W/G
Dryer Circuit	240V	30A	#10 - 3 W/G

NOTES:

- (1) Number of circuits and breakdown of circuits shall comply with N.E.C. and all Local and State codes.
- (2) Main size and service conductor size shown is for standard Unit. This and other mains shall comply with N.E.C. (Smaller wiring acceptable if per N.E.C. by type.)
- (3) Small appliance circuits in Kitchen and other 120V designated circuits shall be 20A #12 - 2 with ground.
- (4) Electrical Contractor shall verify and coordinate with HVAC Contractor the exact type service required by furnace and condenser to be supplied for this project, and provide breaker and wiring accordingly.
- (5) Use 30A circuit for 2-4500W non-simultaneous element water heaters.
- (6) Electrical Contractor shall provide and install power cords for all ranges, and disposals. Furnaces, water heaters, and condensing units shall be provided with other disconnecting means.
- (7) Switch legs only may be #14-2 with ground.

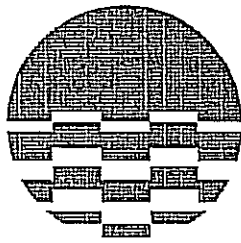
COMMUNITY BUILDING PANEL

(1) ELECTRICAL CIRCUITS - 120/240V, Single Phase

<u>Description</u>	<u>Voltage</u>	<u>Min. Breaker Size</u>	<u>Min. Copper Wire Size</u>
Main (2)	240V	400A MLO	2 Sets 3/0 - 3 W/G
Common Area Convenience Outlet Circuits	120V	20A	#12 - 2 W/G (3)
Lighting Circuits	120V	20A	#12 - 2 W/G (3) (7)
Kitchen Counter Outlet Circuits	120V	20A	#12 - 2 W/G (3)
Water Heater Circuit	240V	30A	#10 - 3 W/G (5) (6)
Furnace Circuit	240V	50A	#8 - 3 W/G (4)
Condensing Unit Circuit	240V	30A	#10 - 3 W/G (4)
Washer Circuit	120V	20A	#12 - 2 W/G
Dryer Circuit	240V	30A	#10 - 3 W/G
Range Circuit	240V	40A	#8 - 3 W/G (6)

NOTES:

- (1) Number of circuits and breakdown of circuits shall comply with N.E.C. and all Local and State codes.
- (2) Main size and service conductor size shown is for standard Unit. This and other mains shall comply with N.E.C. (Smaller wiring acceptable if per N.E.C. by type.)
- (3) Common area circuits and other 120V designated circuits shall be 20A w/#12-2 W/G.
- (4) Breaker and wire size determined by total ampacity connected to circuit. Verify ampacity of furnace and condensing unit for exact sizing.
- (5) Use 30A circuit for 4500W non-simultaneous element operation and 40A circuit for 2-4500 watt simultaneous element operation, depending on operation of specific water heater approved for use.
- (6) Electrical Contractor shall provide and install power cord for disposal. Furnaces, water heaters, and condensing units shall be provided with other disconnecting means.
- (7) Switch legs only may be #14-2 with ground.



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Customer Installation Standards for Electric Service

Effective June 1, 2008

A transition period will exist from June 1 through December 31, 2008 in which installations may be approved and connected as long as they meet either the 2005 or the 2008 editions. Beginning January 1, 2009, only the 2008 edition of the Customer Installation Standards will be accepted.

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2008 Issue

Section 8 Underground Service and Installations

8.1 General Comments

Economic, physical and technical considerations normally dictate the use of overhead distribution facilities in the Company's operating area. Customer may either elect or be required to take underground electric service. The Customer will be required to pay the additional cost, if any, in excess of the cost of an overhead system. Consult the Company.

Single-phase underground service will normally be 120/240 volts, three wire. The service from three phase pad mount or vault type transformers should be restricted to 120/208Y or 277/480Y volts, four wire. The Company's typical installation includes a pad mount transformer. Occasionally, other type transformers may be required. Consult the Company for details.

8.2 Ownership of Facilities

The Company will generally own and operate all facilities on the Company side of the point of delivery. The Company will own metering equipment and selected equipment located in vaults. Specific ownership requirements for residential and non-residential installations can be found in Section 8.6, Requirements for Obtaining Underground Residential Service, and Section 8.7, Requirements for Commercial, Industrial, and Other Non-Residential Underground Service.

8.3 Initial Clearing of Property for Service

The Customer

- requesting a new service is responsible for preparing the initial right of way.
- Shall notify One Call 48 hours before digging and shall have One Call locate all underground facilities before digging. (Call 1 -888- 258-0808 or consult telephone directory for phone number of local One Call.)
- shall be responsible for performing all grubbing and clearing as instructed by the Company on all property owned by the Customer
- will be responsible for removal of all debris shall bring the easement to final grade prior to any installation of facilities by the Company
- Shall be responsible for costs associated with raising, lowering or relocating facilities due to changes in the surface grade after installation of the Company's facilities.

At the Company's option, the Company may prepare the right-of-way and will be reimbursed by the Customer

8.4 Agreement for Underground Service

The Customer may be required to execute an agreement that will set forth ownership and maintenance responsibilities, characteristics of the services covered, and any financial arrangements. An agreement may also be required with the Individual Customer in order for the Company to provide underground service.

8.5 Specification Requirements

All facilities, which the Company will own and operate, shall be installed either by the Company or to the Company's specifications. The Company will not accept ownership of any underground facilities that do not meet the Company's specifications.

8.6 Requirements for Obtaining Underground Residential Service

8.6.1 General Comments

Underground residential service may be available from either overhead or underground facilities. The Customer shall provide, install, own and maintain the conduit from the meter socket (minimum size D 4 1/8" X W 11" X H 15 1/2") flush against the wall, down to a point thirty inches (30") below ground in accordance with Company specifications. A 36" bend will be required See Section 8.10.2.2 and Drawings SS8.6-2 and SS8.6-7. Installation of the conduit through the footings shall conform to the requirements of Drawing SS8.6-4. (Note: The foundation may be required to have a blocked out area for conduit in order for conduit to be flush with wall when installed.) Consult the Company for information if conflict arises.

Typically, the Customer pays for all costs above the value of an overhead service installation. The Customer may have the option to either (1) have the Company install the complete service or (2) do part of work. Contact the Company for details.

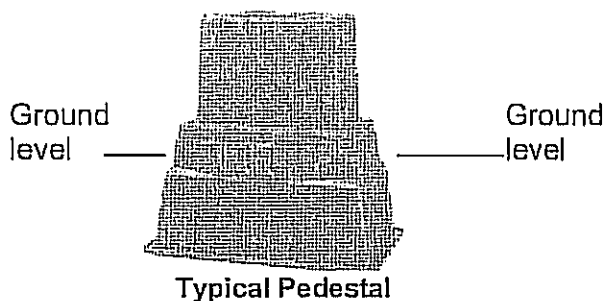
When a complete conduit system is used, the Customer shall provide a continuous run of conduit with a minimum size of 2.5" (except in Arkansas where 2" is the minimum) for 200 ampere single phase service. See Drawing SS8.6-3 for underground service from an overhead source and Drawing SS8.6-2 for an underground service from an underground source. Drawing SS8.6-1 contains additional requirements for conduit. Conduit is always required in places with restricted access, (under or potentially under concrete driveways, sidewalks, patios, flowerbeds, etc.) and in many locales with soil subsidence or other restrictive conditions, consult the Company for details. Drawing SS8.6-5 shows conduit encased in concrete when such an installation is required. Consult the Company for details. The Company shall furnish and pull the underground conductors in the conduit system. Refer to Section 8.10, Conduit, for more information.

8.6.2 Underground Electric Service for New Residential Subdivisions

Contact the Company at the earliest date possible so that,

1. the Company can plan the distribution system, design any applicable street lighting feed points or other lighting systems, determine the meter and service locations, and
2. Agreement can be reached on the manner of paying the additional cost, if any, in excess of the cost of any overhead system.

Underground facilities will be installed on the front lot easement with pad mount transformers and pedestals where needed. Easements for underground facilities shall be described on Company's right-of-way agreement forms and furnished to the Company as outlined by Company policy and/or on dedicated recorded plat. Refer to Section 6.2, Right-of-Way for Service Facilities.



Customers within an underground subdivision adjacent to an overhead distribution system may be served with an underground service from the overhead system.

8.6.3 Underground Service from an Underground Distribution System.

A residential Customer may elect or be required to take electric service through an underground service from an underground distribution system and will be required to pay in some manner the additional cost, if any, in excess of the cost of an overhead system.

8.6.4 Underground Service from Overhead Distribution System

The Customer may elect or be required to take service through an underground service from an overhead distribution system and will be required to pay in some manner the additional cost, if any, in excess of the cost of an overhead service.

New Customers in new residential areas taking underground service will be required to pay the additional cost, if any, in excess of the cost of an overhead service. The cost of the underground service is the installed cost of the cable plus conduits, and pedestals, if required. Consult the Company for Information on situations that require a conduit system.

8.6.4 Underground Service from Overhead Distribution System (Continued)

In general, a pedestal is not required when a Customer is taking underground service from an overhead system. Pedestals are normally required when two or more Customers are taking underground service from the same pole in an overhead distribution system.

Two or more conduits may be installed on the same pole in accordance with the limitations in the Section 8.10.2.1, Conduit Installation General Comments, with the approval of the Company. The conduit for the pole shall be provided by the Customer and installed by the Company. The elbow at the base of the pole and adjacent to the house shall be provided and installed by the Customer. Refer to Section 8.10.2.2, Conduits Used In Residential Underground Installations. The cost of the pedestal and riser installation may be divided among the Customers to be served from those facilities or be paid for by the Developer.

8.6.5 Underground Service Replacing Existing Overhead Service

An existing Customer served with an overhead service may request the removal of the overhead service and installation of a new underground service. If the existing service is of adequate size to serve the load, the Customer is responsible for paying the total estimated cost of the job plus the removal cost less salvage. Where the existing service is not adequate to serve the increased load, the Customer shall pay the difference between the estimated cost of an underground service and a new overhead service. Consult the Company for information and specifications.

8.7 Requirements for Commercial, Industrial, and Other Non-Residential Underground Service

8.7.1 Junction Box Requirements

If the Company owns the service, the Customer shall supply a UL listed Company approved junction box or a UL listed Company approved alternative with a locking mechanism to secure it suitable for a Company padlock. Junction boxes used for various situations are shown in Drawing SS11.6-3, Drawing SS11.6-4, Drawing SS11.6-5, Drawing SS11.8-3, and Drawing SS11.8-4. The Customer shall supply UL listed connectors inside, which will be the point of common coupling between Company and Customer. These connectors shall be sized no less than 125% of continuous load, plus 100% of the non-continuous load. Any ampacity adjustment shall be made in accordance with the terminal rating requirements of Section 110.14 of the 2002 NEC. Connectors shall be suitable for both copper and aluminum. Insulated multi connector block or bus bar type shall be used. Bus bar type shall be fastened to the back of junction box. A durable marking for color or word coding shall be installed. The neutral conductor shall have a white marking or a suitable identifying mark. The next section of the terminals shall have color suitable for applicable voltage. Plastic anchors are not allowed.

When the Customer provides, owns, installs & maintains the secondary wire to the Company's transformer, a Junction box is not required. Consult the Company for the requirements in your area.

Table 8.7.1-1: Guideline for Junction Box Use with Multiple Circuits

No of conductors allowed per phase		Box Dimensions		
Customer	Company	Depth	Width	Height
(2)#250-500 Cu or less	(2)A366-A500 or less	12"	30"	36"
(3) #500Cu	(3)A500-A750	15"	48"	48"

For larger sizes consult the Company

8.7.2 Underground Service from Underground Systems

Underground secondary service from an underground distribution system may be provided to non-residential Customers. It is the responsibility of the Customer to install, own, and maintain the transformer / equipment pad or vault. This includes both single and multi-meter installations. See Drawing SS8.7-1 and Drawing SS11.6-5.

Any underground primary conductors required to serve the Customer will be owned by the Company. The Customer shall pay the difference between the cost of the Company's underground facilities and the cost of the Company's overhead facilities, if any, to serve the load. Refer to Section 8.10.2.3, Conduit Used In Commercial, Industrial, and Other Non-Residential Underground Installations, to Section 8.11.3, Conductors Used in Underground Non-Residential Installations, to Section 8.14, Transformers Used In Underground Installations, and to Section 10.5, Transformer Vaults. Consult the Company for additional information, specifications, and contract forms for underground installations.

8.7.3 Underground Secondary Service from Overhead Systems

Underground secondary service from an overhead distribution system may be provided to non-residential Customers. The Company will install any conduits and conductors to be attached to its poles. Refer to Section 8.10, Conduit and Section 8.11.3, Conductors Used in Underground Non-Residential Installations. Consult the Company for additional information, specifications, and contract forms for underground installations.

8.8 Underground Service from an Underground Network

Specific portions of the distribution system in downtown areas with highly concentrated loads have been designated as Underground Network Areas. Area boundaries may be obtained from the Company. Service for individual loads up to 300 kVA may be provided directly from the secondary system. Voltages available are single phase, two or three wire, and three phase, four wire, and 120/208 volts. In some networks, 277/480-Volt service may be available. In Mississippi and Arkansas 125/216 Volt service may be available. Consult the Company for available voltage at specific locations. Larger loads may require installation of one or more transformers, which shall be located in a suitable vault furnished by the Customer. The Company and authorities having jurisdiction shall approve the vault and its location. Contact the Company to arrange for such an installation or to arrange for service at other voltages.

The location of the point of termination of the service run shall be approved by the authorities having jurisdiction and by the Company. Consult the Company for service requirements.

8.9 Underground Electric Service for Mobile Home Parks

The Company will provide underground electric service to approved Mobile Home Parks. The Customer shall pay the difference between the overhead and the underground systems. (Approved Mobile Home Park shall mean one that is permanent, rather than temporary, and shall have permanent central water and sewage systems.)

Other than in a mobile home park, service to individual mobile homes will be made at individually installed meter pedestals. The Customer shall supply the pedestal. Consult the Company for information. See Drawing SS4.6-3 and Drawing SS4.6-4 for details.

Also see Section 4.6 Services for Individually Located Mobile Homes and Travel Trailers and Section 4.7 Services for Mobile Home Parks.

8.10 Conduit

8.10.1 General Comments

Conduit is always required in places with restricted access, (under or potentially under concrete driveways, sidewalks, patios, flowerbeds, etc.) and in many Networks due to local soil, underground congestion of pipes or other utilities service lines, or other conditions, consult the Company for details. The conduit may be rigid/ intermediate metal steel, rigid aluminum, Schedule 40 PVC or Schedule 80 PVC in appropriate applications. All conduits shall be of such size and type to meet the requirements of the Company and the Company specifications for the selected cable to serve the Customer. All bends and elbows shall be a minimum 36" radius. The Customer's anticipated future load requirements should also be considered when sizing cable and conduit to serve the Customer's present requirements.

8.10.2 Installation

8.10.2.1 General Comments

All conduits shall be installed according to Company requirements. Normally, conduits on a Company owned pole will be limited to one. More than one conduit may be allowed in certain circumstances, with prior Company approval. Customers requesting additional conduits may be required to provide a separate support structure for the conduits and a suitable attachment point for the Company owned overhead service conductors. When more than one conduit is allowed, they shall be installed adjacent to each other, and not cover more than one quarter of the pole circumference. At Company's option an above ground pedestal may be installed to accommodate additional services.

Due to the quality of the soil in some portions of the Company's service area, concrete around the conduit may be required. If concrete encased conduit bends are required at the base of the pole, the concrete shall be formed to prevent its touching the pole and a fibrous separator is required between the pole and the concrete.

8.10.2.2 Conduits Used in Residential Underground Installations

Services installed in conduits for residential Customers shall conform to Drawing SS8.6-2 or Drawing SS8.6-3. Also see Drawing SS8.6-1. The Customer shall install the conduit at a minimum depth of 30 inches, with the end of the elbow coming up at a point 7 inches from the base of the pole for service from an overhead source. The Customer shall install the conduit to a point 24 inches from the side of the transformer pad for service from an underground source. The Customer shall mark the end of the cable or conduit by a stake or other agreed upon method.

In general, the conduits shall be installed such that when the conduit run has more than three 90-degree bends, including riser bends, (riser bends shall be 36 inches in radius), and the Customer shall install a pull box. The pull box shall be of a design that conforms to Company specifications. It shall be installed as advised by the Company. Also consult the Company when conduit or cable length runs exceed 200 feet. A pull box may be needed when conduit runs exceed 200 feet. Long cable runs may also require bigger cable and conduit to compensate for voltage drops.

When the source is an overhead system, the Customer shall supply the conduit riser in accordance with Company specifications. The Company will install the riser on the pole. The Company will pull the conductors in the conduit system.

When two or more services originate from one Company pole having overhead facilities, means of accommodating multiple services may be installed by the Company. Refer to Section 8.6.4.

8.10.2.3 Conduit Used in Commercial, Industrial, and Other Non-Residential Underground Installations

The proposed load, cable sizes and conduit sizes should be given consideration when determining the pulls and lengths of conduit run. The elbow radius for all conduit sizes will be 36 inches. The Company shall specify the number, design and location of pull boxes and total length of conduit runs to be installed. If pull boxes are required, they shall be of sufficient strength, as approved by the Company, to support all expected loads that may be imposed on the structure, including local traffic. All spare conduits, if necessary, will conform to the requirements set forth in Section 8.10.4, Spare Conduits. See Drawing SS8.7-1 for a typical primary service to a single pad mount transformer serving commercial or industrial Customers. Table 8.10-3 contains a recommended conduit guide for approved conductor sizes.

Table 8.10-3: Recommended Conduit Guide for Typical Underground Conductor

Primary Conductors

Size	Voltage	One Cable	Three(3) Cables
#2 Al	15kV	2"	4"
1/0 Al		2"	4"
4/0 Al		2"	5"
750 Al		3"	6"
750 Cu		3"	6"
#1 Al	25kV	2"	5"
2/0 Cu		3"	5"
750 Al		3"	5"
750 Cu		3"	5"
1/0 Al	35kV	3"	5"
750 Al		3"	6"
750 Cu		3"	6"

Secondary Conductors,

#4 Al Triplex	2.5" (2" in Arkansas only)
1/0 Al Triplex	2.5" (2" in Arkansas only)
4/0 Al Triplex	2.5" (2" in Arkansas only)
350 Al Triplex	3"
500 Al Triplex	3"
750 Al Triplex	5"
1000 Al Triplex	5"
1/0 Al Quad	3"
4/0 Al Quad.	3"
350 Al Quad.	3"
500 Al Quad.	4"
750 Al Quad.	5"
1000 Al Quad.	5"

*The recommended conduit size conforms to the Company standards for conduit used on the Company system. Consult the Company during the design process to ensure that the proposed conduit system meets Company requirements.

8.10.3 Types of Conduit

8.10.3.1 General Comments

All conduits shall be rigid/intermediate metal steel, rigid aluminum, and/or rigid nonmetallic conduit with an U. L. label. Local Building Codes may be restrictive in the type(s) of conduit permitted. Consult authorities having jurisdiction before choosing conduit material.

8.10.3.2 Rigid/Intermediate Metal Conduits

Rigid intermediate metal steel and rigid aluminum conduits (with a U. L. label) may be used. Rigid aluminum conduit (with a U. L. label) can be used above grade only. In certain cases, when steel conduit is used below final grade, it shall be completely

encased in a minimum of 4" of red concrete according to Drawing SS8.6-5 or wrapped with a material approved by the Company to provide corrosion protection.

8.10.3.3 Rigid Nonmetallic Conduits

Rigid Polyvinyl Chloride (PVC), Schedule 80, (with a U. L. label), may be used as a conduit riser, where building codes permit, under the meter socket, and as primary, secondary, and service risers on distribution poles. Rigid nonmetallic conduits may be used in inaccessible areas and below final earth grade. Generally, nonmetallic conduit installed below grade shall be at least Schedule 40 PVC (with a U. L. label). In certain cases, concrete encasement may be required according to Drawing SS8.6-5.

8.10.3.4 Conduit Fittings

Conduit fittings to join the continuous lengths of conduits and to join the continuous lengths to bends of the same material shall be of the same material as the conduits and shall be U. L. approved and meet Company specifications. Fittings to join rigid nonmetallic conduit to rigid metal or intermediate metal conduit at transitions such as from below grade to above grade shall be U. L. approved and meet Company specifications.

8.10.4 Spare Conduits

The Company recommends the installation of spare conduits. Spare conduits will conform to all conduit requirements as set forth in these Service Standards.

In cases where the primary system is three phase and radially fed, a minimum of one spare elbow shall be installed with the primary conduit in the transformer pad, vault or socket when a complete spare conduit system is not provided. See Section 10, Transformers for further explanation of transformer installations.

8.11 Conductors

8.11.1 General Comments

The Company will generally own and operate all conductors on the Company side of the point of delivery. If the Company's facilities do not exist to serve the Customer's load, the Customer shall be required to pay for the difference between the cost to extend the line as an overhead distribution facility and the actual cost to install underground facilities. Specific requirements are defined in the Company's line extension policy. Consult the Company for details.

8.11.2 Conductors Used in Underground Residential Installations

Normally conductors installed for permanent service to single residences shall be 4/0 aluminum. Installations shall conform to Section 8.10, Conduits Used in Residential Underground Installations.

8.11.3 Conductors Used in Underground Non-Residential Installations

The maximum size conductor inside a single-phase transformer cabinet is 500 kcmil. The maximum size conductor inside a three-phase transformer cabinet is 1000 kcmil. Consult the Company in advance for consideration of requirements that exceed these limitations or where parallel of Conductors

are required. More information is available in Section 13.4, Service Entrance Conductors.

8.12 Termination of Customers' Conductors in Company's Transformers

The Company shall furnish terminals for secondary conductors when Company's standard, sized to ampacity, conductors are used. The Company will normally bolt all terminals to the connectors of the transformer. The phasing and proper conductor length will be the responsibility of the Customer regardless of who installs the terminals or bolts the terminals to the transformer connectors. More information is available in Section 13.4, Service Entrance Conductors

8.13 Metering for Underground Service

The meter installation shall be located outside of a building or structure. Refer to Section 11.5, Location of Meter Installations. Disconnect switches or a main breaker panel shall be mounted within 2 feet of the side of the meter socket. Prior approval shall be obtained from the Company for the installation of any service equipment directly below the meter sockets. Also see NEC 230.70.

If a single transformer-rated metering installation is to be used in connection with a three-phase pad mount transformer installation, the meter will typically be installed on the pad mount transformer. Special metering options may be available with approval of the Company. The Customer shall bear the additional cost made necessary by the special metering options.

8.14 Transformers Used in Underground Installations

8.14.1 General Comments

The Company will generally own and operate all transformers on the Company side of the point of delivery. Pad mount transformers shall be installed in accordance with Company specifications. Vaults, enclosures, etc. (when used) will be at Customer's expense and shall conform to Company specifications. See Section 10, Transformers Vaults and Substations. Consult Company for specific details.

8.14.2 Transformer Pads or Slabs

The Company will generally furnish single-phase transformer pads. Three phase transformer pads / slabs shall be provided by the Customer, and shall conform to Company specifications. When supporting foundations are needed for the transformer installation the Customer will be responsible for the design of the supporting foundation and for obtaining approval of the design by the Company. Consult the Company.

Section 10 Transformers, Vaults and Substations

10.1 General Comments

When large concentrated loads or long distances are encountered, it is frequently necessary to install transformers on or in the Customer's property. In such cases, high voltage conductors are taken directly to the vault or transformer. Whether transformers are to be installed outside, on, or in the Customer's property, the Customer shall provide a suitable location. The Customer shall consult the Company regarding the location, size, and construction of the facilities during the design and planning phase. Installations will vary so widely that the Customer shall consult with the Company so that arrangements can be worked out to the benefit of both parties.

In the interest of public safety, it is imperative that all transformers be readily accessible to the Company at any time of the day or night. In all but the most unusual cases, the Customer shall equip each door (or other barrier) between the transformer and the nearest public access with locks that can be opened by the Company. These locks will be provided by the Company and installed by the Customer.

For ready access to unenclosed pad mount transformers, a minimum clearance of three feet from the side and back edges of the pad and twelve feet from the front of the transformer shall be maintained at all times. See **Drawing SS10.1-1** for other restrictions on transformer placement. The Company, at its option, may require a barricade to be installed to prevent damage to the meters or encroachment on the clearances (driveways, parking lots, etc.)

The Company will not energize its facilities until the installation is:

1. made in accordance with manufacturer recommendations and engineering standards,
2. approved by authorities having jurisdiction, and
3. acceptable to the Company.

Adequate access and support to accommodate line trucks or other necessary lifting and hauling equipment shall be provided and maintained by Customer to allow for maintenance, operation or replacement of equipment at all hours.

10.2 Fences, Screen Walls, Decorative Walls

The Company will not construct, reimburse the Customer, or accept ownership and maintenance responsibility of any fences, screen walls, or decorative walls around pad mount transformer installations or vaults. Prior written approval shall be obtained from the Company before the Customer constructs such walls or fences. Adequate space and means of ingress and egress (such as wide removable panels) shall be provided to operate, maintain, remove and replace transformer, metering or other equipment located behind the fence or wall. See **Drawing SS10.1-1**.

10.2 Fences, Screen Walls, Decorative Walls - Continued

The Company will construct or reimburse the Customer and accept ownership and maintenance responsibilities for chain link fences meeting Company specifications which are required for protection around ground type substations.

10.3 Types of Transformer Installations

The Company provides electric service from one of the following general transformer installations:

1. Pole mounted transformers, one or cluster of two or three transformers
2. Two pole transformer platform
3. Ground substations, fenced
4. Padmount transformers,
5. Transformer vaults, usually on the Customer's premises.

10.4 Pad Mount Transformers

Pad mount transformers are generally provided, owned and maintained by the Company for underground service to residential subdivisions, mobile home parks, shopping centers, and commercial and industrial Customers. Consult the Company for requirements and availability in totally underground systems.

For pad-mount transformers in non-residential applications, the Customer will provide the conductors to the transformer secondary terminals.

10.5 Transformer Vaults

Transformer vaults are generally provided, owned, and maintained by the Customer on the Customer's premises and constructed in accordance with the Company's specifications and all applicable codes. Vaults should be located where they can be vented to the outside air without ducts. Vaults shall be provided with suitable hasps for the Company's padlock. These locks will be provided by the Company and installed by the Customer.

The Company will generally provide and install the transformers and primary cables in the Customer's vault. The Customer will provide the transformer vault, service conduits, and extend the service cables into the vault. The cable extensions shall have sufficient length of slack cable for the Company to connect them to its facilities. The meter shall always be located outside the transformer vault.

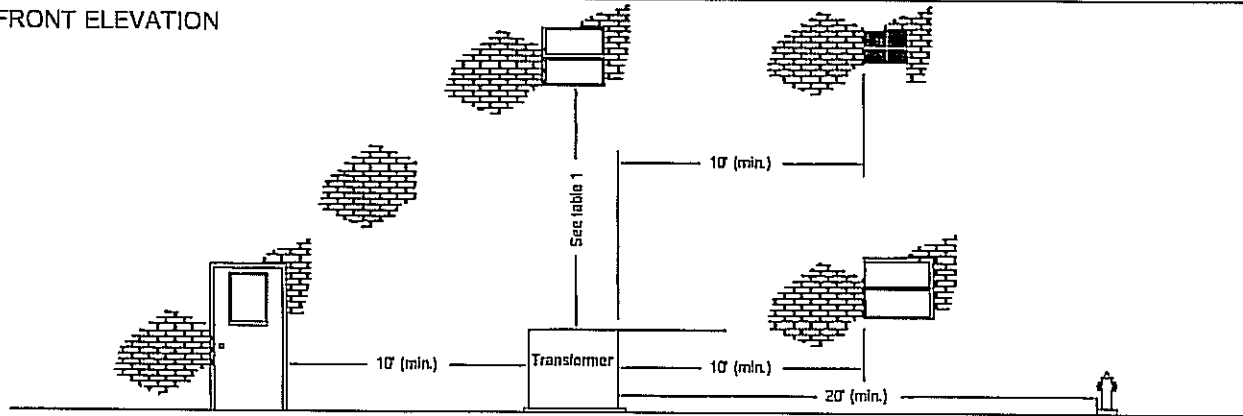
Consult Company so that satisfactory plans and specifications may be worked out for each individual case.

10.6 Termination of Secondary Conductors to Transformers for Non-Residential Services

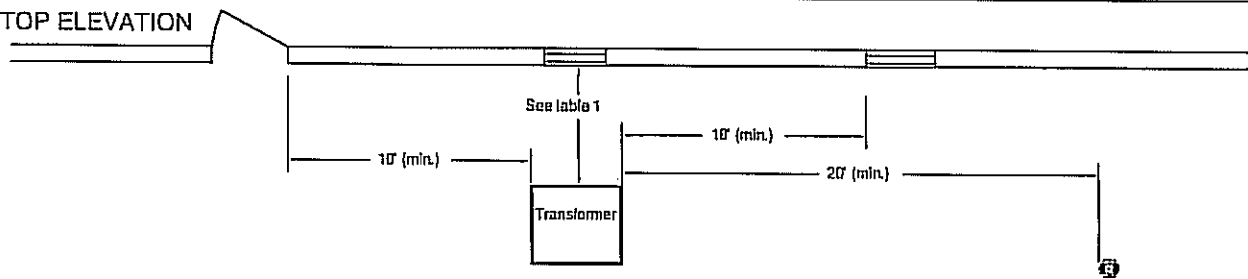
Terminals for secondary conductors shall be installed as provided in Section 8.12, Termination of Customer's Conductors in Company's Pad-Mounted Transformers.

The phasing, sizing and proper length of conductors is the sole responsibility of the Customer. The Customer shall also be responsible for properly marking the phases. The Company will generally make connection of the terminals to the connectors of the transformer.

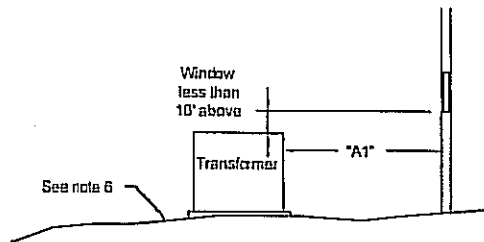
FRONT ELEVATION



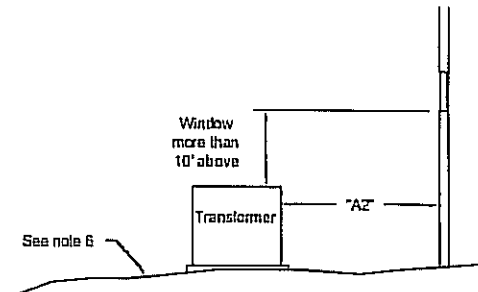
TOP ELEVATION



SIDE ELEVATION OPTION "A1" in Table 1



SIDE ELEVATION OPTION "A2" in Table 1



NOTES:

1. The transformer shall be installed so that the front of the unit does not face the building.
2. Adequate passageways to accommodate line trucks or other necessary lifting and hauling equipment shall be provided to allow for maintenance, operation or replacement.
3. No portion of the the building shall extend over the transformer.
4. The 20' minimum dimension to the fire hydrant also applies to fire escapes.
5. The 10' minimum dimension to the doorway also applies to open stairways.
6. Drainage of the area surrounding the transformer shall be away from the building.
7. There shall be no above ground obstructions such as cooling towers, shrubs, plants, or fences, within 12' of the front of the transformer pad or within 3' of the sides or back of the transformer pad.
8. It shall be the Customer's responsibility to comply with any insurance regulations, building codes, and local ordinances affecting the installation.

TABLE 1

STRUCTURES	"A1"	"A2"
STEEL OR MASONRY	10'	3'
WOOD	10'	10'

2	4/02	UPDATED: CUSTOMER INSTALLATION STANDARDS TEAM	DAT	
1	8/17/99	REFERENCE DRAWING TO DAS01201	DAT	LIKE
NO.	DATE:	REVISION	BY:	APPR:

ENTERGY SERVICES, INC.	
LOCATION OF TRANSFORMERS AND OTHER OIL FILLED EQUIPMENT	
APPROVED BY: JDS	DATE: 04-03-95
CHECKED BY: LKE	SCALE: NONE
DRAWN BY: VSS	
No. SS 10.1-1	
PLOT 1=1	SH. 1 OF 1

Section 11 Metering Installations and Equipment

11.1 General Comments

11.1.1 Responsible Parties

The metering equipment is usually installed on the Customer's premises (on Customer owned building; pole or structure also see NEC 314.23 *Supports*) as part of the service entrance equipment, therefore provisions shall be made for it in the Customer's installation. The Company will provide, as required, meters, metering transformers, relays, color-coded cable and transformer-rated meter sockets. The type of equipment supplied will depend on the requirements of the applicable rate schedule and the Company's standard practices.

The Customer will be required to provide the Company with information regarding the total connected load. The Customer may be required to provide and / or install the meter socket, metering transformer enclosure and adequate attachments or devices for attaching Company's metering facilities to the building. (This may require running conduit through eaves of roof and other similar necessities that could alter the Customer's building.)

11.1.2 Meter Socket Specifications

1. All meter sockets have a UL label which signifies they meet ANSI C12.7 and UL 414.
2. All meter sockets shall be sealable and in serviceable condition.
(The Company recommends socket pans that provide a knockout in the front cover and flange inside for barrel-locking.)
3. On combination meter/ breaker boxes, the wires behind the breakers and the Company wires shall be secured behind separate barriers. Company personnel shall have access to Company wires without exposing the wires behind the breakers.
4. All sockets except residential single phase less than 320 Amps shall have a manual mechanical gang operated bypass switch. Horn bypasses and similar devices are not allowed. Service entrance wires shall enter and stay opposite of the by-pass switch. (Any commercial 100 amp service such as billboards and other non-critical small commercial services should consult with the Company.)
5. The lugs in 320 Amp meter sockets shall accept up to 500 MCM conductors.
6. For 5 terminal meter sockets, the 5th terminal shall be physically secured to the meter socket. It should be relocatable but shall be securely attached to the socket in the proposed operating position.
7. In accordance with all applicable codes, a socket shall be properly installed and used in the application for which it is designed. Load and supply wires shall not cross in the meter socket. Overhead sockets are required in overhead installations and underground sockets are required in underground installations. (Example of an inappropriate application: A three-gang meter socket installed on a duplex apartment building is not acceptable.) Meter pan socket shall be large enough to accommodate

conductor size see NEC 300.34 Conductor Bending Radius. For meter sockets in underground installations, minimum size shall be D 4 1/8" X W 11" X H 15 1/2 ". Customer shall properly seal all unused openings on the meter socket assembly.

8. If ring-type sockets are used, Customer shall supply a meter ring to secure the meter in the socket. The ring should be stainless steel.

11.1.3 Meter Transformer Enclosure Specifications

The Company specifies instrument transformer enclosures that accommodate the Company's equipment standards. These standards may differ from manufacturer's specifications if determined only by ampere ratings. Therefore, Customers or their agents should determine the enclosure size based upon the size and number of service conductors as well as ampere ratings. Instrument transformers shall be bolted to the back-plate and each shall be capable of being removed individually. The back plate is in addition to the back wall of the enclosure and shall be metal or 3/4" plywood. All enclosures should be rain-tight (NEMA 3R).

For 600 amps or below or single conductors of 750 MCM or greater and parallel conductors up to and including 500 MCM, the minimum requirements are:

Aluminum or 14 gauge G90 steel enclosure, 14"D x 32" W. X 40" H., with a back-plate, front cover that is hinged and sealing latches.

For 600 –800 amps or parallel conductors greater than 500 MCM, the minimum requirements are:

Aluminum or 14 gauge G90 steel enclosure, 14" D. X 32" W. x 54" H., with a back-plate, front cover that is hinged and sealing latches.

For 800 amps or parallel conductors greater than 750 MCM contact Company for requirements

Service connections cannot be made in an instrument transformer enclosure.

11.2 Meter Connections and Seals

The Company shall install the meters, seal all meters, and seal all instrument transformer enclosures. Except as noted below, only the Company and its authorized agents are permitted to break or replace a seal, or to remove or change a meter. Under certain conditions, and with specific approval of the Company, authorization may be obtained by a licensed electrical contractor to remove a Company meter seal. The contractor shall obtain approval prior to removing the meter seal, or notify the Company after doing so under unusual circumstances. Any infringement or violation shall be dealt with in accordance with the Company procedure for dealing with meter tampering.

Also see Section 7.7, 480-Volt Metered Service.

11.3 Meter Clearance

Meters and metering equipment enclosures shall be mounted in locations that will provide at least 15 inches clearance on all sides and at least three feet in front. Exceptions to this section must be approved by the Company. Equipment and clearances shall be within Customer's property. See Drawing SS8.6-6.

The additional requirements for distance between a gas meter and an electric meter are as follows:

- National Gas Code 2.7.2 Gas Meter Locations (c), Gas meters shall be located at least 3 feet (0.9 m) from sources of ignition.
- Office of Pipeline Safety, Part 192 Minimum Federal Safety Standard. #192.353 Customer meters and regulators: Location (c), which states that each meter installed within a building must be located in a ventilated space and not less than 3 feet (0.9 m) from any source of ignition or any source of heat that may damage the meter.

An electric meter is a possible source of ignition whether located inside or outside of a building.

11.4 Outdoor Meters

An outdoor meter installation is the Company's standard for all new installations and where practicable on rewired installations. (For example, locations inside porches or beneath carports are not considered as being outdoors.) To facilitate reading by both the Customer and the Company and to provide accessibility for testing, the Company requires that outdoor meters be mounted between five and six feet above finished grade.

11.5 Location of Meter Installations

In all cases, the Company designates the meter location. The Company should always be consulted to determine the meter location on any new building or renovation. For residential service, the meter is to be located on the outside of the building on the side of residences within three feet of the front wall and outside of fences on the side most economical to reach the Company's facilities. This location minimizes the Company's required access to the Customer's premises. The Company will endeavor to select a meter location that will be satisfactory and economical for the Customer and at the same time convenient to the Company in providing the necessary connections as part of the service entrance installation. See Drawings SS7.1-1 and SS8.6-4.

Prior written approval of the Company is required to locate the meter other than in the preferred location, and the Customer shall pay any and all appropriate charges. Approval of the Company to locate the meter elsewhere will not be given unless the meter is and will remain readily accessible. Construction of pools, decks, fences or any structure near, under or over electrical facilities may cause a code and / or safety violation and may require relocation of the meter, connection point and/or electrical facility at Customer expense. Consult the Company concerning all clearances.

11.5 Location of Meter Installations (continued)

The meter shall not be installed above or behind any piece of apparatus or machinery. The location should be such as to minimize the possibility of damage from moisture, vibration, dirt, mechanical damage and corrosive or dangerous fumes. The meter shall be in a safe location accessible to the Company at all hours.

In locations where the metering installation is difficult to access, the Company may require at its option, the use of the Customer's telephone line to access the meter for reading and programming.

11.6 Grouping of Meters

When more than one meter is involved, the meters shall be grouped at one location. Therefore, it is important that a meter location be selected which will provide ample space for the meters required. In-group installations, the Customer shall permanently mark both meter loops and service switches. **Permanently attached tags are required.** The lettering on each tag shall be 3/16 inch or larger and be either raised or incised on each tag. Each tag shall be riveted or glued to the meter loop or switch. The tags shall identify the space served by each meter and service switch; and will be for future reference when servicing or repairs are required.

Where the Customer furnishes Ganged Factory Bussed Meter Sockets, the Customer shall check with the Company for approval before purchasing. These shall have provisions for locking each individual meter space. These shall also allow for any one meter to be removed or serviced without disturbing the other meters. The metering Installation should be as tamper-proof as possible. It is important that the equipment be of good quality and strength so that corrosion and deterioration will not present security problems.

Where the Company provides underground service, all non-residential underground services for multiple meter arrangements shall terminate in a junction box. See section 8.7 Requirements for Commercial, Industrial and Other Non-Residential Underground Service for details of required junction box. Diagrams of typical meter installations and layout are shown in the drawings listed below.

Drawing No.	Description
SS11.6-1	Typical Multiple Meter (Field Assembled), OH Service.
SS11.6-2	Typical Multiple Meter (Pre-assembled), OH Service.
SS11.6-3	Typical Multiple Meter (Field Assembled), UG Service.
SS11.6-4	Typical Multiple Meter (Pre-assembled), UG Service
SS11.6-5	Typical Multiple Meter Three Phase Service

11.7 Meter Mounting Height

To facilitate reading, resetting and servicing, the preferred mounting height of a single meter or a single row of meters is 5 1/2 feet above the ground to center of the meter(s). It shall not be less than 5 feet and no more than 6 feet above ground to center of the meter(s).

The height of the meter may be increased to accommodate flood plains (see Drawings SS11.7-1 & SS11.7-2). At all times Customer shall furnish a permanent four foot by four foot (4' X 4') platform, five to six feet below the center of the meter with permanent rails around the platform and steps. Consult Company for details.

Where two meters are mounted vertically on a wall as a gang installation, the upper meter shall be mounted at least 5 1/2 feet to center above ground, and not more than 6 feet to center above ground. The lower meter shall be mounted so as to allow three inches clearance between meter sockets. Where more than two meters are to be installed as a gang installation, they shall be mounted in horizontal rows.

Individually metered apartment complexes may have meters installed in manufactured combination meter enclosure and switchgear assemblies. Such assemblies shall not have more than six horizontal rows of meters. When such assemblies are installed indoors or in enclosures, the center of the highest meter shall not be more than 6 1/2 feet above the floor and the center of the lowest meter shall not be less than 18 inches above the floor or bottom of enclosure. When such assemblies are mounted on the exterior walls of a building, the center of the highest meter shall not be more than 6 1/2 feet above finished grade and the center of the lowest meter shall not be less than 34 inches above finished grade. Assemblies mounted on the exterior walls of a building shall be rain tight. Where more than one meter shall of necessity be mounted vertically on a pole, the top meter shall be mounted no more than 6 feet to center above final grade. Additional sockets shall be mounted to allow three inches clearance between sockets and the center of the lowest meter shall not be less than 34 inches above final grade. The Company, at its option, may require a barricade to be installed to prevent damage to the meters or encroachment on the clearances (driveways, parking lots, etc.)

11.8 Types of Meter Installations

11.8.1 Self-Contained Metering Installations

Normally, residential and small non-residential loads are metered with self-contained meters.

Customers desiring three-phase service with loads above 200 amps should consult the Company concerning availability of self-contained meters. All three phase self-contained meters shall have a meter socket containing a by-pass switch. All three-phase, four wire, 120 V / 240 V self-contained meter installation shall have the high voltage leg clearly and properly identified at the service entrance and connected to the right-hand (line) side of the meter socket. See Drawing SS11.8-1 for wiring diagrams of the most common types of self-contained meters.

11.8.2 Instrument Transformer Installation

When in the Company's judgment the load exceeds the capacity of a self-contained meter (320 Amps), the Company shall provide instrument transformers and a transformer-rated socket. The Company will determine the type of metering to be used.

Unless specified by the Company, an instrument transformer enclosure (as described in Section 11.1.3) is required for all transformer-rated installations. The center of the enclosure shall not be less than eighteen inches above final grade and not more than six feet above grade. All transformer-rated sockets should be no more than 25 feet from the instrument transformer enclosure.

As the requirements involving this installation vary so much, it is not practical to describe requirements covering all installations. The Customer or contractor contemplating an installation of this nature shall consult with the Company as to the number, size, location of and provisions for mounting instrument transformers and metering enclosures. Upon request, the Company will furnish information regarding the type, dimensions and connections of metering equipment to be used. For larger installations it is essential that such information be obtained before wiring plans are completed.

All three phase, four wire 120V/240V transformer-rated installations shall have the high voltage leg clearly and properly identified at the service entrance. If the transformers are mounted horizontally, the high voltage leg should pass through the right-most transformer. If mounted vertically, the high voltage leg should pass through the bottom transformer.

11.8.3 Metering in Underground Network Areas

In underground network applications, special metering solutions are required. Consult the Company before purchasing any material or equipment.

11.9 Primary Metering Installations

Certain installations involve the use of large quantities of power where the Customer intends to use electricity without transformation or finds it convenient to own a distribution system and provide the transformers. In these cases the Company may provide service under one of the three options. (Note: In many cases, the Company does not provide the supporting structure and since each installation is unique, the Customer shall consult with the Company during the design phase of the proposed service.) The three options for furnishing service involving primary voltage delivery or metering are as follows:

1. Primary voltage delivery and metering: All service is delivered and metered at primary line voltage and the Customer owns and maintains all of the service transformers and substation installation, except for the metering equipment.
2. Primary voltage metering and secondary voltage delivery: All service is metered at primary line voltage and the Company owns some or all of the service transformers or substation installation. The Customer takes delivery at the secondary voltage level.

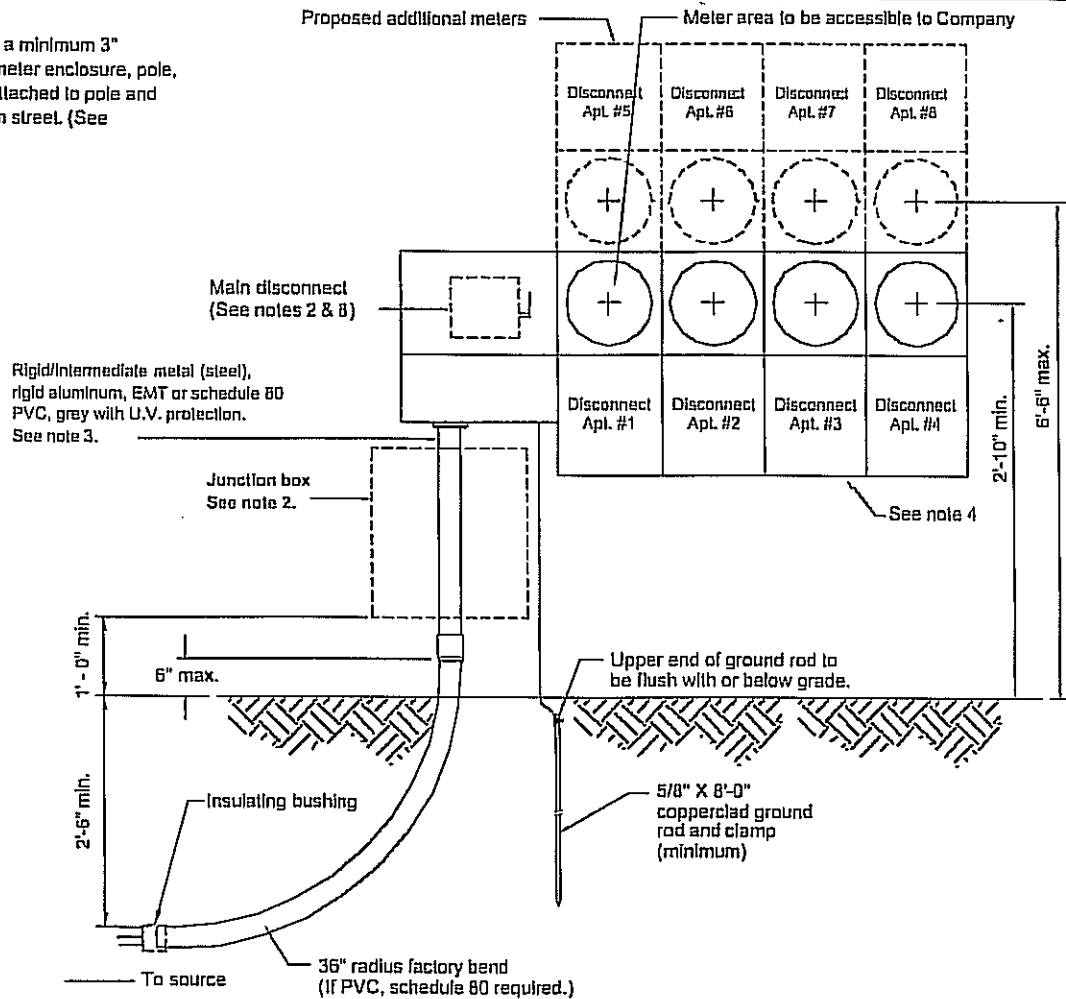
3. Primary voltage delivery and secondary voltage metering: All service is delivered at primary line voltage and the Customer owns and maintains all of the service installation on the Customer's premises, except for the metering installation. The meters are part of the service installation on the Customer's premises, but they are owned and maintained by the Company. Service is metered at the secondary voltage level.

Regardless of the option desired, when the metering installation is located on the Customer's premises, the Customer shall provide a suitable location without cost to the Company. The Customer shall also provide the Company suitable right-of-way over the premises for the Company's overhead primary circuit to the substation or in lieu thereof an underground service for primary voltage may be provided.

11.10 Meter Grounding

Grounding the metering installation is a safety consideration both for the Company and the Customer. The grounding connection shall be made in accordance with NEC Article 250 and any other referenced code and preferably in the meter socket. If the grounding connection is made anywhere other than the meter socket, the Customer shall be responsible for grounding continuity between the point where the grounding is made and the meter socket. (Also see Section 13.5, Grounding of Service Equipment.)

911 address shall be a minimum 3" lettering marked on meter enclosure, pole, or durable material attached to pole and should be visible from street. (See sections 1-3, 3, 4)



Notes:

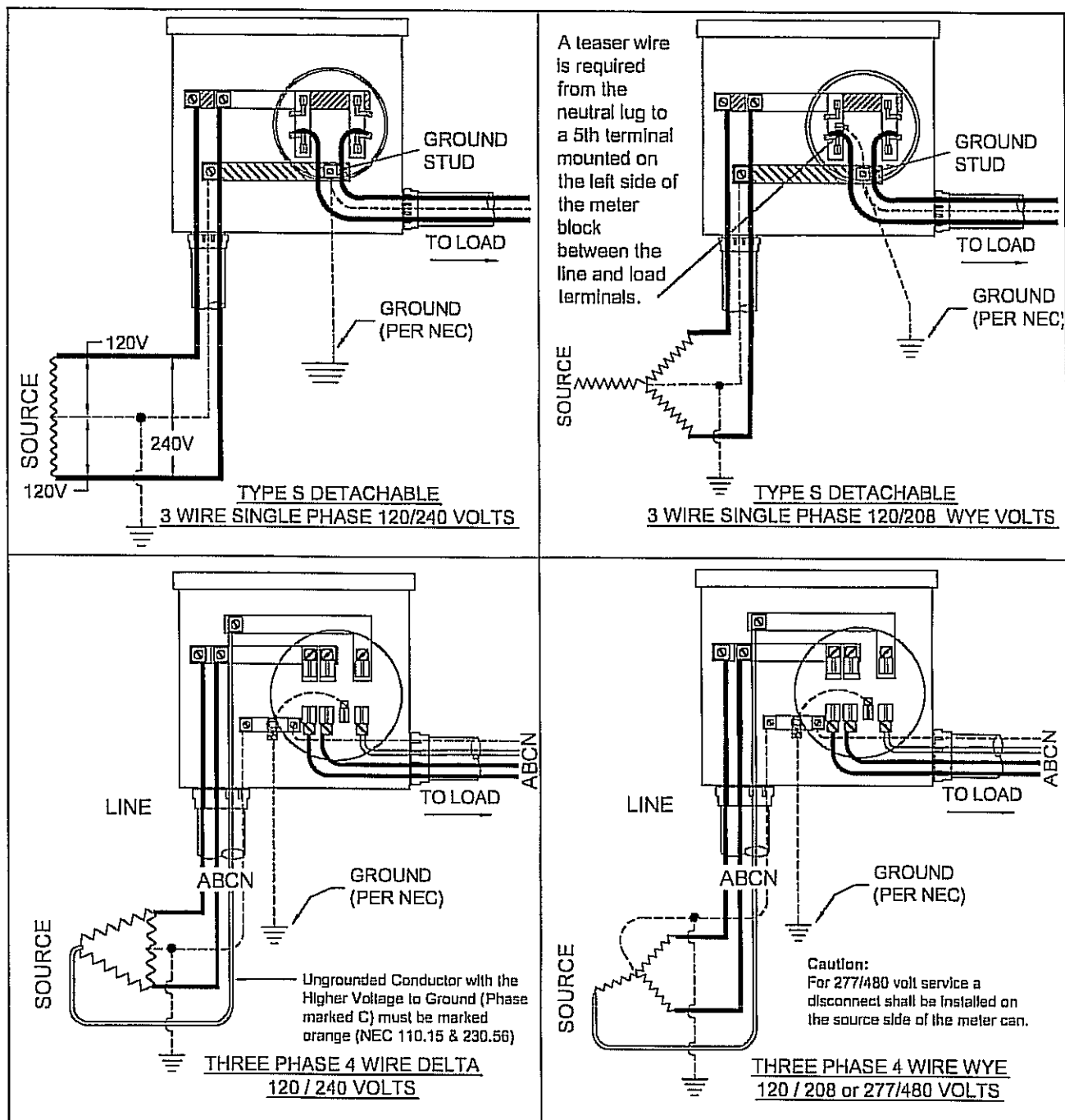
- Customer facilities shall comply with Company Standards, the National Electrical Code, and authorities having jurisdiction.
- When the Customer provides, owns, installs, and maintains the secondary wire to the Company's transformer, a junction box is not required. Consult the Company.
- All other material including conduit to be furnished, installed and maintained by the Customer.
- Each meter and disconnect shall be permanently and plainly marked to designate unit served.
- Customer to obtain meter location from the Company.
- Customer to obtain conduit size from the Company.
- If the meters are secured with meter rings or faceplates with sliding/falling latching mechanisms, the rings/latching mechanism shall be capable of accepting both a seal and a lock and shall be constructed sturdy enough to prevent access to meters without first removing seal and lock. The rings/faceplate shall fit well enough to prevent tampering with meters if locking mechanism is secured.
- A main disconnect is required for seven or more disconnects - (National Electrical Code 230-71(a)). A main disconnect is recommended in all cases for isolation of this disconnect/meter group from any other groups served by the same transformer. Utility connection shall be made on the line side of main disconnect or junction box.
- Each meter should have a separate cover that can be removed for repairs without disturbing other meters.
- The Customer shall install 80lb test non-metallic (manila or grass) pull line or bull tape in the conduit.
- Use masonry anchors to secure the meter socket assembly (plastic anchors are not allowed).
- If a current transformer (CT) installation is required, see SS11.6-3.
- See section 8.7.1 for junction box sizing and Customer supplied connectors.

5	3/05	UPDATED: CUSTOMER INSTALLATION STANDARDS TEAM	DAT	
4	4/05	UPDATED: CUSTOMER INSTALLATION STANDARDS TEAM	DAT	
3	4/02	UPDATED: CUSTOMER INSTALLATION STANDARDS TEAM	DAT	
2	5/99	UPDATED PER SERVICE STANDARDS TEAM	TKV	
1	6/98	UPDATED PER SOLUTION GROUP RECOMMENDATIONS	MCC	
NO.	DATE:	REVISION	BY:	APPR:

Call 48 Hours Before You Dig
1-888-258-0808

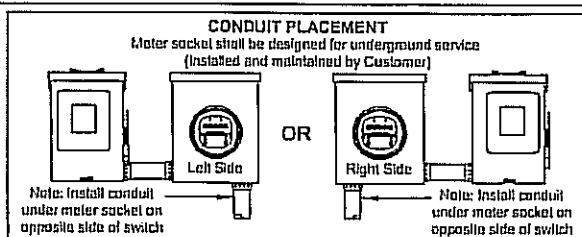
In locations with underground facilities, the Customer shall notify One Call and shall have One Call locate all underground facilities before digging. It shall be the responsibility of the Customer to stay clear of all underground facilities.

ENTERGY SERVICES, INC.	
CUSTOMER OWNED MULTIPLE METER (PRE- ASSEMBLED) UNDERGROUND SERVICE	
APPROVED BY: JDS	DATE: April 1998
CHECKED BY: LKE	SCALE: NONE
DRAWN BY: WINK-AJC	
No. SS11.6-4	
PLOT 1=1 SH. 1 OF 1	



Notes:

1. All diagrams on this drawing show connections when the switch is installed on the right side (see Right Side below) of the meter socket. If the switch is installed on the left side of the meter socket you will need to mirror this diagram (see Left Side below).
2. All sockets, except residential single phase less than 320 Amps, shall have a manual mechanical gang operated bypass switch.
3. Load and supply wires shall not cross in the meter socket (11.1.2.7)



ENTERGY SERVICES, INC.
**WIRING DIAGRAM CONNECTIONS
FOR UNDERGROUND
SELF CONTAINED METERS**

APPROVED BY: JRH DATE: APRIL 2005
CHECKED BY: JED SCALE: NONE
DRAWN BY: DAT



No. SS11.8-2

PLOT 1=1 SH. 2 OF 2

1	3/08	UPDATED: CUSTOMER INSTALLATION STANDARDS TEAM	DAT
NO.	DATE:	REVISION	BY: APPR:

Section 13 Customer's Service Installation

13.1 General Comments

Information regarding characteristics and availability of service, exact points of delivery and service entrance and location and type of service equipment shall be determined by consultation with the Company in planning any electrical work for new installations, for changes brought about by rewiring, for building reconstruction, or for increased load.

The Customer shall normally provide, install, own, and maintain all service cables, raceways, conduits, fittings, wires, fuses, main entrance and meter service switches or breakers, wire troughs, etc., on the Customer's premises beyond the point of termination of the Company's overhead service drop, or at the secondary terminals of the Company's transformer. (Exception: For residential Customers with underground service, the Company will own the service. See Section 8.6, Requirements for Obtaining Underground Residential Service.) The meters and metering apparatus including metering transformers will be furnished by the Company to adequately measure the Customer's load. The Customer shall pay for any additional metering requirements.

It is important that the Company be notified in advance of any substantial change in the Customer's equipment or wiring. Consultation with the Company is necessary to guard against the purchase of unsuitable equipment by the Customer, and possible damage to the Company's service equipment.

The construction of pools, decks, fences or any structure, near under or over electrical facilities may cause a code and / or safety violation. See Section 7.3 Clearances and drawings SS7.1-1 SS7.1-2 and SS7.2-1. Consult the Company concerning all clearances.

13.2 Inspection and Approvals

The wiring, electrical equipment and appliances of the Customer should be installed in accordance with the requirements of the latest NEC and of authorities having jurisdiction. **The Company does not inspect Customer premise wiring.** Where inspection is available, the Company requires the Customer to have the premise wiring inspected and approved by the authorities having jurisdiction before requesting connection to the Company's service. Where inspection is required, the Company is not allowed to connect to the Customer's installation until it has been inspected and approved by the authorities having jurisdiction.

13.2 Inspection and Approvals (continued)

The Company reserves the right to refuse connection to any new installation and/or to disconnect from any existing service, should the Company learn that the wiring is unsafe or that it has not been approved. The authorities having jurisdiction also have the right to require the Company by written notification to discontinue service to an installation which has been found unsafe. The Company is not liable for any damages incurred when electrical service is discontinued under order of the authorities having jurisdiction. The Company accepts no responsibility for injury or damage to the Customer's premises or to persons on the Customer's premises resulting from defective wiring or equipment.

13.3 Meter Requirements

Refer to Section 11, Metering Installations and Equipment.

13.4 Service Entrance Conductors

The class and type of service being rendered determine the number and size of service entrance conductors. The service entrance conductors shall be sized as prescribed by the NEC and / or the authorities having jurisdiction.

Meter sockets shall not be used as junction boxes see Section 8.7.1. Only one conductor per phase or neutral shall be connected to the terminals in meter sockets unless the terminals are designed for more than one.

For loads where parallel phase and neutral service entrance conductors are installed, the Customer shall consult with the Company early in the design phase to determine how many and sizing of conductors that may be brought out for their system.

1. For overhead transformer banks, the Company shall connect its service drop to a maximum of four conductors per phase using Customer furnished terminal pads. Company approved, Customer furnished connectors shall be required for loads that exceed four conductors per phase for overhead service.
2. Pad mount transformers
 - 500 kVA or smaller can accept eight conductors per phase
 - 750kva and larger can accept twelve conductors per phase.
3. For underground service, bus duct or a Customer furnished Company approved junction box should be required for loads that exceed the number of conductors the Company can accept.

13.5 Grounding of Service Equipment

The neutral conductor and metallic parts of the service equipment, including all meter sockets, and instrument transformer enclosures, shall be effectively grounded and all grounding shall be bonded together according to NEC250.4

Typical grounding of service equipment:

1. Single-phase 120 Volt, two-wire system: The identified neutral conductor.
2. Single phase three wire system: The identified neutral conductor.

3. Multiphase systems having one wire common to all phases: The identified common conductor.
4. Multiphase systems in which one phase is used to supply 120/240 Volt, single-phase service: The identified neutral conductor.

The National Electrical Code requires grounding to a 'grounding electrode' (NEC article 250.52). A driven ground rod is preferred by Company and is shown in drawings in Section 7 (Overhead Services) and Section 8 (Underground Services). The Company reserves the right to refuse installation of service contingent upon inspection of Customer's grounding connections.

Grounding requirements are shown on many of the drawings in the Customer Installation Standards. A grounding conductor (#6 CU minimum – refer to NEC for correct sizing) that is free from exposure to physical damage shall be permitted to be run along the surface of the building construction without metal covering or protection where it is securely fastened to the construction; otherwise, it shall be in conduit, electrical metallic tubing, or cable armor (installed in accordance with the NEC).

All metal buildings, metal structures, and metal siding on buildings to which electric service is to be supplied shall be permanently bonded to the service entrance ground before service is connected.

13.6 Service Entrance from Overhead System

13.6.1 General Comments

The service entrance meter loop shall meet the requirements of all applicable codes and the Company's Service Standard requirements. It shall be installed, owned, and maintained by the Customer. In general, the service mast shall be extended above the service drop attachment. See Drawing SS7.1-1. The service drop attachment shall be high enough to provide the required clearances in Section 7.3, Clearances. The Customer shall provide the required conductors in the meter loop and leave three feet of wire outside the top of the service entrance mast for connection to Company's service drop.

13.6.2 Service Entrance Masts

When a building is not tall enough to attach the service drop at a point to provide for the necessary line clearances above the ground, a "service mast" or other approved extension to support the service drop conductors shall be furnished and installed by the Customer. The extension shall permit the point of attachment to be located at a proper height above ground as defined in Section 7.3, Clearances and Section 7.2 Point of Attachment. The service mast shall not exceed 21' above the ground or be more than 60" from its base.

Refer to Drawing SS7.1-2 for typical installation of service mast above the eaves.

If a service mast is used to support the service drop conductors, it shall be rigid/intermediate metal steel. Service drop conductors shall be the only attachment to the service mast per NEC 230.28. Metallic conduits or brackets used as a service

mast or extension shall be electrically bonded and grounded to the ground wire terminal in the meter socket.

Service masts or other types of extensions shall be able to withstand the maximum loading requirements placed on them by the service line attached. Mast supports may be used to support loading. Mast supports shall be painted or otherwise treated to provide protection against corrosion and rotting. The Company reserves the right to refuse to attach its service drop to any service mast or extension considered a hazard to public safety.

Consult the Company for service entrance mast requirements for commercial installations designed for 200 Amps and above.

The Company assumes no responsibility of any kind or in any manner for any failure of the Customer owned service mast or extension.

13.7 Service Entrance from Underground Distribution System

The service entrance riser conduit shall be rigid/intermediate metal steel, rigid aluminum, or Schedule 80 PVC securely fastened, made rain tight, installed, owned, and maintained by the Customer. Refer to Section 8, Underground Service and Installations. Consult the Company for additional information and specifications.

13.8 Service Disconnecting Means

13.8.1 Disconnecting Means for Services Less Than 600 Volts

The Customer is required to provide each set of service entrance conductors with a means of disconnecting all energized wires from the source of supply. The disconnecting means may consist of not more than six switches with over current protection or six manually operable circuit breakers mounted in a single enclosure, in a group of separate enclosures, or in a switchboard.

The disconnecting means must be located in a readily accessible location near the point of delivery, either outside of a building or structure (recommended) or on the inside wall directly behind the outside service entrance. For residences, the main breaker should be a maximum of 2 feet horizontal and vertical from the meter.

480- volt electricity is much more likely to arc than 120, 208 or 240 volt service. To safely install and service 480 volt service. For any 480-Volt self-contained meter installations, the Customer shall supply a Junction box and a disconnecting means on the supply side of the Company meter. Specific 480V applications involving ballparks, oil fields and irrigation pumps require a disconnect ahead of the meter and an over current device on the load side of the meter.

All equipment must be U. L. approved and be installed in enclosures suitable for prevailing conditions, such as weather extremes or corrosive environments.

For more details, refer to NEC Articles 230 VI and VII and any other referenced code.

13.8.2 Disconnecting Means for Services Over 600 Volts

The Customer shall provide a means of disconnecting all energized conductors of each service entrance from the source of supply. The disconnecting means shall comply with the requirements of the NEC Article 230.205 through NEC 230.208 and any other referenced code and/or authorities having jurisdiction.

Where the Customer has self-generation or takes two or more points of service that can be tied together, automatic trip circuit breakers shall be required. Relaying on these circuit breakers should be coordinated with the Company.

For disconnecting means required on service above 4160/2400Y volts, contact the Company.

13.9 Isolation Switches for Services Over 600 Volts

The Customer shall install isolating switches between the supply conductors and the disconnecting means. The isolating switch shall isolate the circuit or equipment from any source of power. (Isolating switches are required as a safety measure and strict compliance is necessary to protect the interest of the Customer and the Company.) The disconnecting means shall separate the conductors of the circuit from the source of supply.

Isolation switches are not required where disconnecting equipment is mounted on removable panels or metal-enclosed switch gear units which cannot be opened unless the circuit is disconnected, and which, when removed from the normal operating position, automatically disconnects the circuit breaker or switch from all live parts. Also, fuses or cutouts used with non-automatic oil switches as disconnecting means may serve as isolating switches provided that they can be operated as a disconnect switch and completely disconnect the oil switch and all service equipment from the source of supply. The Customer shall be equipped to operate the fuses or cutouts. Finally, pole top air break switches which are accessible to the Customer's authorized personnel only and which are arranged so that grounding connection can readily be made on the load side may be used as isolating switches.

13.10 Alternate Sources and Automatic Transfer Schemes

A Customer may need alternate power sources due to the requirements of the load. If the Customer desires to have an additional distribution feeder as the second source, the Customer is responsible for the costs to install, operate and maintain the Company's additional facilities in addition to the charges, if any, required for the original service.

An automatic transfer switch may be specified as part of any alternative source system. The Company does not normally specify switches that are installed on the Customer's premises, past the metering point. However, any automatic switch connected to the Company's system shall be able to sense a dead power line and shall be blocked from closing in on the dead line. The Customer shall be responsible for the consequences of any back feed that occurs due to the switch closing in on a dead power line.

13.10 Alternate Sources and Automatic Transfer Schemes (continued)

The automatic transfer scheme shall block any faults occurring in the Customer's facilities from the utility system.

Furthermore, a closed transition transfer switching (CTTS) (make-before-break) application, while momentarily paralleling the Customer's system to the original power source, shall limit the parallel power feed to 10 cycles or less. This CTTS (make-before-break) application shall be performed while the utility supply is energized and shall contain the necessary synchronizing checks.

Consult the Company for a guideline for automatic transfer schemes.

Energy Star Scope of Work

The project owners have contracted the services of econsultants of Columbia, MO to assist with the design coordination and inspection services for this development to achieve Energy Star Certification. Note that the project is currently contracted to be designed, constructed and verified to these guideline.

During construction, the Architect is contracted to be on-site on a monthly basis to view construction progress and note such. It is not the Architect's responsibility to conduct inspections related to the Energy Star checklist items.

