# SUPPLEMENTARY CONDITIONS

OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms, if any, used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The paragraph address system used in these Supplementary Conditions is the same as the paragraph address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC-4.05."

## ARTICLE 1—DEFINITIONS AND TERMINOLOGY

SC-1.01.A.40 Add the following to Paragraph 1.01.A.40:

Trucking, shipping, delivery firms, consultants, and entities performing testing or inspection retained by Contractor or any Subcontractor are considered to be Subcontractors.

SC-1.01.A.45 Add the following to Paragraph 1.01.A.45:

Entities that rent construction equipment or machinery, but are not incorporated into the Work, are considered to be Suppliers. If such rental entity furnishes both equipment and one or more personnel to operate and maintain the equipment, such entity is a Subcontractor.

## ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

SC-2.01 Delete Paragraphs 2.01.B. and C. in their entirety and insert the following in their place:

B. *Evidence of Contractor's Insurance:* When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

2.02 *Copies of Documents*

SC-2.02 Amend the first sentence of Paragraph 2.02.A to read as follows:

Owner shall furnish to Contractor [number] paper copies of the Contract Documents (including one fully signed counterpart of the Agreement), and [one copy] [none] in electronic portable document format (PDF).

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

A. Owner shall furnish to Contractor [number] paper copies of conformed Contract Documents incorporating and integrating all Addenda and amendments, if any, negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional paper copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

2.06 *Electronic Transmittals*

SC-2.06 Delete in its entirety Paragraph 2.06.B and replace with the following new paragraph:

B. *Electronic Document Protocol*: Comply with Specifications Section 01 31 26 – Electronic Communication Protocols.

**ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

3.01 *Intent*

SC-3.01 Delete Paragraph 3.01.C in its entirety.

SC-3.01 Add the following new paragraphs immediately after Paragraph 3.01.E:

F. The Specifications and other verbal components of the Contract Documents may vary in form, format, and style. Some Specification sections are written in varying degrees of streamlined or declarative style and some Specifications sections may, in comparison, employ a more-narrative style. Omissions of such words and phrases as "Contractor shall," "in conformity with," "as shown," or "as specified" are intentional in streamlined language in the Contract Documents. Omitted words and phrases are incorporated by inference. Similar types of provisions may appear in various parts of a Specifications section or elsewhere in the Contract Documents. Contractor shall not attempt to take advantage of any variation of form, format or style in Change Proposal(s) and Claim(s).

G. Cross referencing of Specification sections in a Specifications section's heading "Related Sections includes, but are not necessarily limited to: "and elsewhere within each Specifications section is provided as an aid and convenience to Contractor. Contractor shall not rely on cross referencing indicated and is responsible for coordinating the entire Work and providing a complete Project whether or not cross referencing is provided in each Specifications section or whether or not cross referencing is complete.

**ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK**

4.05 *Delays in Contractor's Progress*

SC-4.05.C Amend Paragraph 4.05.C by adding the following subparagraphs:

5. *Weather-Related Delays*

a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: (1) that weather conditions were abnormal for the period of time in which the delay occurred, (2) that such weather conditions could not have been

reasonably anticipated, and (3) that such weather conditions had an adverse effect on the Work on the critical path at the time of the delay.

b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:

1) Every workday on which one or more of the following conditions exist will be considered a "bad weather day":

i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds [threshold precipitation quantity] of precipitation (as rain equivalent, based on the snow/rain conversion indicated in Table SC-4.05.C-1—Foreseeable Bad Weather Days .

ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: [temperature] degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: [temperature] degrees Fahrenheit.

2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by [name of the entity operating the weather station] weather monitoring station at [location of the weather monitoring station].

3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in Table SC-4.05-C-1—Foreseeable Bad Weather Days.

4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in Table SC-4.05.C-1—Foreseeable Bad Weather Days, will be considered as "abnormal weather conditions." The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor's then-current Progress Schedule's critical path for the Project.

**Table SC-4.05.C-1—Foreseeable Bad Weather Days**

| Month | Number of Foreseeable Bad Weather Days in Month Based on Precipitation as Rain Equivalent (inches) [1] | Ambient Outdoor Air Temperature (degrees F) | |
|---|---|---|---|
| | | Number of Foreseeable Bad Weather Days in Month Based on Low Temperature (at 11:00 a.m.) | Number of Foreseeable Bad Weather Days in Month Based on High Temperature (at 3:00 p.m.) |
| January | | | |
| February | | | |
| March | | | |
| April | | | |
| May | | | |

| Month | Number of Foreseeable Bad Weather Days in Month Based on Precipitation as Rain Equivalent (inches) [1] | Ambient Outdoor Air Temperature (degrees F) | |
|---|---|---|---|
| | | Number of Foreseeable Bad Weather Days in Month Based on Low Temperature (at 11:00 a.m.) | Number of Foreseeable Bad Weather Days in Month Based on High Temperature (at 3:00 p.m.) |
| June | | | |
| July | | | |
| August | | | |
| September | | | |
| October | | | |
| November | | | |
| December | | | |

Notes:

1. Two inches of sleet equal one inch of rain. Five inches of wet, heavy snow equal one inch of rain. Fifteen inches of "dry" powder snow equals one inch of rain.

## ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.03 *Subsurface and Physical Conditions*

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely: [If there are no such reports, edit this paragraph to indicate that, and delete the table.]

| Report Title | Date of Report | Technical Data |
|---|---|---|
| | | [Identify Technical Data] |
| | | |
| | | |

F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely: [If there are no such drawings, edit this paragraph to indicate that, and delete the table.]

| Drawings Title | Date of Drawings | Technical Data |
|---|---|---|
| | | [Identify Technical Data] |
| | | |

| Drawings Title | Date of Drawings | Technical Data |
|---|---|---|
| | | |

G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents at [location] during regular business hours, or may request copies from Engineer.

SC-5.04.A Add the following new paragraph immediately after Paragraph 5.04.A.4:

5. Contractor encounters human remains, recognizes the existence of burial markers, archaeological sites, historical sites, artifacts of potential archaeological or historical interest, or wetlands not shown or indicated in the Contract Documents, Contractor shall immediately cease operations that may disturb such area(s) and secure the adjacent Work; and Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations (Contractor shall continue to suspend such operations until otherwise instructed by Owner but shall continue with all other operations that do not affect those remains or features);

SC-5.03 and SC-5.04 Delete in their entirety Paragraphs 5.03 and 5.04. Provisions on subsurface and physical conditions at the Site, and differing subsurface or physical conditions, are in Specifications Section 02 06 13 – Geotechnical Baseline Report.

5.06 *Hazardous Environmental Conditions*

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely: [If there are no such reports, edit this paragraph to indicate that, and delete in the table.]

| Report Title | Date of Report | Technical Data |
|---|---|---|
| | | [Identify Technical Data] |
| | | |
| | | |

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely: [If there are no such drawings, edit this paragraph to indicate that, and delete in the table.]

| Drawings Title | Date of Drawings | Technical Data |
|---|---|---|
| | | [Identify Technical Data] |
| | | |
| | | |

## ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2010, 2013, or 2018 edition).
2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2010, 2013, or 2018 edition).

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.B:

1. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be [number—either "two", "three", or other] years after Substantial Completion.
2. After Substantial Completion, Contractor shall furnish a warranty bond issued in the form of EJCDC® C-612, Warranty Bond (2018). The warranty bond must be in a bond amount of [amount—either 10, 15, or other] percent of the final Contract Price. The warranty bond period will extend to a date [number—either "two", "three" or other] years after Substantial Completion of the Work. Contractor shall deliver the fully executed warranty bond to Owner prior to or with the final Application for Payment, and in any event not later than 11 months after Substantial Completion.
3. The warranty bond must be issued by the same surety that issues the performance bond required under Paragraph 6.01.A of the General Conditions.

6.02 *Insurance—General Provisions*

Make changes only when directed by the OwnerSC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

The Owner shall direct all HDR revisions in this provision, if anySC-6.02 Add the following paragraph immediately after Paragraph 6.02.H.2 of the General Conditions:

3. For the following Subcontractors, Suppliers, or categories of Subcontractor or Supplier, Contractor shall require the following specified insurance, with policy limits as stated: [Identify Subcontractors, Suppliers, or categories of same, and insert specific insurance requirements and policy limits]

6.03 *Contractor's Insurance*

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess,

pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following: [Here list by legal name (not Project role or classification) other persons or entities to be included as additional insureds. See GC-6.03.C.]

E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

| Workers' Compensation and Related Policies | Policy limits of not less than: |
|---|---|
| **Workers' Compensation** | |
| State | Statutory |
| Applicable Federal (e.g., Longshoreman's) | Statutory |
| Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable | Statutory |
| **Jones Act (if applicable)** | |
| Bodily injury by accident—each accident | $ |
| Bodily injury by disease—aggregate | $ |
| **Employer's Liability** | |
| Each accident | $ |
| Each employee | $ |
| Policy limit | $ |
| **Stop-gap Liability Coverage** | |
| For work performed in monopolistic states, stop-gap liability coverage must be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of: | $ |

F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:

1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
2. damages insured by reasonably available personal injury liability coverage, and
3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial

general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage.
    a. Such insurance must be maintained for three years after final payment.
    b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
4. Underground, explosion, and collapse coverage.
5. Personal injury coverage.
6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:

1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
2. Any exclusion for water intrusion or water damage.
3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
4. Any exclusion of coverage relating to earth subsidence or movement.
5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).
6. Any limitation or exclusion based on the nature of Contractor's work.
7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

| Commercial General Liability | Policy limits of not less than: |
|---|---|
| General Aggregate | $ |
| Products—Completed Operations Aggregate | $ |
| Personal and Advertising Injury | $ |
| Bodily Injury and Property Damage—Each Occurrence | $ |

J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy must be written on an occurrence basis.

| Automobile Liability | Policy limits of not less than: |
|---|---|
| **Bodily Injury** | |
| Each Person | $ |
| Each Accident | $ |
| **Property Damage** | |
| Each Accident | $ |
| **[or]** | |
| **Combined Single Limit** | |
| Combined Single Limit (Bodily Injury and Property Damage) | $ |

K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

| Excess or Umbrella Liability | Policy limits of not less than: |
|---|---|
| Each Occurrence | $ |
| General Aggregate | $ |

L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy

was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of $[specify amount] after accounting for partial attribution of its limits to underlying policies, as allowed above.

M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

| Contractor's Pollution Liability | Policy limits of not less than: |
|---|---|
| Each Occurrence/Claim | $ |
| General Aggregate | $ |

N. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

| Contractor's Professional Liability | Policy limits of not less than: |
|---|---|
| Each Claim | $ |
| Annual Aggregate | $ |

O. *Railroad Protective Liability Insurance:* Prior to commencing any Work within 50 feet of railroad-owned and controlled property, Contractor shall (1) endorse its commercial general liability policy with ISO CG 24 17, removing the contractual liability exclusion for work within 50 feet of a railroad, (2) purchase and maintain railroad protective liability insurance meeting the following requirements, (3) furnish a copy of the endorsement to Owner, and (4) submit a copy of the railroad protective policy and other railroad-required documentation to the railroad, and notify Owner of such submittal.

[Insert additional specific requirements, commonly set by the railroad, here.]

| Railroad Protective Liability Insurance | Policy limits of not less than: |
|---|---|
| Each Claim | $ |
| Aggregate | $ |

P. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV—commonly referred to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor's compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.

| **Unmanned Aerial Vehicle Liability Insurance** | **Policy limits of not less than:** |
|---|---|
| Each Claim | $ |
| General Aggregate | $ |

Q. *Other Required Insurance:* [Here list additional types and amounts of insurance that Contractor is required to carry; if none, delete this Paragraph Q.]

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Delete Paragraph 6.04.A and insert the following in its place:

A. Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

SC-6.04 Supplement Paragraph 6.04 with the following provisions:

F. *Builder's Risk Requirements:* The builder's risk insurance must:

1. be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).

    a. Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.

    b. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.

2. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

3. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of contractors, engineers, and architects).

4. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier). If this coverage is subject to a sublimit, such sublimit will be a minimum of $[amount].

5. extend to cover damage or loss to insured property while in transit. If this coverage is subject to a sublimit, such sublimit will be a minimum of $[amount].

6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.

7. allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.

8. include performance/hot testing and start-up, if applicable.

9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.

10 include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds." In addition to Owner, Contractor, and Subcontractors of every tier, include as insureds the following:

    a. [Here list by legal name (not Project role or classification) other persons or entities to be insured on the builder's risk policy; see the "HDR Guidance Note" at the start of SC-6.04.F, above). It is generally recommended to list the insured's full legal/contractual name, address, contact person, telephone, and e-mail address. Include only persons or entities that have property at the Site that is to be insured by the builder's risk insurance. If applicable, separately identify any mortgagee or lender required to be named as a loss payee.]

11. include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:

    a. [Here list or provide cross-reference to specific items of Owner-furnished (or third-party furnished) equipment, and purchase value; do not list items whose value is

already included in the Contract Price (as is the case when an equipment procurement contract is assigned to the Contractor). Contact HDR's ENG MSS team for guidance on this matter when necessary.]

12. If debris removal in connection with repair or replacement of insured property is subject to a coverage sublimit, such sublimit will be a minimum of $[amount].

13. In addition to the coverage sublimits stated above, the following coverages are also subject to sublimits, as follows:

    a. [Here list a specific coverage, or cause of loss, that has been determined to be likely to be subject to a sublimit. If not applicable, then delete Paragraph SC-6.04.F.13 in its entirety.] If this coverage is subject to a sublimit, such sublimit will be a minimum of $[amount].

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provision:

G. *Coverage for Completion Delays:* The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

H. *Builder's Risk and Other Property Insurance Deductibles:* The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.

1. The builder's risk policy (or if applicable the installation floater) will be subject to a deductible amount of not more than $[number] for direct physical loss in any one occurrence.

SC-6.04 Delete Paragraph 6.04.A and substitute the following in its place:

A. *Installation Floater*

1. Contractor shall provide and maintain installation floater insurance on a broad form or "all risk" policy providing coverage for materials, supplies, machinery, fixtures, and equipment that will be incorporated into the Work ("Covered Property"). Coverage under the Contractor's installation floater will include loss from covered "all risk" causes (perils) to Covered Property:

    a. of the Contractor, and Covered Property of others that is in Contractor's care, custody, and control;

    b. while in transit to the Site, including while at temporary storage sites;

    c. while at the Site awaiting and during installation, erection, and testing;

    d. continuing at least until the installation or erection of the Covered Property is completed, and the Work into which it is incorporated is accepted by Owner.

2. The installation floater coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable.

3. The installation floater coverage will be in an amount sufficient to protect Contractor's interest in the Covered Property. The Contractor will be solely responsible for any deductible carried under this coverage.

4. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.

**ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES**

7.02 *Supervision and Superintendence*

SC-7.02 Add the following to Paragraph 7.02, following Paragraph 7.02.B:

C. Unless Owner otherwise agrees in writing, the superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

7.03 *Labor; Working Hours*

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be [Here insert schedule of regular working hours].

2. Owner's legal holidays are [Here insert list of legal holidays].

SC-7.03 Amend the first and second sentences of Paragraph 7.03.C to state "...all Work at the Site must be performed during regular working hours, [day of the week] through [day of the week]. Contractor will not perform Work on a [day of the week], [day of the week], or any legal holiday." The balance of Paragraph 7.03.C remains unchanged except for the foregoing.

SC-7.03 Delete Paragraph 7.03.C in its entirety, and insert the following:

C. In the absence of any Laws or Regulations to the contrary, Contractor may perform the Work on holidays, during any or all hours of the day, and on any or all days of the week, at Contractor's sole discretion.

SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C:

D. [Contractor] [Owner] shall be responsible for the cost of overtime (premium) pay and other expense incurred by Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-7.03 Add the following new subparagraph immediately after Paragraph SC-7.03.D:

1. For purposes of administering the foregoing requirement, additional overtime costs are defined as [Here insert parameters for compensated overtime hours].

7.10 *Taxes*

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:

A. Owner is exempt from payment of sales and compensating use taxes of the State of [name of state or jurisdiction where the Site is located] and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of materials and equipment to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools or machinery, construction equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

7.11 *Laws and Regulations*

SC-7.11 Add the following new paragraph immediately after Paragraph 7.10.C:

D. Refer to Article SC-19 [and Document 00 73 73 – Statutory and Funding-Financing Entity Requirements], for Laws and Regulations that, by terms of said Laws and Regulations, are to be included in the Contract Documents. The failure to include in Article SC-19 [or Document 00 73 73 – Statutory and Funding-Financing Entity Requirements,] any Law or Regulation applicable to the performance of the Work does not diminish Contractor's responsibility to comply with all Laws and Regulations applicable to the performance of the Work.

7.13 *Safety and Protection*

SC-7.13 Insert the following after the second sentence of Paragraph 7.13.G:

The following Owner safety programs are applicable to the Work: [Here expressly identify by title and/or date, any such Owner safety programs. If Owner's safety programs are included in or addressed in the Specifications, SC-7.13 may be used to provide a cross-reference to the Specification section].

7.14 *Hazard Communication Programs*

SC-7.14 Add the following new paragraph immediately after Paragraph 7.14.A:

B *Single Prime Contract*: Contractor shall be responsible for coordinating exchange of safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws and Regulations. Contractor shall provide a centralized location for the maintenance of the safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the material safety data sheets or other hazard communication information shall be readily accessible to the employees of employers on the Site.

B *Multiple Prime Contracts*: General Contractor shall be responsible for coordinating exchange of safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws and Regulations. General Contractor shall provide a centralized location for the maintenance of the material safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the safety data sheets or other hazard communication information shall be readily accessible to the employees of employers on the Site. Each other Contractor ¬or employer shall furnish to the General Contractor

safety data sheets and other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws and Regulations.

**ARTICLE 8—OTHER WORK AT THE SITE**

8.02 *Coordination*

SC-8.02 Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:

C. Owner intends to contract with others for the performance of other work at or adjacent to the Site, which is indicated in Specifications Section 01 11 00 – Summary of Work

1. [Here identify individual or entirety] shall have authority and responsibility for coordination of the various contractors and work forces at the Site;

2. The following specific matters are to be covered by such authority and responsibility: [Here itemize such matters];

3. The extent of such authority and responsibilities is: [Here provide the extent].

**ARTICLE 9—OWNER'S RESPONSIBILITIES**

9.13 *Owner's Site Representative*

SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:

9.13 *Owner's Site Representative*

A. Owner will furnish an "Owner's Site Representative" (OSR) to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner's Site Representative is not Engineer's consultant, agent, or employee. Owner's Site Representative will be [here identify individual or entity]. The authority and responsibilities of Owner's Site Representative follow: [Here describe the duties and activities of the Owner's Site Representative.]

**ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION**

10.03 *Resident Project Representative*

SC-10.03 Add the following new subparagraph immediately after Paragraph 10.03.A:

1. On this Project, by agreement with Owner, the Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work.

tSC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.B:

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

    a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

    b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

    c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

4. *Review of Work; Defective Work*

    a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

    b. Observe whether any Work in place appears to be defective. This does not impose on either RPR or Engineer any obligation to find all, or any specific element of, defective Work, for which Contractor remains solely responsible.

    b. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

    a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to (1) code-required tests and special inspections, and (2) those performed by public or other agencies having jurisdiction over the Work.

    b. Observe specific tests, inspections, and other field quality control required by the Contract Documents and performed by Contractor, Subcontractor, Supplier, or by testing or laboratories retained by any of them, .

    c. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor and advise Contractor regarding quantities or extent of the Work eligible for payment.

7. *Completion*

    a. Participate in Engineer's visits regarding inspection for Substantial Completion.

    b. Assist in the augmenting or amending the punch list of items to be completed or corrected prior to final inspection.

c. *Final Inspection*: Participate in Engineer's visit to the Site, in the company of Owner and Contractor, regarding completion of the Work, and prepare a final punch list (if any) of items to be completed or corrected by Contractor.

d. Observe whether items on the final punch list have been completed or corrected.

d. *Record Documents*: Periodically during the Work, review with Contractor the status of Contractor's record documents required by the Contract Documents and advise Contractor on whether such record documents appear to comply with the Contract's requirements for record documents. Review final record documents submitted by Contractor.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials, equipment (including "or-equal" items), or procedures or sequences indicated in the Contract Documents.
2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.
4. Advise on, issue directions relative to, or assume control or responsibility over any aspect of the means, methods, techniques, sequences or procedures of construction.
5. Advise on, issue directions regarding, or assume control over security protection, or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
7. Authorize Owner to occupy the Project in whole or in part.

**ARTICLE 11—CHANGES TO THE CONTRACT**

No Supplementary Conditions in this Article.

**ARTICLE 12—CLAIMS**

No Supplementary Conditions in this Article.

**ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK**

13.01 *Cost of the Work*

SC-13.01.B.5.c.(1) Supplement Paragraph 13.01.B.5.c.(1) by adding the following subparagraphs:

a) Prior to commencing Work at the Site, submit to Owner, through Engineer, copies of the equipment rental agreements for Owner's approval.

b) Should Contractor perform Work using rented construction equipment or machinery without Owner's written approval of the associated rental agreement and the parties subsequently disagree on the applicable rental rates, use of such construction

equipment and machinery will be compensated on the basis of the rental rate book indicated in Paragraph SC-13.01.B.5.c.(2).

c) When the rental rate book is used basis for determining compensation for construction equipment and machinery leased from a rental firm, the hourly rate for such equipment shall be determined in accordance with Paragraph 13.01.B.5.(2) of the General Conditions.

SC-13.01.B.5.c.(2) Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of [name of equipment rental rate book].

SC-13.01.B.5.c Supplement Paragraph 13.01.B.5.c by adding the following subparagraphs:

4) *Inactive Equipment and Machinery*: Rental of construction equipment and machinery shall cease when the use thereof is no longer necessary for the Work. Periods of inactivity for such construction equipment or machinery will not be compensable unless agreed upon in writing by Owner, unless the costs of disassembly, removal, transportation, reassembly, and remobilization, as submitted to and accepted by Owner (with advice of Engineer) would exceed the cost of continuing to rent the item(s) during the period(s) of inactivity. Contractor is responsible for obtaining Owner's written approval for compensation for construction equipment and machinery for periods of inactivity. Owner is not responsible for retroactively approving such inactivity. "Period of inactivity" for such items includes periods when the construction equipment or machinery is not used or necessary for the logical and efficient progression of the Work, or when other, available equipment or machinery is suitable for performing the given task.

5) *Condition of Equipment and Machinery*: Construction equipment and machinery will be compensable only for serviceable construction equipment and machinery capable of efficiently performing its intended function at the Site. Construction equipment and machinery not in compliance with this Paragraph SC-13.01.B.5.c.5) is not eligible for compensation.

6) *Capped Compensation*: Compensation paid Contractor for a given item of Contractor-owned construction equipment or machinery will be capped at, and shall not exceed, the comparable purchase price of such item of equal or comparable capacity and capability.

SC-13.01.C.2 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

a. For purposes of this paragraph, "small tools and hand tools" means items in one or more of the following categories: (1) Items that are ordinarily required for the performing worker's job function, including but not limited to equipment which ordinarily has no associated licensing, insurance, or substantive storage costs; such as hammers, wrenches, socket tools, manual saws, power saws, chainsaws, common power tools, impact drills, threaders, benders, transits and theodolites and related equipment, and other tools transportable by hand, regardless of ownership of such items; (2) Items such as gang-boxes, ladders, hand carts and similar wheeled items manually operated by workers, extension cords, and similar items; (3) common testing equipment such as insulation testers (megger-testing

equipment), amp meters, gas detectors, pressure gauges, and similar items; (4) A purchase price (if purchased new, at retail) of $500, although such limit is not absolute, and certain items may be deemed by Owner or Engineer as "small tools or hand tools" (and not eligible for compensation) even though such item may have a purchase price greater than the amount indicated in this Paragraph 13.01.C.2.

**HDR Guidance Note—VEQ Clause**SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

    a. the extended price of a particular item of Unit Price Work amounts to [number] percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than [number] percent from the estimated quantity of such item indicated in the Agreement; and

    b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price if the quantity on an individual bid item extends or fails to achieve [number] percent of the estimated quantity at the time of Contract formation plus any additions or deletions included in change orders to the contract.

2. The adjusted unit price will apply only to all units installed for that bid item.

## ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

No Supplementary Conditions in this Article.

## ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.01 *Progress Payments*

SC-15.01 Add the following new Paragraph 15.01.F:

F. For contracts in which the Contract Price is based on the Cost of Work plus a fee, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor

prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

15.03 *Substantial Completion*

SC-15.03.B Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined by Engineer not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer or other entity retained by Owner, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

15.08 *Correction Period*

SC-15.08.G Add the following new Paragraph 15.08.G:

G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in Paragraph SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be **[number]** years after the date of Substantial Completion established in Engineer's certificate of Substantial Completion.

**ARTICLE 16—SUSPENSION OF WORK AND TERMINATION**

No Supplementary Conditions in this Article.

**ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES**

17.02 *Arbitration*

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

SC-17.02 *Arbitration*

A. All matters subject to final resolution under this Article will be settled by arbitration administered by [the American Arbitration Association] in accordance with [its Construction Industry Arbitration Rules] (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of $100,000 or less will be settled in accordance with [the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration]. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be concurrently sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or, if no specified time is applicable, within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when

institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.

C. The arbitration will be held in [indicate location, such as "the same locality as the Site" or "the same municipality as the Owner's principal office location", or other, as directed by the Owner].

D. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the [Construction Arbitration Rules] that contemplate in-person hearings. The arbitrator(s) will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.

E. The Arbitrator(s) will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.

F. The award of the arbitrator(s) must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.

G. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.

H. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;

3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and

4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.

I. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.

J. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior

written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

17.03 *Attorneys' Fees*

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02.

SC-17.03 *Attorneys' Fees*

A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

**ARTICLE 18—MISCELLANEOUS**

18.08 *Assignment of Contract*

SC-18.08 Add the following new paragraph immediately after Paragraph 18.08.A:

B. The contract dated [date] between Owner as "buyer" and [identify seller] as "seller" for procurement of goods and special services ("procurement contract") [is hereby] [will be] assigned to Contractor by Owner, and Contractor [accepts] [will accept] such assignment. A form documenting the assignment is attached as an exhibit to this Contract.

1. This assignment will occur on the [Effective Date of the Contract], and will relieve the Owner as "buyer" from all further obligations and liabilities under the procurement contract.

2. Upon assignment, the "seller" will be a Subcontractor or Supplier of the Contractor, and Contractor will be responsible for seller's performance, acts, and omissions, as set forth in Paragraph 7.07 of the General Conditions just as Contractor is responsible for all other Subcontractors and Suppliers.

3. Notwithstanding this assignment, all performance guarantees and warranties required by the procurement contract will continue to run for the benefit of the Owner and, in addition, for the benefit of the Contractor.

4. Except as noted in the procurement contract, all rights, duties and obligations of Engineer to "buyer" and "seller" under the procurement contract will cease [upon the assignment to Contractor].

SC-18.11 Add a new paragraph immediately after Paragraph 18.10:

SC-18.11 *Confidential Information*

A. All Drawings, Specifications, technical data, and other information furnished to Contractor either by Owner or Engineer or developed by Contractor or others in connection with the Work are, and will remain, the property of Owner or Engineer, and shall not be copied or otherwise reproduced or used in any way except in connection with the Work, or disclosed to third parties or used in any manner detrimental to the interests of Owner or Engineer.

B. The following information is not subject to the above confidentiality requirements:

1. information in the public domain through no action of Contractor in breach of the Contract Documents; or

2. information lawfully possessed by Contractor before receipt from Owner or Engineer; or

3. information required to be disclosed by Laws or Regulations, or by a court or agency of competent jurisdiction. However, in the event Contractor shall be so required to disclose such information, Contractor shall, prior to disclosure, provide reasonable notice to Owner and Engineer, who shall have the right to interpose all objections Owner may have to the disclosure of such information.

SC-18.12 Add a new paragraph immediately after Paragraph 18.11, to read as follows:

SC-18.12 *Publicity*

A. Contractor shall not disclose to any third party the nature of its Work on the Project, nor engage in publicity or public media disclosures with respect to the Project without the prior written consent of Owner.

SC-19 Add new article immediately after Article 18, to read as follows:

**ARTICLE SC-19 – STATUTORY REQUIREMENTS**

SC-19.01 This article contains portions of certain Laws or Regulations which, by provision of Laws or Regulations, are required to be included in the Contract Documents. The matters addressed in this Article SC-19 may not be complete or current. Contractor's obligation to comply with all Laws and Regulations is set forth in Paragraph 7.11 of the General Conditions.

SC-19.02 [____]

**EXHIBIT A—**

# 00 73 46
## WAGE DETERMINATION SCHEDULE

Kentucky Division of Water
Prevailing Wages -- Project Rates
(Comprised of 7 pages plus this cover page)

# 00 73 46
## WAGE DETERMINATION SCHEDULE

Kentucky Division of Water
Prevailing Wages – Project Rates
(Comprised of 7 pages plus this cover page)

"General Decision Number: KY20220051 02/25/2022

Superseded General Decision Number: KY20210051

State: Kentucky

Construction Type: Heavy

County: Lyon County in Kentucky.

HEAVY CONSTRUCTION PROJECTS (including sewer/water construction).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

| | |
|---|---|
| If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022: | . Executive Order 14026 generally applies to the contract.<br>. The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022. |
| If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022: | . Executive Order 13658 generally applies to the contract.<br>. The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022. |

The applicable Executive Order minimum wage rate will be

adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.

| Modification Number | Publication Date |
|---|---|
| 0 | 01/07/2022 |
| 1 | 02/25/2022 |

ENGI0181-009 07/01/2021

| | Rates | Fringes |
|---|---|---|
| POWER EQUIPMENT OPERATOR | | |
| GROUP 1 | $ 34.80 | 17.85 |
| GROUP 2 | $ 31.94 | 17.85 |
| GROUP 3 | $ 32.39 | 17.85 |
| GROUP 4 | $ 31.62 | 17.85 |

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Backhoe/Excavator/Trackhoe; Bulldozer; Crane; Drill; Grader/Blade; Loader; Mechanic; Scraper

GROUP 2 - Bobcat/Skid Steer/Skid Loader; Forklift; Tractor (50 H.P. or over)

GROUP 3 - Articulating Truck Operator

GROUP 4 - Oiler; Tractor (under 50 H.P.)

Operators on cranes with booms 150 feet and over (including jib) shall receive $1.00 above Group 1 rate; 250 feet and over including jib shall receive $1.50 above Class 1 rate. Combination Rate: All crane operators operating cranes, where the length of the boom in combination with the length of the piling leads equal or exceeds 150 feet, shall receive $1.00 above the Group 1 rate.

Employees assigned to work below ground level are to be paid 10% above basic wage rate. This does not apply to open cut work.

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IRON0782-010 08/01/2021

| | Rates | Fringes |
|---|---|---|
| IRONWORKER (Reinforcing & Structural) | | |
| Projects over $20,000,000.00 | $ 30.83 | 25.52 |
| Projects under $20,000,000.00 | $ 29.24 | 23.22 |

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LABO0189-001 07/01/2021

| | Rates | Fringes |
|---|---|---|
| LABORER | | |
| Concrete Saw (Hand Held/Walk Behind) | $ 23.76 | 16.22 |

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LABO0561-003 10/20/2021

| | Rates | Fringes |
|---|---|---|
| LABORER | | |
| Form Worker | $ 24.26 | 16.60 |

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LABO1214-001 07/01/2021

| | Rates | Fringes |
|---|---|---|
| LABORER | | |
| Backfiller, Carpenter Tender, Common or General, Concrete Worker, Dumpman, Fence Erection | $ 23.51 | 16.22 |
| Pipelayer & Tamper (Hand Held/Walk Behind) | $ 23.76 | 16.22 |

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* UAVG-KY-0001 01/01/2020

| | Rates | Fringes |
|---|---|---|
| LABORER: Grade Checker | $ 24.08 | 14.93 |

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SUKY2011-007 06/25/2014

| | Rates | Fringes |
|---|---|---|
| CEMENT MASON/CONCRETE FINISHER | $ 20.96 | 10.53 |

ELECTRICIAN.....$ 32.35 2.18

LABORER: Flagger.....$ 18.31 8.89

OPERATOR: Boring Machine.....$ 25.35 13.00

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

---

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage

payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

CONTRACT III TANK IMPROVEMENTS

LYON COUNTY WATER DISTRICT
KUTTAWA, KENTUCKY

# ADDENDUM NO. [1]

[Month] [Day], [Year]

TO: Prospective Bidders

FROM: HDR (Engineer)
[HDR project office street address]
[HDR project office city, state, postal code]

OWNER: [Owner's organization name]
[Owner's street address]
[Owner's city, state, postal code]

SUBJECT: [Site or facility name]
[Project title—same as on Drawings and project manual cover]
[Owner's contract designation, if any]

This Addendum is part of the Bidding Documents and the Contract Documents and modifies the original Bidding Documents dated [____], as indicated below. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification for award of the associated Contract.

This Addendum consists of [____] pages and the attachments, if any, listed on the last page.

## ADDENDUM NO. [1] SEALS AND SIGNATURES

| | |
|---|---|
| [*insert licensee*], PE<br>License No. [____] | The seal and signature to the left applies to the changes made via this Addendum for the Work in the following divisions, sections, and Drawings of the proposed Contract Documents:<br>• [____].<br>• [____]. |
| [*insert licensee*], PE<br>License No. [____] | The seal and signature to the left applies to the changes made via this Addendum for the Work in the following divisions, sections, and Drawings of the proposed Contract Documents:<br>• [____].<br>• [____]. |
| [*insert licensee*], PE<br>License No. [____] | The seal and signature to the left applies to the changes made via this Addendum for the Work in the following divisions, sections, and Drawings of the proposed Contract Documents:<br>• [____].<br>• [____]. |

| | |
|---|---|
| [*insert licensee*], PE<br>License No. [____] | The seal and signature to the left applies to the changes made via this Addendum for the Work in the following divisions, sections, and Drawings of the proposed Contract Documents:<br>• [____].<br>• [____]. |

Engineer's seal and signature does not apply to the documents, or changes thereto, that comprise Division 00, Bidding and Contracting Requirements, except for revisions to provisions of prior Addenda that modify the Specifications and Drawings.

It is a violation applicable laws and regulations governing professional licensing and registration for any person, unless acting under the direction of the licensed and registered design professional(s) indicated above, to alter in any way the proposed Specifications, Drawings, and Addenda for this Project.

## CHANGES TO PRIOR ADDENDA

None

## CHANGES TO INTRODUCTORY INFORMATION

[1].01 Document 00 01 10, Table of Contents: Delete the following:

43 27 76 Manually-Cleaned Process Liquid Strainers ..... 43 27 76-1

[1].02 Document 00 01 10, Table of Contents: Add the following:

43 27 73 Automatic Self-Cleaning Process Liquid Strainers ..... 43 27 73-1

## CHANGES TO BIDDING REQUIREMENTS

None

## CHANGES TO CONTRACTING REQUIREMENTS

None

## CHANGES TO SPECIFICATIONS

[1].03 Section 01 14 16 - Coordination with Owner's Operations: In Paragraph 3.3.A, Table 01 14 16-A, delete the rows that indicate tie-in nos. 51 through 52, inclusive.

[1].04 Section 10 14 00 - Signage: In Table 10 14 00-C following Paragraph 2.5.C.5.b, delete the following rows:

| | | | |
|---|---|---|---|
| Final Effluent Water | Strainer No. 3 | Black | White |
| Final Effluent Water | Strainer No. 4 | Black | White |
| Final Effluent Water | Strainer No. 5 | Black | White |
| Final Effluent Water | Strainer No. 6 | Black | White |

[1].05 Section 43 27 73 - Automatic Self-Cleaning Process Liquid Strainers: Add Section 43 27 73, Automatic Self-Cleaning Process Liquid Strainers, which is Attachment 1 to this Addendum.

[1].06 Section 43 27 76 - Manually-Cleaned Process Liquid Strainers: Delete this Section in its entirety.

## CHANGES TO DRAWINGS

[1].07 Drawing D1, Equipment Building Partial Basement Demolition Plan and Section: Modify the Drawing as shown and indicated on attached Sketch SK AD[1].1.

[1].08 Drawing M3, Blower Building Partial First Floor Plan: Add the following note to the Drawing:

"NOTE:

1. GENERAL CONTRACTOR SHALL FURNISH NEW VFD FOR RETURN SLUDGE PUMP NO. 3. DELIVER NEW VFD TO LOCATION AT THE TREATMENT PLANT AS DESIGNATED BY OWNER."

## ATTACHMENTS

The items listed below and bound following this document's "End of Addendum" designation, are part of this Addendum.

[1].09 New Drawings attachments hereto are as follows:

- Drawing M26 – Equipment Building Basement Plan.
- Replacement Drawing M6 – Blower Building First Floor Plan.

[1].10 Other attachments hereto are as follows:

- Attachment 1 – Specifications Section 43 27 73, Automatic Self-Cleaning Process Liquid Strainers.
- Sketches SK AD[1].1 through SK AD[1].3.

**END OF ADDENDUM NO. [1]**

# DIVISION 01

## GENERAL REQUIREMENTS

# SECTION 01 11 00
## SUMMARY OF WORK

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Location and description of Work and prior uses of the Site.
   2. Construction Contracts for this Project.

### 1.2 LOCATION AND DESCRIPTION OF WORK

A. The Work is located in Lyon County, Kentucky at two sites, Tinsley Creek Subdivision and KY 274 Creek Crossing.

B. Work to be performed under this Contract includes, but is not limited to, the replacement of an undersized 2-in waterline in the Tinsley Creek Subdivision and the replacement of a 6-in waterline at the KY 274 Creek Crossing, and all other Work required in accordance with the Contract Documents.

C. The Contractor shall be responsible for the general overall coordination of the work. Each Sub-Contractor shall carefully check the Drawings, Specifications, and the Project Site in order to advise and coordinate their phase of the Work. Each Subcontractor shall leave the required space and clearances for the work of others, field check all dimensions and file a written report to the Engineer where discrepancies occur between the work to be performed and the Drawings, Specifications, or Project Site conditions. If no report is filed prior to approvals of Shop Drawings and Samples, it will be assumed that no conflict occurs. Resolutions of conflicts after Shop Drawings and Sample approvals shall be resolved by the Engineer and the conflict corrected in the field at no increase in the Contract Sum.

D. All contractors, subcontractors, suppliers, and other employers involved with work at the Project Site shall be responsible for compliance with all federal, state, local, and Project Owner's regulations, standards, and codes in effect during the Contract Time.

E. All notices, demands, requests, instructions, reports, approvals, proposals, Change Orders, Field Orders, and claims shall be in writing.

F. The Contractor shall perform all required testing of installed piping, equipment, etc. as required by these Technical Specifications and the owing utility specifications. Adjustments of process equipment will be the responsibility of the Contractor and/or equipment supplier. All systems shall be adjusted and balanced to the approval of the Engineer prior to project closeout.

G. Contracting Method: The Project will be constructed under a single prime construction Contract

### 1.3 CONSTRUCTION CONTRACTS FOR THIS PROJECT

A. Single Prime Construction Contract: The Contract requires all the Work for the Project not expressly allocated to Owner or others in the Contract Documents.

## PART 2 - PRODUCTS - (NOT USED)

## PART 3 - EXECUTION - (NOT USED)

## END OF SECTION

# SECTION 01 22 00
## MEASUREMENT AND PAYMENT

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. General requirements applicable to all bid/pay items.
   2. General provisions on unit prices and quantities.
   3. General provisions on lump sums.
   4. Listing of the various bid/pay items in the Project, together with criteria for measuring Unit Price Work for payment.

B. Related Requirements:
   1. Include but are not necessarily limited to:
      a. Section 00 41 13 – Bid Form.

### 1.2 REQUIREMENTS APPLICABLE TO ALL BID/PAY ITEMS

A. In this Section and elsewhere in the Contract Documents, the terms "bid item", "pay item", "bid/pay item", "Item" followed by a number designation, "this item", and the like all have the same meaning, and refer to one or more specific elements of the Contract, established for pricing and payment, as indicated in the Bid Form and in the Agreement (or exhibit to the Agreement) at the time the Contract was signed by the parties.

B. This Article applies to all bid/pay items in the Contract.

C. Prices – General:
   1. The bid/pay items listed starting with Article 1.5 of this Section refer to and are the same bid items listed in the Bid Form and included in the Contract, and constitute all bid/pay items for the Work at the time the Contract was signed by the parties.
   2. Price Escalation:
      a. Unless expressly indicated otherwise in the Contract Documents, Owner is not obligated to change the stipulated prices (including lump sums, unit prices, and allowances) that are all or part of the Contract Price because of escalation of costs when there is no corresponding change in the Contract Times.
      b. Changes in the Contract Times do not necessarily entitle Contractor to a change in Contract Price due to escalation.
      c. Should Contractor claim a change in Contract Price for one or more stipulated price pay items without a corresponding change in scope, extent, or quality in the associated Work, prior to receiving any such change in Contract Price, Contractor shall submit with Contractor's associated Change Proposal, documentation satisfactory to Engineer supporting and documenting that Contractor's costs have increased because of delays beyond Contractor's control within the associated change in Contract Times included in such Change Proposal.
   3. Compensation for all services, labor, materials, and equipment shall be included in prices stipulated for the unit price bid/pay items in the Contract.
   4. Each unit price in the Contract shall include an amount considered by Contractor as sufficient for all overhead and profit for each separately identified bid/pay item.

D. Contract Price, Payment Procedures, and Related Matters:
   1. Contract Price: The Contract Price, as apportioned among bid/pay items in the Contract, is indicated in the Agreement and any associated exhibits thereto and may be modified by Change Order.
   2. Payments to Contractor: Refer to the General Conditions (as may be modified by the Supplementary Conditions), the Agreement (including provisions on retainage, if any), among other applicable Contract Documents.

3. Schedule of Values: Refer to the General Conditions (as may be modified by the Supplementary Conditions) and Section 01 29 73 - Schedule of Values.
4. Procedures for Changes in Contract Price: Refer to the General Conditions (as may be modified by the Supplementary Conditions) and Section 01 26 00 - Contract Modification Procedures.
5. Alternates: The scope and limits of alternates, when contemplated for or included in the Contract, may be addressed, in whole or in part, in Section 01 23 00 - Alternates.
6. Defective Work is not eligible for payment.

## 1.3 GENERAL PROVISIONS ON UNIT PRICES AND QUANTITIES

A. Quantities:
   1. Quantities of Unit Price Work indicated in the Bid Form and in the Contract (at the time the Agreement was signed by the parties) are estimates for purposes of pricing and comparison of Bids.
   2. Owner does not represent, either expressly or by implication, or agree that the nature of materials encountered below ground surface or in concealed areas, or actual quantities of Unit Price Work required, will correspond with the quantities in the Contract at the time the Agreement was signed by the parties. Owner reserves the right to increase or decrease quantities, and to eliminate quantities, as Owner may deem necessary or as may be necessary due to Site conditions encountered.
   3. Adjustment of Unit Prices Due to Variation in Quantities:
      a. Provisions, if any, regarding adjustment of unit prices due to variations in actual quantities (eligible for payment) from the estimated quantities in the Contract (including quantities at the time the Agreement was signed by the parties and as subsequently modified by Change Order) are in the General Conditions, as may be modified by the Supplementary Conditions.
         1) Engineer's review for possible unit price adjustment, when provision for such adjustment is expressly indicated in the Contract, will be at a time Engineer deems reasonable and proper.
         2) When the Supplementary Conditions establish that, to be eligible for an adjustment in the unit price, a pay item of Unit Price Work must have a total computed, extended price (at the time the Agreement was signed by the parties) equal to or greater than a specified percentage (stipulated in the Supplementary Conditions) of the total Contract Price (at the time the Agreement was signed by the parties), and the total extended price of such pay item does not exceed the stipulated percentage of the Contract Price, then the associated pay item will be paid at the unit price in the Contract without adjustment for variations in actual quantity.
   4. Quantities eligible for payment will be actual quantities furnished and installed (as applicable) in accordance with the Contract Documents, within the pay limits shown or indicated, as measured by Engineer (or other entity so empowered in the Contract Documents), and recommended for payment by Engineer.
   5. At Contractor's expense, Contractor may independently verify quantities measured by Engineer for payment. Should Contractor disagree with quantities measured and recommended for payment by Engineer, submit appropriate Change Proposal (appealing Engineer's measurements) indicating the specific reasons for Contractor's appeal, with detailed reasons therefor and associated calculations and estimates, in accordance with the Contract Documents.
   6. Quantity Overruns:
      a. When the quantity of a pay item of Unit Price Work eligible for payment exceeds the pay item's quantity included in the Contract, Owner will pay for quantities that exceed those in the Contract only while the estimated total payments to Contractor under the Contract will not exceed the Contract Price. Otherwise, a Change Order is required to modify the associated quantity in the Contract, thus changing the Contract Price.

7. Except as may be established elsewhere in the Contract Documents, make no claim for anticipated profit, loss of profit, damages, or additional compensation arising from difference between quantities of Unit Price Work eligible for payment and the estimated quantities in the Contract.

B. Measuring for Payment:
   1. At Engineer's option, Engineer may delegate to Resident Project Representative (RPR) (if any), some or all of Engineer's responsibilities for measuring Unit Price Work eligible for payment.
   2. Unless expressly indicated otherwise in the Contract Documents, measurements will be in United States standard measurements.
   3. Unless indicated otherwise elsewhere in the Contract Documents, quantities of Unit Price Work eligible for payment will be rounded to the nearest whole number.
   4. In the event of conflict between this Section and the measurement criteria in the Specifications of Divisions 02-49, the measurement criteria in this Section will govern. Typical intent when measurement criteria are in both this Section and the associated Division 02-49 Specifications section, is for the criteria to be interpreted together.
   5. Assistance with Measurements:
      a. Assist Engineer and Resident Project Representative (RPR) (if any), by providing measuring equipment, labor, and survey personnel necessary to measure quantities eligible for payment.
   6. Quantities eligible for payment can be adjusted by Engineer to correct quantities included in Contractor's prior payment requests, and for incomplete or defective Unit Price Work. Such corrections are at Engineer's sole discretion.

## 1.4 GENERAL PROVISIONS ON LUMP SUM ITEMS

A. Progress payments for Work paid on a lump sum basis will based on Engineer's estimate of the Work (in accordance with the Contract Documents) performed through the end of the associated pay period, based on the Schedule of Values accepted by Engineer in accordance with the Contract Documents.

B. At its sole discretion, Engineer may correct amounts of lump sum Work included in prior payment requests based on improved data or information available to Engineer, or Engineer's knowledge or reasonable belief that Work is incomplete or defective.

## 1.5 BID/PAY ITEMS – GENERAL CONTRACT

A. Item 1 – Replacement of 2-in Waterline:
   1. Measurement: Lump Sum.
   2. Item Includes:
      a. Coordination with Owner to locate and isolate waterline throughout the Work.
      b. Excavation and disposal of existing 2-in waterline.
      c. Installation of new 4-in waterline.
      d. Collection, handling, and disposal of debris.
      e. Traffic control and permitting as needed throughout the Work.
      f. Site maintenance and restoration.
      g. Testing, disinfection, and start-up of new waterline.
   3. Payment: Per completion of all work associated with the replacement of the existing undersized waterline at the Tinsley Creek Subdivision.

B. Item 2 – Replacement of 6-in Waterline:
   1. Measurement: Lump Sum.
   2. Item Includes:
      a. Coordination with Owner to locate and isolate waterline throughout the Work.
      b. Excavation and disposal of existing 6-in waterline.
      c. Installation of new 6-in waterline.
      d. Collection, handling, and disposal of debris.
      e. Traffic control and permitting as needed throughout the Work.

f. Site maintenance and restoration.
g. Testing, disinfection, and start-up of new waterline.

3. Payment: Per completion of all work associated with the replacement of the existing waterline at the KY 274 Creek Crossing.

C. Item 3 – Mobilization and Demobilization:
1. Measurement: Lump Sum.
2. Item Includes:
a. Work and activities indicated in this provision are intended as illustrative for purposes of scope and payment and do not represent a complete list of all preconstruction activities and Submittals, or all Work or activities required by the contract for mobilization and demobilization.
b. Mobilization Work paid under this item will include:
1) Furnishing required performance bond and payment bond.
2) Furnishing required insurance and associated documentation.
3) Obtaining Owner's acceptance of proposed Subcontractors and Suppliers and entering into subcontracts and purchase orders needed to start the Work.
4) Preparing and obtaining Engineer's approval of Shop Drawings as required.
5) Preparing and obtaining Engineer's acceptance of schedules, including Progress Schedule, Schedule of Submittals, and Schedule of Values.
6) Preconstruction conference(s) required by the Contract Documents.
7) Preconstruction photographic documentation.
8) Establishing Contractor's Site-specific health and safety plan, preconstruction activities needed to start implementing Contractor's safety programs, and verifying status of training of construction workers and personnel and condition of construction equipment, machinery, and tools.
9) Submitting acceptable emergency contact information
10) Obtaining required permits needed to start the Work.
11) Initial establishment of temporary utilities and temporary facilities.
12) Establishing Contractor's field office and sheds, [Engineer's field office,] Contractor's storage areas, staging and laydown areas, and other areas necessary to perform the Work.
13) Initial establishment of construction vehicular access to the Site, parking needed for construction, and offsite haul routes.
14) Establishing construction equipment, machinery, and tools at the Site.
15) Providing initial temporary controls.
16) Temporary security needed to start Work at the Site.
17) Other mobilization acceptable to Engineer.
c. Demobilization Work paid under this item will include:
1) Removal from the Site and adjacent areas of excess materials and equipment.
2) Removal of temporary controls, temporary facilities, temporary barriers, and similar materials and equipment.
3) Removal of temporary access roads and parking areas not part of permanent pavement or otherwise allowed to remain by Owner, including temporary traffic controls established for construction vehicles and equipment.
4) Removal of all field office and sheds, storage areas, staging and laydown areas, and other areas needed to perform the Work and restoration of such areas.
5) Removal from the Site of all construction equipment, machinery, tools, Contractor's containers, temporary fuel storage tanks, and similar items.
6) Closeout of permits on which Contractor is a permittee or co-permittee.
7) Final cleaning.
8) Furnishing required closeout documents.
9) Other costs and effort by Contractor for demobilization.
d. Other cost and Work are under other bid/pay items in the Contract.

3. Payment: Lump sum price for this item will be full compensation for all mobilization and demobilization required and needed for the Contract, not included under other bid/pay items or contracts.

## PART 2 - PRODUCTS - (NOT USED)

## PART 3 - EXECUTION - (NOT USED)

**END OF SECTION**

# SECTION 01 78 36
WARRANTIES

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. General requirements for warranties required in the various Specifications.
   2. Provisions addressing:
      a. Suppliers' standard warranties.
      b. Suppliers' special or extended warranties.
      c. Commencement and duration of warranties.

### 1.2 SUBMITTALS

A. General:
   1. For each item of equipment furnished under the Contract, submit Supplier's standard warranty, regardless of whether such warranty or Submittal thereof is required by the associated Specifications for that item. Submit such warranties for materials where such Submittal is required in the Specifications for the material.
   2. For each item of material or equipment where Supplier's special (or extended) warranty is required by the Contract Documents, submit appropriate special warranty that complies with the Contract Documents.
   3. Supplier's warranties shall be specifically endorsed to Owner, Contractor, and the entity purchasing the item (if other than Contractor) by the entity issuing such warranty.
   4. Submit Suppliers' standard warranties and special warranties as Submittals in accordance with the Schedule of Submittals accepted by Engineer.

### 1.3 CONTRACTOR'S GENERAL WARRANTY AND CORRECTION PERIOD OBLIGATIONS

A. Contractor's General Warranty and Guarantee: Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.

B. Contractor's Warranty of Title: Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.

C. Correction Period: Comply with requirements of the General Conditions, as may be modified by the Supplementary Conditions.

### 1.4 SUPPLIERS' WARRANTIES FOR MATERIALS AND EQUIPMENT

A. Warranty Types:
   1. Required by the General Conditions:
      a. Warranties specified for materials and equipment shall be in addition to, and run concurrent with, Contractor's general warranty and guarantee and requirements for the Contract's correction period.
      b. Disclaimers and limitations in specific materials and equipment warranties do not limit Contractor's general warranty and guarantee, nor does such affect or limit Contractor's performance obligations under the correction period.
   2. Material or equipment manufacturer's standard warranty is pre-printed, written warranty published by item's manufacturer and specifically endorsed by manufacturer to the entities indicated in this Specifications Section's Article 1.2.
   3. Special warranty is written warranty that either extends the duration of material or equipment manufacturer's standard warranty or provides other, increased rights to Owner and other beneficiaries (if any) of such warranty. Where the Contract Documents indicate specific requirements for warranties that differ from the manufacturer's standard warranty for that item, special warranty is implied.

B. Requirements for Special Warranties:
   1. Submit written special warranty document that contains appropriate provisions and identification, ready for signature by material or equipment manufacturer, Owner, and other beneficiaries indicated in Article 1.2 of this Specifications Section. Submit draft warranty with Submittals required prior to fabrication and shipment of the item from the Supplier's facility.
   2. Manufacturer's Standard Form: Modified to include Project-specific information and properly signed by product manufacturer and other entities as appropriate.
   3. Specified Form: When specified forms for special warranties are included in the Contract Documents, prepare written document, properly signed by item manufacturer, Owner, and other beneficiaries indicated in Article 1.2 of this Specifications Section, using the required form.
   4. Refer to the Specifications for content and requirements for submitting special warranties.

## 1.5 COMMENCEMENT AND DURATION OF WARRANTIES

A. Commencement of Warranties:
   1. Contract correction period and Contractor's general warranty commence as indicated in the General Conditions, as may be modified by the Supplementary Conditions.
   2. Suppliers' standard warranties and special warranties commence running on the date that the associated item is certified by Engineer as substantially complete in accordance with the Contract Documents. In no event shall special warranties commence running prior to Engineer's review and acceptance of special warranty Submittal for the item.
   3. Implied warranties commence in accordance with Laws and Regulations.

B. Duration of Warranties:
   1. Duration of correction period is set forth in the General Conditions, as may be modified by the Supplementary Conditions.
   2. Duration of Contractor's general warranty and guarantee is in accordance with Laws and Regulations.
   3. Duration of Suppliers' standard warranties is in accordance with the applicable standard warranty document accepted for the Project by Engineer.
   4. Duration of required Suppliers' special warranties shall be in accordance with the requirements of the Contract Documents for the subject item.

# PART 2 - PRODUCTS - (NOT USED)

# PART 3 - EXECUTION - (NOT USED)

**END OF SECTION**

# DIVISION 31

## EARTHWORK

# SECTION 31 23 10
# EXCAVATION AND BACKFILL

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Earthwork - excavation, backfilling, compaction, disposal of waste and surplus materials, placing structural fill, placing crushed stone, sheeting, bracing, dewatering and other Earthwork related work.

B. Related Specification Sections include but are not necessarily limited to:
   1. Division 33 - Utilities

### 1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. C33, Standard Specification for Concrete Aggregates.
      b. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 FT-LBF/CUFT).
      c. D1241, Standard Specification for Material for Soil-Aggregate Subbase, Base, and Surface Courses.
      d. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 FT-LBF/CUFT(2,700 kN-M/M)).
      e. D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
      f. D3786, Standard Test Method for Bursting Strength of Textile Fabrics--Diaphragm Bursting Strength Tester Method.
      g. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
      h. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
      i. D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
   2. American Association of State Highway and Transportation Officials (AASHTO)
      a. M 43, Standard Specification for Sizes of Aggregate for Road and Bridge Construction.
      b. M 57, Standard Specification for Materials for Embankment and Subgrades.
      c. M 147, Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.

B. Federal Regulations:
   1. Occupational Safety and Health Administration (OSHA):
      a. 29 CFR Part 1926.650, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

### 1.3 DEFINITIONS

A. Excavation:
   1. Consists of removal of material encountered to subgrade elevations required or indicated.
   2. Includes excavation of soils; pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; boulders; and rock.

B. Foundations: Footings, base slabs, foundation walls, mat foundations, grade beams, piers and any other support placed directly on soil or rock.

C. Geotechnical Engineer: Independent geotechnical specialist providing field quality control for the project.

D. Non-Structural Fill/Backfill: Soil materials placed and compacted to achieve finish grade elevations that do NOT support foundations, slabs, paving, or other flatwork.

E. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

F. Subgrade: The earth or soil layer immediately below foundation bearing elevation, subbase material, fill material, backfill material, or topsoil materials.

G. Unauthorized Excavation:
   1. Consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer.
      a. Unauthorized excavation, as well as associated remedial work as directed by Engineer or Geotechnical Engineer, shall be at Contractor's expense.
   2. Unsuitable Soil Materials: Soil materials encountered at or below subgrade elevation of insufficient strength and stiffness to support construction as determined by the Geotechnical Engineer.

### 1.4 SUBMITTALS

A. Product Data:
   1. Acknowledgement that products submitted meet requirements of standards referenced.
   2. Manufacturer's installation instructions.
   3. Certifications.

B. Samples:
   1. Coordinate samples and testing for approval of off-site materials with the Geotechnical Engineer.

### 1.5 PROJECT CONDITIONS

A. Salvageable Items: Carefully remove items to be salvaged, and store on Owner's premises unless otherwise directed.

B. Dispose of waste materials, legally, off site.
   1. Burning, as a means of waste disposal, is not permitted.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Fill and Backfill:
   1. Selected material approved by Geotechnical Engineer [from site excavation or] from off site borrow.
   2. Structural Fill:
      a. May be low volume change cohesive or granular soil at Contractor's option.
      b. Free of organic matter, frozen material and debris.
      c. Low volume change cohesive soil:
         1) ASTM D2487 classification: [CL-ML or CL].
         2) Liquid limit: Less than [45].
         3) Maximum plasticity index: [20].
      d. Granular soil:
         1) ASTM D2487 classification: [GW, GP, GM, GC, SW, SP, SM or SC].
   3. Non-Structural Fill:
      a. ASTM D2487 classification: [GW, GP, GM, GC, SC, SW, SP, SM, CL-ML or CL].
      b. Liquid limit: Less than [45].
      c. Maximum plasticity index: [20].

## PART 3 - EXECUTION

### 3.1 PROTECTION

A. Erosion Control:
   1. See Specification Section 31 25 00.
   2. Clean paved roadways daily of any spillage of dirt, rocks or debris from vehicles and equipment entering or leaving site.
   3. Conduct work to minimize erosion of site. Remove eroded material washed off site.
      a. If necessary or requested by Engineer, construct stilling areas to settle and detain eroded material.

B. Protect existing surface and subsurface features on-site and adjacent to site as follows:
   1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing items indicated to remain in place.
   2. Protect and maintain bench marks, monuments or other established reference points and property corners.
      a. If disturbed or destroyed, replace at own expense to full satisfaction of Owner and controlling agency.
   3. Maintain free of damage, existing sidewalks, structures, and pavement, not indicated to be removed.
      a. Protect new and existing structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
      b. Any item known or unknown or not properly located that is inadvertently damaged shall be repaired to original condition.
      c. All repairs to be made and paid for by Contractor.
   4. Provide full access to public and private premises, fire hydrants, street crossings, sidewalks and other points as designated by Owner to prevent serious interruption of travel.
   5. Maintain stockpiles and excavations in such a manner to prevent inconvenience or damage to structures on-site or on adjoining property.
   6. Avoid surcharge or excavation procedures which can result in heaving, caving, or slides.

### 3.2 EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES

A. General:
   1. In general, work includes, but is not necessarily limited to, excavation for structures and retaining walls, removal of underground obstructions and undesirable material, backfilling, filling, and fill, backfill, and subgrade compaction.
   2. Obtain fill and backfill material necessary to produce grades required.
      a. Materials and source to be approved by Geotechnical Engineer.
      b. Excavated material approved by Geotechnical Engineer may also be used for fill and backfill.
   3. In the paragraphs of this Specification Section, the word "soil" also includes any type of rock subgrade that may be present at or below existing subgrade levels.

B. Filling and Backfilling Outside of Structures.
   1. This paragraph of this Specification applies to fill and backfill placed outside of structures above bottom level of both foundations and piping but not under paving.
   2. Provide material as approved by Geotechnical Engineer for filling and backfilling outside of structures.
   3. Fill and backfill placement:
      a. Prior to placing fill and backfill material, obtain optimum moisture and maximum density properties for proposed material from Geotechnical Engineer.
      b. Place fill and backfill material to maximum allowable lift thickness indicated in Paragraph 3.2, C, 5, b of this Section.
      c. Compact material with equipment of proper type and size to obtain density specified.

d. Use hand operated equipment for filling and backfilling within 5 FT of walls and less than 3 FT above pipes.
    1) Compaction equipment exceeding 3000 LBS dead weight shall not be used within 5 FT of the wall as a minimum.
    2) Contractor is responsible for method of compaction so as not to damage walls or buried commodities.
e. Use only hand operated equipment for filling and backfilling next to walls and retaining walls.
f. Do not place fill or backfill material when temperature is less than 40 DEGF and when subgrade to receive material is frozen, wet, loose, or soft.
g. Use vibratory equipment for compacting granular material; do not use water.

4. Backfilling against walls:
    a. Do not backfill around any part of structures until each part has reached specified 28-day compressive strength and backfill material has been approved.
    b. Do not start backfilling until concrete forms have been removed, trash removed from excavations, pointing of masonry work, concrete finishing, dampproofing and waterproofing have been completed.
    c. Do not place fills against walls until floor slabs at top, bottom, and at intermediate levels of walls are in place and have reached 28-day required compressive strength to prevent wall movement.
        1) See Contract Drawings for specific exceptions.
    d. Bring backfill and fill up uniformly around the structures and individual walls, piers, or columns.

C. Backfilling Outside of Structures Under Piping or Paving:
1. When backfilling outside of structures requires placing backfill material under piping or paving, the material shall be placed from bottom of excavation to underside of piping or paving at the density required for fill under piping or paving as indicated in this Specification Section.
2. This compacted material shall extend transversely to the centerline of piping or paving a horizontal distance each side of the exterior edges of piping or paving equal to the depth of backfill measured from bottom of excavation to underside of piping or paving.
3. Provide special compacted bedding or compacted subgrade material under piping or paving as required by other Specification Sections for the Project.

## 3.3 COMPACTION DENSITY REQUIREMENTS

A. Obtain approval from Geotechnical Engineer with regard to suitability of soils and acceptable subgrade prior to subsequent operations.

B. Provide dewatering system necessary to successfully complete compaction and construction requirements.

C. Remove frozen, loose, wet, or soft material and replace with approved material as directed by Geotechnical Engineer.

D. Stabilize subgrade with well graded granular materials as directed by Geotechnical Engineer.

1. Specific areas:

## 3.4 FIELD QUALITY CONTROL

A. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA standards 29 CFR Part 1926.650 Subpart P, and state requirements. Where conflict between OSHA and state regulations exists, the more stringent requirements shall apply.

B. Responsibilities of Special Inspector:
   1. Review proposed materials for fill and backfill around structures.
   2. All testing, observation and work indicated as being performed by the Geotechnical Engineer in [this Specification Section] [Article 3.5 of this Specification Section].
   3. Services will include verification and documentation of satisfactory soil materials, subgrade quality, sampling, placement, moisture conditioning, compaction and testing of proposed soil materials, and field testing for quality control.
   4. Moisture density relations, to be established by the Geotechnical Engineer required for all materials to be compacted.
   5. Extent of compaction testing will be as necessary to assure compliance with specifications.
   6. Prepare and submit inspection and test reports to Engineer.
      a. Coordinate such work with other Special Inspectors.
   7. Test reports to include the following:
      a. Report and certification of aggregate fill and drainage fill.
      b. Test reports on borrow material.
      c. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
      d. Field reports; in-place soil density and moisture tests.
      e. One optimum moisture-maximum density curve for each type of soil encountered.
      f. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.
      g. Other documentation necessary for Geotechnical Engineer to approve earthwork.
      h. Assist Engineer to determine corrective measures necessary for defective work.

C. Responsibilities of Testing Agency for Excavation and Backfilling:
   1. All testing, observation and work indicated as being performed by the Geotechnical Engineer in other than Article 3.5 of this Specification Section.
   2. Services will include verification and documentation of satisfactory soil materials, subgrade quality, sampling, placement, moisture conditioning, compaction and testing of proposed soil materials, and field testing for quality control.
   3. Moisture density relations, to be established by the Geotechnical Engineer required for all materials to be compacted.
   4. Extent of compaction testing will be as necessary to assure compliance with specifications.

**END OF SECTION**

# SECTION 31 23 33
## TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Excavation, trenching, backfilling and compacting for all underground utilities.

B. Related Specification Sections include but are not necessarily limited to:
   1. Section 31 23 10 – Excavation and Backfill.
   2. Section 33 11 13 – Water Main Construction.

### 1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 FT-LBF/FT$^3$ (600 kN-M/M$^3$)).
      b. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
      c. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

B. Qualifications: Hire an independent soils laboratory to conduct in-place moisture-density tests for backfilling to assure that all work complies with this Specification Section.

### 1.3 DEFINITIONS

A. Excavation: All excavation will be defined as unclassified.

### 1.4 SUBMITTALS

A. Shop Drawings:
   1. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
   2. Submit respective pipe or conduit manufacturer's data regarding bedding methods of installation and general recommendations.
   3. Submit sieve analysis reports on all granular materials.

B. Informational Submittals:
   1. Trench shield (trench box) certification if employed:
      a. Specific to Project conditions.
      b. Re-certified if members become distressed.
      c. Certification by registered professional structural engineer, registered in the state where the Project is located.
      d. Engineer is not responsible to, and will not, review and approve.

### 1.5 SITE CONDITIONS

A. Avoid overloading or surcharge a sufficient distance back from edge of excavation to prevent slides or caving.
   1. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property owners.

B. Provide full access to public and private premises and fire hydrants, at street crossings, sidewalks and other points as designated by Owner to prevent serious interruption of travel.

C. Protect and maintain bench marks, monuments or other established points and reference points and if disturbed or destroyed, replace items to full satisfaction of Owner and controlling agency.

D. Verify location of existing underground utilities

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Crushed stone material shall conform with the requirements of the applicable sections of the Kentucky Bureau of Highways Standard Specifications and shall consist of clean, hard, and durable particles or fragments, free from dirt, vegetation or objectionable materials.

B. Two classes of crushed stone material are used in this Section. The type of material in each class is as follows:
   1. Class I - No. 9 Aggregate.
   2. Class II - Dense Graded Aggregate (DGA).

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Remove and dispose of unsuitable materials as directed by Engineer or Owner Representative to site provided by Owner.

### 3.2 EXCAVATION

A. Unclassified Excavation: Remove rock excavation, clay, silt, gravel, hard pan, loose shale, and loose stone.

B. Excavation for Appurtenances:
   1. 12 IN (minimum) clear distance between outer surface and embankment.
   2. See Specification Section 31 23 00 for applicable requirements.
   3. See Specification Section 33 05 16 for applicable requirements.

C. Groundwater Dewatering:
   1. Where groundwater is, or is expected to be, encountered during excavation, install a dewatering system to prevent softening and disturbance of subgrade to allow [subgrade stabilization,] pipe, bedding and backfill material to be placed in the dry, and to maintain a stable trench wall or side slope.
   2. Groundwater shall be drawn down and maintained at least 3 FT below the bottom of any trench or manhole excavation prior to excavation.
   3. Review soils investigation before beginning excavation and determine where groundwater is likely to be encountered during excavation.
      a. Employ dewatering specialist for selecting and operating dewatering system.
   4. Keep dewatering system in operation until dead load of pipe, structure and backfill exceeds possible buoyant uplift force on pipe or structure.
   5. Dispose of groundwater to an area which will not interfere with construction operations or damage existing construction.
   6. Install groundwater monitoring wells as necessary.
   7. Shut off dewatering system at such a rate to prevent a quick upsurge of water that might weaken the subgrade.

D. Trench Excavation:
   1. Excavate trenches by open cut method to depth shown on Drawings and necessary to accommodate work.
      a. Support existing utility lines and yard piping where proposed work crosses at a lower elevation.
         1) Stabilize excavation to prevent undermining of existing utility and yard piping.

2. Open trench outside buildings, units, and structures:
   a. No more than the distance between two manholes, structures, units, or 300 LF, whichever is less.
   b. Field adjust limitations as weather conditions dictate.
3. Any trench or portion of trench, which is opened and remains idle for seven calendar days, or longer, as determined by the Owner, may be directed to be immediately refilled, without completion of work, at no additional cost to Owner.
   a. Said trench may not be reopened until Owner is satisfied that work associated with trench will be prosecuted with dispatch.
4. Observe following trenching criteria:
   a. Trench size:
      1) Excavate width to accommodate free working space.
      2) Maximum trench width at top of pipe or conduit may not exceed outside diameter of utility service by more than the following dimensions:

| OVERALL DIAMETER OF UTILITY SERVICE | EXCESS DIMENSION |
|---|---|
| 33 IN and less | 18 IN |
| more than 33 IN | 24 IN |

      3) Cut trench walls vertically from bottom of trench to 1 FT above top of pipe, conduit, or utility service.
      4) Keep trenches free of surface water runoff.
         a) Include cost in Bid.
         b) No separate payment for surface water runoff pumping will be made.

E. Trenching for Electrical Installations:
   1. Observe the preceding Trench Excavation paragraph in PART 3 of this Specification Section.
   2. Modify for electrical installations as follows:
      a. Open no more than 600 LF of trench in exterior locations for trenches more than 12 IN but not more than 30 IN wide.
      b. Any length of trench may be opened in exterior locations for trenches which are 12 IN wide or less.
      c. Do not over excavate trench.
      d. Cut trenches for electrical runs with minimum 30 IN cover, unless otherwise specified or shown on Drawings.
      e. See Division 26 for additional requirements.

F. Flowable Fill:
   1. Flowable fill must meet Tennessee DOT Standards.
   2. Flowable fill shall be:
      a. Discharged from a mixer by any means acceptable to the Engineer into the area to be filled.
      b. Placed in 4 FT maximum lifts to the elevations indicated.
         1) Allow 12 HR set-up time before placing next lift or as approved by the Engineer.
         2) Place flowable fill lifts in such a manner as to prevent flotation of the pipe.
   3. Flowable fill shall not be placed on frozen ground.
   4. Subgrade on which flowable fill is placed shall be free of disturbed or softened material and water.
   5. Flowable fill batching, mixing, and placing may be started if weather conditions are favorable, and the air temperature is 34 DEGF and rising.
   6. At the time of placement, flowable fill must have a temperature of at least 40 DEGF.
   7. Mixing and placing shall stop when the air temperature is 38 DEGF or less and falling.
   8. Each filling stage shall be as continuous an operation as is practicable.

9. Prevent traffic contact with flowable fill for at least 24 HRS after placement or until flowable fill is hard enough to prevent rutting by construction equipment.
10. Flowable fill shall not be placed until water has been controlled or groundwater level has been lowered in conformance with the requirements of the preceding Groundwater Dewatering paragraph in PART 3 of this Specification Section.

## 3.3 PREPARATION OF FOUNDATION FOR PIPE LAYING

A. Over-Excavation:
   1. Backfill and compact to 90% of maximum dry density per ASTM D698.
   2. Backfill with granular bedding material as option.

B. Rock Excavation:
   1. Excavate minimum of 6 IN below bottom exterior surface of the pipe or conduit.
   2. Backfill to grade with suitable earth or granular material.
   3. Form bell holes in trench bottom.

C. Subgrade Stabilization:
   1. Stabilize the subgrade when directed by the Owner.
   2. Observe the following requirements when unstable trench bottom materials are encountered.
      a. Notify Owner when unstable materials are encountered.
         1) Define by drawing station locations and limits.
      b. Remove unstable trench bottom caused by Contractor failure to dewater, rainfall, or Contractor operations.
         1) Replace with subgrade stabilization with no additional compensation.

## 3.4 BACKFILLING METHODS

A. Do not backfill until tests to be performed on system show system is in full compliance with specified requirements.

B. Carefully Compacted Backfill:
   1. Furnish where indicated on Drawings, specified for trench embedment conditions and for compacted backfill conditions up to 12 IN above top of pipe or conduit.
   2. Comply with the following:
      a. Place backfill in lifts not exceeding 8 IN (loose thickness).
      b. Hand place, shovel-slice, and pneumatically tamp all carefully compacted backfill.
      c. Observe specific manufacturer's recommendations regarding backfilling and compaction.
      d. Compact each lift to specified requirements.

C. Common Trench Backfill:
   1. Perform in accordance with the following:
      a. Place backfill in lift thicknesses capable of being compacted to densities specified.
      b. Observe specific manufacturer's recommendations regarding backfilling and compaction.
      c. Avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion.

D. Water flushing for consolidation is not permitted.

E. Backfilling for Electrical Installations:
   1. Observe the preceding Carefully Compacted Backfill paragraph or Common Trench Backfill paragraph in PART 3 of this Specification Section or when approved by the Engineer.
   2. Modify for electrical installation as follows:
      a. Observe notes and details on electrical drawings for fill in immediate vicinity of direct burial cables

## 3.5 COMPACTION

A. General:

1. Place and assure bedding, backfill, and fill materials achieve an equal or higher degree of compaction than undisturbed materials adjacent to the work.
2. In no case shall degree of compaction below minimum compactions specified be accepted.

B. Compaction Requirements:
1. Unless noted otherwise on Drawings or more stringently by other Specification Sections, comply with following minimum trench compaction criteria.
a. Bedding material:

| LOCATION | SOIL TYPE | COMPACTION DENSITY |
|---|---|---|
| All locations | Cohesionless soils | 75% relative density by ASTM D4253 and ASTM D4254 |

b. Carefully compacted backfill:

| LOCATION | SOIL TYPE | COMPACTION DENSITY |
|---|---|---|
| All applicable areas | Cohesive soils | 95% of maximum dry density by ASTM D698 |
| | Cohesionless soils | 75% relative density by ASTM D4253 and ASTM D4254 |

c. Toe drain bedding and backfill:

| LOCATION | SOIL TYPE | COMPACTION DENSITY |
|---|---|---|
| All locations | Cohesionless soils | 60% relative density by ASTM D4253 and ASTM D4254 |

d. Common trench backfill:

| LOCATION | SOIL TYPE | COMPACTION DENSITY |
|---|---|---|
| Under pavements, roadways, surfaces within highway right-of-ways | Cohesive soils | 95% of maximum dry density by ASTM D698 |
| | Cohesionless soils | 60% of relative density by ASTM D4253 and ASTM D4254 |
| Under turfed, sodded, plant seeded, nontraffic areas | Cohesive soils | 85% of maximum dry density by ATM D698 |
| | Cohesionless soils | 40% of relative density by ASTM D4253 and ASTM D4254 |

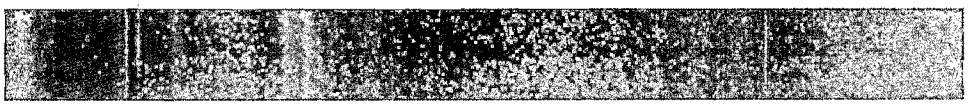
## 3.6 FIELD QUALITY CONTROL

A. Testing:
1. Perform in-place moisture-density tests as directed by the Owner.
2. Perform tests through recognized testing laboratory approved by Owner.
3. Costs of "Passing" tests paid by Owner.
4. Perform additional tests as directed until compaction meets or exceeds requirements.
5. Cost associated with "Failing" tests shall be paid by Contractor.
6. Reference to Engineer in this Specification Section will imply Geotechnical Engineer when employed by Owner and directed by Engineer to undertake necessary inspections as approvals as necessary.
7. Assure Owner has immediate access for testing of all soils related work.
8. Ensure excavations are safe for testing personnel.

**END OF SECTION**

# DIVISION 32

## EXTERIOR IMPROVEMENTS



# SECTION 32 12 16
## ASPHALTIC CONCRETE VEHICULAR PAVING

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Asphaltic concrete vehicular paving.
   2. Line painting.

B. Related Specification Sections include but are not necessarily limited to:

### 1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. Federal Specifications (FS):
      a. TT-P-1952F, Paint, Traffic and Airfield Marking, Waterborne.
   2. Construction standards: Kentucky Transportation Cabinet Standards, as amended to date.

### 1.3 SUBMITTALS

A. Shop Drawings:
   1. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
      c. Asphalt design mix.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Prime coat: Cut-back asphalt.

B. Tack coat: Emulsified asphalt.

C. Asphaltic cement: AASHTO M226 and as required by local authorities.

D. Aggregate: Crushed stone or crushed gravel.

E. Traffic paint: Quick-drying chlorinated-rubber alkyd type, color as approved.

F. Wheel-stops: Precast concrete of uniform color and texture with steel stakes.

### 2.2 MIXES

A. Comply with mix design as stated in KYTC Specification Divisions 400 and 500.

## PART 3 - EXECUTION

### 3.1 NEW PAVEMENT INSTALLATION

A. Asphalt/aggregate Mixture: Comply with local DPW Standard Specifications for Highways and Bridges. Class as required by loading and use.

B. Remove loose material from existing pavement. Proof roll and check for areas requiring additional compaction. Report unsatisfactory conditions in writing. Beginning of work means acceptance of condition of existing pavement and subbase.

C. Apply prime coat to prepared surface. Apply tack coat to previous laid work and adjacent in place concrete surfaces.

D. Place bituminous concrete at minimum temperature of 225 degrees F in strips not less than 10' wide overlapping joints in previous courses. Complete entire base course thickness before beginning surface course.

E. Construct curbs, where required, to dimensions indicated or if not indicated to standard shapes. Provide tack coat between curb and pavement.

F. Begin rolling when pavement can withstand weight of roller. Roll while still hot to obtain maximum density and to eliminate roller marks.

G. Provide 4" lane and striping paint in uniform, straight lines. Provide wheelstops where indicated and securely dowel into pavement.

## 3.2 TRENCH WIDTH PAVEMENT REPLACEMENT

A. Sections of pavement shall be replaced as required to install the pipelines. Disturbed pavement shall be reconstructed to original lines and grades with bituminous binder as detailed on the Drawings and in such manner as to leave all such surfaces in fully as good or better condition than that which existed prior to these operations.

B. Prior to trenching, the pavement shall be scored or cut to straight edges along each side of the proposed trench to avoid unnecessary damage to the remainder of the paving. Edges of the existing pavement shall be recut and trimmed as necessary to square, straight edges after the pipe has been installed and prior to placement of the binder course or concrete.

C. Backfilling of trenches shall be in accordance with the applicable portions of Section 31 23 33.

D. Bituminous surface shall be one course construction of an appropriate surface JMF prepared and installed in accordance with the requirements of the Kentucky Department of Highways.
   1. Placement and compaction of surface course shall be in accordance with Section 403 of the Kentucky Department of Highways Standard Specifications. Minimum thickness after compaction shall be as detailed on the Drawings.

E. Dense graded aggregate base, as detailed on the drawings, shall conform to the applicable requirements of the Kentucky Department of Highways.

F. Bituminous pavement replacement is NOT separate pay item.

## 3.3 LINE PAINTING:

A. Thoroughly clean surfaces which are to receive paint.

B. Dry completely before paint is applied.

C. Do not paint until minimum of five days has elapsed from time surface is completed.
   1. A longer period may be required if directed by Engineer.

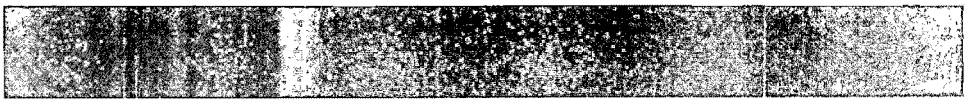
D. Do not apply paint over wet surfaces, during wet or damp weather, or when temperature is below 40 DEGF.

E. Lay out markings and striping in accordance with Drawings.
   1. Width of painted lines: 4 IN.

**END OF SECTION**

# DIVISION 33

## UTILITIES



# SECTION 33 11 13
# WATER MAIN CONSTRUCTION

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Coordination and interface with existing facilities and utilities.
   2. Connections to existing water mains.
   3. Testing, flushing and disinfection.

B. Related Specification Sections include but are not necessarily limited to:
   1. Section 32 12 16 – Asphaltic Concrete Vehicular Paving.
   2. Section 33 12 19 - Fire Hydrant.
   3. Section 40 05 00 - Pipe and Pipe Fittings - Basic Requirements.
   4. Section 40 05 51 - Valves - Basic Requirements.

### 1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Water Work Association (AWWA):
      a. B300, Standard for Hypochlorites.
      b. B301, Standard for Liquid Chlorine.
      c. C651, Standard for Disinfecting Water Mains.

### 1.3 SUBMITTALS

A. Submit results of the leakage tests, identifying the specific length of pipe tested, the test pressure, the duration of test and the amount of leakage.

B. Submit satisfactory bacteriological test reports on disinfection requirements.

C. Contract Closeout Information:
   1. Operation and Maintenance Data:
      a. See Contract Documents for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Pipe: Refer to Specification Section 40 05 00 and Section 40 05 31.

B. In-Line Valves:
   1. Refer to Specification Section 40 05 61.
   2. Provide adjustable valve boxes.
      a. Include price of valve boxes in price of valve installed complete.

C. Fire Hydrants: Refer to Specification Section 33 12 19.

## PART 3 - EXECUTION

### 3.1 INSTALLATION APPLICATION

A. Install water main to the line and grade on the Drawings.
   1. Water mains to be staked at a minimum 100 FT interval with depth of cuts monitored.

B. Field verify depth of utilities that will be crossed.
   1. Adjust water main elevation as required during construction.

2. No separate payment will be made for field verification or adjustment of main depths as required.

C. Contractor will restore all existing structures or services damaged by Contractor's operations at no cost to Owner.

## 3.2 INTERRUPTION OF SERVICE

A. Interruption of service to water users shall not exceed 4 HRS.
   1. Notify property owners of interruption a minimum of 24 HRS in advance.

## 3.3 UNDERGROUND SERVICES

A. Notify utility representative prior to construction to obtain available information on location of existing utilities.
   1. Contractor shall be responsible for locating all utilities.

B. Existing water services are to be connected to the new water mains as directed by Owner.
   1. Damage to existing water service to be repaired, using copper pipe and union the same size as existing service.

## 3.4 DRIVEWAY REMOVAL AND REPLACEMENT

A. All Portland cement concrete and asphalt noted for removal and replacement shall be cut prior to removal.
   1. Cut by sawing, vertical cut to be 1 IN minimum.
   2. The remaining depth of section may be broken out in a manner subject to Engineers approval.
   3. Width of section removed to be either a width not greater than the outside diameter of the water main plus 4 FT-0 IN or broken out to the nearest joint.

B. Replace Portland cement concrete and asphalt equal to or better than original paving plus 2 IN.

C. Debris resulting from the above operations shall be removed and hauled as directed by the Engineer.

D. Include driveway removal and replacement in cost of the bid unit price of the water main.

## 3.5 GRAVEL SURFACED DRIVES AND ROADWAYS

A. Restore all damaged gravel surfaced drives and roadways to a condition equal to or better than original.
   1. Payment to be at bid unit price for this item.
   2. Replacement gravel gradation.

## 3.6 PROTECTION OF EXISTING UTILITIES

A. Contractor to verify the location of all underground utilities.
   1. Omission from, or the inclusion of utility locations on the plans is not to be considered as the nonexistence of or a definite location of existing underground utilities.

B. A representative of the underground utilities shall be notified 24 HRS in advance of crossings.

## 3.7 CONNECTIONS TO EXISTING WATER MAINS

A. Make connections to existing water mains as shown on Drawings, by attaching to existing or changed fitting.
   1. Cost for making connections shall include cost of all fittings including flexible couplings, and shall be included in the bid unit price of the water main.

B. Where the connection is made to an existing water main which can be adequately isolated from the distribution system, it shall be termed a "dry connection."

C. Contractor is responsible for controlling and disposing of water in the trench at no additional cost to the Owner.

## 3.8 SEWER CROSSINGS

A. Water mains crossing house sewers, storm sewers or sanitary sewers shall be laid to provide a vertical separation of at least 18 IN between the bottom of the water main and the top of the sewer, whenever possible.
   1. A water main may be laid closer than 10 FT if the crown of the sewer is at least 18 IN below the water main invert.
   2. In the event 18 IN of vertical separation cannot be provided at a sewer crossing, the sewer shall be removed for a distance of 10 FT on each side of the water main and replaced with one 20 FT length of ductile iron pipe of the same size.

B. Concrete collars shall be provided at each end of the ductile iron pipe to connect to the existing sewer pipe as shown on the Drawings.

C. Payment for crossings shall be included in the bid unit price of the water main.

## 3.9 TREES

A. Do not remove trees without written instructions from the Engineer unless tree removal is shown on drawings.
   1. No separate payment will be made for tree removal and the cost shall be included in the bid unit price for transmission main.

## 3.10 FENCES, SIGNS, MAILBOXES, ETC.

A. Restore all damaged fences, signs, mailboxes, etc., to their original conditions.
   1. No separate payment will be made for these items.

## 3.11 FIELD QUALITY CONTROL

A. Hydrostatic Testing:
   1. All valves, hydrants, pipe and fittings shall be hydrostatically tested.
   2. Furnish all necessary apparatus to run hydrostatic test, including necessary taps into the pipe.
   3. Prior to pressure testing, expel air from the pipe.
   4. Install corporation cocks at all high points in water main to allow air to be expelled.
   5. After pipe has been laid and backfilled, slowly fill each valved section of pipe with water and apply a test pressure of 150 PSI.
   6. After air has been expelled, close corporation cocks and apply test pressure.
   7. The duration of each hydrostatic test to be a minimum of 2 HRS.
   8. Measure leakage from water main while test pressure is applied.
   9. Leakage is defined as the quantity of water that must be supplied into the pipe to maintain the specified leakage test pressure within 5 PSI of the initial 150 PSI test pressure.
   10. No pipe installation will be accepted if leakage is greater than the following:

| PIPE SIZE | MAXIMUM ALLOWABLE LEAKAGE |
|---|---|
| 6 IN | 0.55 GAL per hour per 1000 FT |
| 8 IN | 0.74 GAL per hour per 1000 FT |
| 10 IN | 0.92 GAL per hour per 1000 FT |
| 12 IN | 1.10 GAL per hour per 1000 FT |
| 24 IN | 2.21 GAL per hour per 1000 FT |
| 30 IN | 2.76 GAL per hour per 1000 FT |
| 36 IN | 3.31 GAL per hour per 1000 FT |

   11. For pipe with 20 FT nominal length, multiply the leakage calculated from above table by 0.9.

a. If pipe under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

12. If the leakage is greater than the maximum allowable, at his own expense locate and repair the defective joints until leakage is within the specified allowances.
    a. No separate payment will be made for this item.

B. Sealing, Flushing, and Disinfection of Potable Water Systems:
1. Maintain interior of all pipes, fittings and other accessories free from dirt and foreign material at all times.
    a. If, in the opinion of the Engineer, the pipe contains dirt that will not be removed by flushing, the pipe interior shall be cleaned and swabbed with bactericidal solution.
    b. At close of day's work or whenever workmen are absent from jobsite, plug, cap or otherwise provide watertight seal from open ends of pipe to prevent ingress of foreign material.
    c. If water is in trench, seal shall remain in place until trench is pumped dry.
2. After favorable performance of pressure test and prior to final acceptance, thoroughly flush the entire potable water piping system and perform disinfection as prescribed.
    a. Perform all work including preventative measures during construction in full compliance to AWWA C651.
3. Flush each segment of the system to provide a flushing velocity of not less than 2.5 FT per second.
4. Drain flushing water to location approved by the Owner.
5. Perform disinfection using one of the following forms:
    a. Application of chlorine gas-water mixture by means of solution-feed chlorinating device.
        1) Liquid chlorine shall comply with AWWA B301.
    b. Application of calcium hypochlorite, or sodium hypochlorite.
        1) Chlorine compounds shall comply with AWWA B300.
6. Disinfect pipe with chlorinated water as per AWWA C651.
    a. Method of application of chlorine shall be by continuous feed method or slug method.
    b. During disinfection procedure, ensure that initial and residual chlorine concentrations meet AWWA C651 requirements by testing by an approved method as directed by the Owner.
    c. Cost of testing shall be included in the Bid Unit Price for water mains and no separate payment will be made for this item.
7. Tag the system during the disinfection procedure.
8. Following disinfection for required contact period, neutralize chlorine residual in water by treating with reducing agent.
    a. Refer to AWWA C651.
    b. Flush all treated water from pipeline at its extremities until replacement water throughout pipe, upon test is proved comparable in quality to water in existing system.
    c. Take two samples to test for bacteriological quality as directed by Engineer.
    d. Repeat disinfection procedure until two satisfactory results are obtained.
    e. Quality of water delivered by the new water main to remain satisfactory for a minimum period of two days.
9. Secure satisfactory bacteriological reports on samples from the system.
    a. Ensure all sampling and testing procedures are in full compliance to AWWA C651, and applicable requirements of the State of Kentucky.
        1) No separate payment will be made for this item.
10. The Owner will provide the water required to fill the main initially and will pay for the water required to flush the main once.
    a. Filling and flushing shall be performed during periods of low usage, between the hours of midnight and 4:00 AM.
    b. Flushing water will be based on a maximum of 8 HRS total.
    c. Any additional refilling or reflushing to be at the Contractor's expense at the City's commercial water rates.

**END OF SECTION**

# SECTION 33 12 19
## FIRE HYDRANT

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Dry-barrel fire hydrant.

B. Related Sections include but are not necessarily limited to:
   1. Section 40 05 00 - Pipe and Pipe Fittings - Basic Requirements.

### 1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Water Works Association (AWWA):
      a. C502, Standard for Dry-Barrel Fire Hydrants.
      b. M17, Installation, Operation and Maintenance of Fire Hydrants.

### 1.3 SUBMITTALS

A. Shop Drawings:
   1. Product technical data:
      a. Acknowledgement that products submitted meet the requirements of the standards referenced.
      b. Manufacturer's installation instructions.
      c. Acknowledge and verify dimensions and provide list of integral parts and materials.
   2. Prior to submission of shop drawings, submit one copy of complete submittal information direct to City of Kuttawa Fire Department, Attn: Fire Chief, and request and secure written approval of hydrant selection.
      a. Incorporate copies of written approval letter with submittals.

B. Contract Closeout Information:
   1. Operation and Maintenance Data:
      a. See Specification Section 01 78 23 for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
   1. Mueller.
   2. American Flow Control.
   3. Waterous.

### 2.2 FIRE HYDRANT

A. Design and Fabrication:
   1. Conform to AWWA C502.
   2. Provide with either compression or gate design.
   3. Provide with a 5 IN valve opening, nozzle section consisting of two, 2-1/2 IN hose nozzles and one, 4-1/2 IN steamer.
   4. Provide with water passages to permit full flow of water to minimize friction loss.
   5. Furnish with multiple weep holes for positive draining to allow water to escape readily from standpipe when hydrant valve is closed.
   6. Designed to throttle flow when partially opened.

7. Designed to allow removal of valve and valve stem without digging up hydrant.
8. Suitable for 5 FT of bury.
9. Furnish with mechanical (gland type) joint inlet connections.
10. Design to break off at ground line when struck by a vehicle.
11. Furnish with O-ring packing only.
12. Furnish hose and steamer nozzles with threads conforming to standard threads used by local Fire Department.
13. Furnish with direction of opening as required by local Fire Department with direction of opening cast on dome.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install hydrants at locations indicated in accordance with AWWA M17 and the following:
   1. Remove foreign material from barrel of hydrant before placement.
   2. Install plumb and at same elevation as connecting pipe and main.
   3. Place each hydrant on a slab of concrete not less than 6 IN thick and 18 IN SQ.
   4. Block backside of hydrant, opposite pipe connection, with concrete firmly wedged between hydrant and vertical face of undisturbed trench.
   5. Place granular bedding material around base of hydrant to the dimensions shown in the Drawings.
   6. Firmly tamp carefully compacted backfill around hydrant to surface of ground and to a distance of 5 FT in front of hydrant.

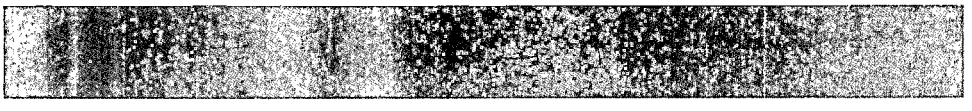
### 3.2 COATINGS AND FINISHES

A. Provide hydrant with below grade and above grade coatings as per Section 09 96 00.
   1. Paint above grade with color conforming to the requirements of the local Fire Department.

**END OF SECTION**

# DIVISION 40

## PROCESS INTERCONNECTIONS



# SECTION 40 05 00
## PIPE AND PIPE FITTINGS - BASIC REQUIREMENTS

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Utility piping systems.
   2. Plumbing piping systems.

B. Related Specification Sections include but are not necessarily limited to:
   1. Section 31 23 33 - Trenching, Backfilling, and Compacting for Utilities.
   2. Section 40 05 31 - Pipe - Plastic
   3. Section 40 05 51 - Valves - Basic Requirements.

### 1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Association of State Highway and Transportation Officials (AASHTO):
   2. American Iron and Steel Institute (AISI).
   3. American Society of Mechanical Engineers (ASME):
      a. B16.5, Pipe Flanges and Flanged Fittings.
      b. B40.100, Pressure Gauges and Gauge Attachments.
   4. ASTM International (ASTM):
      a. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
      b. A74, Standard Specification for Cast Iron Soil Pipe and Fittings.
      c. A106, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
      d. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
      e. A536, Standard Specification for Ductile Iron Castings.
      f. D1785, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
      g. D2466, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
      h. D2467, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
      i. F439, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
      j. F441, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
   5. American Water Works Association (AWWA):
      a. B300, Standard for Hypochlorites.
      b. C200, Standard for Steel Water Pipe - 6 IN and Larger.
      c. C207, Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 IN through 144 IN.
      d. C208, Standard for Dimensions for Fabricated Steel Water Pipe Fittings.
      e. C606, Standard for Grooved and Shouldered Joints.
      f. C651, Standard for Disinfecting Water Mains.
      g. C800, Standard for Underground Service Line Valves and Fittings.
   6. American Water Works Association/American National Standards Institute (AWWA/ANSI):
      a. C110/A21.10, Standard for Ductile-Iron and Gray-Iron Fittings.

b. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
c. C115/A21.15, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
d. C151/A21.51, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
e. C153/A21.53, Standard for Ductile-Iron Compact Fittings for Water Service.
7. International Plumbing Code (IPC).
8. Underwriters Laboratories, Inc. (UL).

B. Coordinate flange dimensions and drillings between piping, valves, and equipment.

## 1.3 DEFINITIONS

A. HPIC: High performance industrial coating.

B. PVDF: Polyvinylidene fluoride.

## 1.4 SYSTEM DESCRIPTION

A. Piping Systems Organization and Definition:
1. Piping services are grouped into designated systems according to the chemical and physical properties of the fluid conveyed, system pressure, piping size and system materials of construction.
2. See PIPING SYSTEMS SCHEDULE in PART 3.

## 1.5 SUBMITTALS

A. Shop Drawings:
1. Product technical data including:
a. Acknowledgement that products submitted meet requirements of standards referenced.
b. Copies of manufacturer's written directions regarding material handling, delivery, storage and installation.
c. Separate schedule sheet for each piping system scheduled in this Specification Section showing compliance of all system components.
1) Attach technical product data on gaskets, pipe, fittings, and other components.
2. Fabrication and/or Layout Drawings:
a. Exterior/yard piping drawings (minimum scale 1 IN equals 10 FT) with information including:
1) Dimensions of piping lengths.
2) Invert or centerline elevations of piping crossings.
3) Acknowledgement of bury depth requirements.
4) Details of fittings, tapping locations, thrust blocks, restrained joint segments, harnessed joint segments, hydrants, and related appurtenances.
5) Acknowledge designated valve or gate tag numbers, manhole numbers, instrument tag numbers, pipe and line numbers.
6) Line slopes and vents.
b. Schedule of interconnections to existing piping and method of connection.

B. Informational Submittals:
1. Qualifications of lab performing disinfection analysis on water systems.
2. Test reports:
a. Copies of pressure test results on all piping systems.
b. Reports defining results of dielectric testing and corrective action taken.
c. Disinfection test report.
d. Notification of time and date of piping pressure tests.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe coating during handling using methods recommended by manufacturer.
1. Use of bare cables, chains, hooks, metal bars or narrow skids in contact with coated pipe is not permitted.

B. Prevent damage to pipe during transit.
   1. Repair abrasions, scars, and blemishes.
   2. If repair of satisfactory quality cannot be achieved, replace damaged material immediately.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
   1. Insulating unions:
      a. "Dielectric" by Epco.
   2. Dirt strainers (Y type):
      a. Mueller (#351).
      b. Sarco.
      c. Armstrong.
   3. Chemical strainers (Y type):
      a. Chemtrol.
      b. Asahi.
   4. Dry disconnect couplings:
      a. Kamlock.
   5. Dielectric flange kit:
      a. PSI.
      b. Maloney.
      c. Central Plastics.
   6. Pipe saddles (for gage installation):
      a. Dresser Style 91 (steel and ductile iron systems).
      b. Dresser Style 194 (nonmetallic systems).
   7. Expansion joint at FRP and poly tanks:
      a. PROCO.
      b. Garlock, Style 215.
   8. Elastomeric bellows type expansion joints:
      a. Garlock, Guardian 200/204.
      b. PROCO, equivalent model.
      c. Red Valve, equivalent model.
      d. Or equal.
   9. Dismantling Joint
      a. Romac DJ400.
      b. Smith Blair 972.

### 2.2 PIPING SYSTEMS SCHEDULE

A. Piping system materials, fittings and appurtenances are subject to requirements of specific piping systems schedule located at the end of PART 3 of this Specification Section.

### 2.3 COMPONENTS AND ACCESSORIES

A. Insulating Components:
   1. Dielectric flange kits:
      a. Flat faced.
      b. 1/8 IN thick dielectric gasket, phenolic, non-asbestos.
      c. Suitable for 175 PSI, 210 DEGF.
      d. 1/32 IN wall thickness bolt sleeves.
      e. 1/8 IN thick phenolic insulating washers.
   2. Dielectric unions:
      a. Screwed end connections.
      b. Rated at 175 PSI, 210 DEGF.

c. Provide dielectric gaskets suitable for continuous operation at union rated temperature and pressure.

B. Dirt Strainers:
1. Y-type.
2. Composition bronze.
3. Rated for test pressure and temperature of system in which they are installed.
4. 20 mesh Monel screen.
5. Threaded bronze plug in the blowoff outlet.
6. Threaded NPT end connections.

C. Reducers:
1. Furnish appropriate size reducers and reducing fittings to mate pipe to equipment connections.
2. Connection size requirements may change from those shown on Drawings depending on equipment furnished.

D. Protective Coating and Lining:
1. Include pipe, fittings, and appurtenances where coatings, linings, coating, tests and other items are specified.
2. Field coating pipe in accordance with Specification Section 09 96 00.

E. Dry Disconnect Couplings:
1. Adapters:
a. Male adapters: Size shown on Drawings.
b. Adapters:
1) Female NPT end connection for sludge and flush applications.
2) Male NPT end connection for chemical applications.
c. Construct adapters for sludge applications from cast iron or steel.
d. Construct adapters for chemical and PVC system applications 3 IN and below from polypropylene.
1) Above 3 IN size, provide stainless steel units.
2. Couplers:
a. Built-in valve and spring loaded poppet which close automatically when disconnected.
b. Designed to remain with only one arm locked in closed position.
c. Construct couplers for sludge applications fabricated from material utilized for adapters.
d. Construct couplers for chemical and PVC system applications 3 IN and less from polypropylene with stainless steel arms and pins.
1) Above 3 IN, provide stainless steel units.
e. Gasket: Compatible with conveyed liquid.
3. Dust caps: For all adapters.

F. Sacrificial Anode Cathodic Protection:
1. 3 LB magnesium sacrificial anodes, prepackaged in a cloth bag containing 75% hydrated gypsum, 20% bentonite and 5% anhydrous sodium sulphate.
2. TW 600 V or an HMWPE insulated copper lead attached to the anode.

G. Valves:
1. See schematics and details for definition of manual valves used in each system under 4 IN in size.
a. See Drawings and Specification Section 40 05 51 schedule for valve types 4 IN and above and for automatic valves used in each system.
2. See Specification Section 40 05 51.

## PART 3 - EXECUTION

### 3.1 EXTERIOR BURIED PIPING INSTALLATION

A. Unless otherwise shown on the Drawings, provide a minimum of 4 FT and maximum of 8 FT earth cover over exterior buried piping systems and appurtenances conveying water, fluids, or solutions subject to freezing.

B. Enter and exit through structure walls, floors, and ceilings by using penetrations and seals specified as shown on Drawings.

C. When entering or leaving structures with buried mechanical joint piping, install joint within 2 FT of point where pipe enters or leaves structure.
   1. Install second joint not more than 6 FT nor less than 4 FT from first joint.

D. Install expansion devices as necessary to allow expansion and contraction movement.

E. Laying Pipe In Trench:
   1. Excavate and backfill trench in accordance with Specification Section 31 23 33.
   2. Clean each pipe length thoroughly and inspect for compliance to specifications.
   3. Grade trench bottom and excavate for pipe bell and lay pipe on trench bottom.
   4. Install gasket or joint material according to manufacturer's directions after joints have been thoroughly cleaned and examined.
   5. Except for first two joints, before making final connections of joints, install two full sections of pipe with earth tamped alongside of pipe or final with bedding material placed.
   6. Lay pipe in only suitable weather with good trench conditions.
      a. Never lay pipe in water except where approved by Engineer.
   7. Seal open end of line with watertight plug if pipe laying stopped.
   8. Remove water in trench before removal of plug.

F. Lining Up Push-On Joint Piping:
   1. Lay piping on route lines shown on Drawings.
   2. Deflect from straight alignments or grades by vertical or horizontal curves or offsets.
   3. Observe maximum deflection values stated in manufacturer's written literature.
   4. Provide special bends when specified or where required alignment exceeds allowable deflections stipulated.
   5. Install shorter lengths of pipe in such length and number that angular deflection of any joint, as represented by specified maximum deflection, is not exceeded.

G. Anchorage and Blocking:
   1. Provide reaction blocking, anchors, joint harnesses, or other acceptable means for preventing movement of piping caused by forces in or on buried piping tees, wye branches, plugs, or bends.
   2. Place concrete blocking so that it extends from fitting into solid undisturbed earth wall.
      a. Concrete blocks shall not cover pipe joints.
   3. Provide bearing area of concrete in accordance with drawing detail.

H. Install insulating components where dissimilar metals are joined together.

### 3.2 CONNECTIONS WITH EXISTING PIPING

A. Where connection between new work and existing work is made, use suitable and proper fittings to suit conditions encountered.

B. Perform connections with existing piping at time and under conditions which will least interfere with service to customers affected by such operation.

C. Undertake connections in fashion which will disturb system as little as possible.

D. Provide suitable equipment and facilities to dewater, drain, and dispose of liquid removed without damage to adjacent property.

E. Where connections to existing systems necessitate employment of past installation methods not currently part of trade practice, utilize necessary special piping components.

F. Where connection involves potable water systems, provide disinfection methods as prescribed in this Specification Section.

G. Once tie-in to each existing system is initiated, continue work continuously until tie-in is made and tested.

## 3.3 PRESSURE GAGES

A. Provide at locations shown on the Drawings and specified.

## 3.4 FIELD QUALITY CONTROL

A. Pipe Testing - General:
   1. Test piping systems as follows:
      a. Test exposed, non-insulated piping systems upon completion of system.
      b. Test exposed, insulated piping systems upon completion of system but prior to application of insulation.
      c. Test concealed interior piping systems prior to concealment and, if system is insulated, prior to application of insulation.
      d. Test buried piping (insulated and non-insulated) prior to backfilling and, if insulated, prior to application of insulation.
   2. Isolate equipment which may be damaged by the specified pressure test conditions.
   3. Perform pressure test using calibrated pressure gages and calibrated volumetric measuring equipment to determine leakage rates.
      a. Select each gage so that the specified test pressure falls within the upper half of the gage's range.
      b. Notify the Engineer 24 HRS prior to each test.
   4. Completely assemble and test new piping systems prior to connection to existing pipe systems.
   5. Acknowledge satisfactory performance of tests and inspections in writing to Engineer prior to final acceptance.
   6. Bear the cost of all testing and inspecting, locating and remedying of leaks and any necessary retesting and re-examination.

B. Pressure Testing:
   1. Testing to be complete in accordance with Specification Section 33 11 13.

## 3.5 CLEANING, DISINFECTION AND PURGING

A. Cleaning:
   1. Clean interior of piping systems thoroughly before installing.
   2. Maintain pipe in clean condition during installation.
   3. Before jointing piping, thoroughly clean and wipe joint contact surfaces and then properly dress and make joint.
      a. Pig high pressure air piping before connecting to valves or instruments.
   4. At completion of work and prior to Final Acceptance, thoroughly clean work installed under these Specifications.
      a. Clean equipment, fixtures, pipe, valves, and fittings of grease, metal cuttings, and sludge which may have accumulated by operation of system, from testing, or from other causes.
      b. Repair any stoppage or discoloration or other damage to parts of building, its finish, or furnishings, due to failure to properly clean piping system, without cost to Owner.
   5. After erection of piping and tubing, but prior to installation of service outlet valves, blow natural gas [, liquefied petroleum gas] and digester gas systems clear of free moisture and foreign matter by means of air, nitrogen or carbon dioxide.
      a. Oxygen shall never be used.

6. Clean chlorine piping in accordance with CI Pamphlet 6.
7. Purge all neat liquid polymer tubing or piping between the neat polymer storage tank or tote and the polymer blending units with mineral oil to remove residual water prior to introducing neat polymer. Following purging, drain as much of the mineral oil out of the system as possible. Dispose of purged fluids and waste mineral oil in accordance with local environmental regulations.

B. Disinfection of Potable Water Systems:
1. After favorable performance of pressure test and prior to Final Acceptance, thoroughly flush entire potable water piping system including supply, source and any appurtenant devices and perform disinfection as prescribed.
2. Perform work, including preventative measures during construction, in full compliance with AWWA C651.
3. Perform disinfection using sodium hypochlorite complying with AWWA B300.
4. Flush each segment of system to provide flushing velocity of not less than 2.5 FT per second.
5. Drain flushing water to sanitary sewer.
   a. Do not drain flushing water to receiving stream.
6. Use continuous feed method of application.
   a. Tag system during disinfection procedure to prevent use.
7. After required contact period, flush system to remove traces of heavily chlorinated water.
8. After final flushing and before placing water in service, obtain an independent laboratory approved by the Owner to collect samples and test for bacteriological quality.
   a. Repeat entire disinfection procedures until satisfactory results are obtained.
9. Secure and deliver to Owner, satisfactory bacteriological reports on samples taken from system.
   a. Ensure sampling and testing procedures are in full compliance to AWWA C651, local water purveyor and applicable requirements of State of Kentucky.

## 3.6 LOCATION OF BURIED OBSTACLES

A. Furnish exact location and description of buried utilities encountered and thrust block placement.

B. Reference items to definitive reference point locations such as found property corners, entrances to buildings, existing structure lines, fire hydrants and related fixed structures.

C. Include such information as location, elevation, coverage, supports and additional pertinent information.

D. Incorporate information on "As-Recorded" Drawings.

## 3.7 PIPE INSULATION

A. Insulate pipe and pipe fittings in accordance with Drawings.

## 3.8 PIPING SYSTEM SCHEDULES

A. Piping System 10 – Buried and Exposed Potable Water Piping.
1. General:
   a. Test requirements:
      1) Test medium: Water.
      2) Pressure: 1.25 x working pressure.
      3) Duration: 6 HRS.
   b. Gaskets and O-rings:
      1) O-rings: Neoprene or rubber.
      2) Flanged, push-on and mechanical joints (ductile iron): Rubber, AWWA/ANSI C111/A21.11.
      3) Flanged joints (steel): Rubber, AWWA C207.
      4) Grooved coupling joints (ductile and steel): Rubber, AWWA C606.
2. System components:
   a. Pipe size to 3 IN:

1) Exposed service:
   a) Material: Copper tubing, Type L.
   b) Solder: Cadmium and lead-free solder compatible with tubing and fittings materials.
   c) Reference: ASTM B88.
   d) Lining: None.
   e) Coating: HPIC; See Specification Section 09 96 00.
   f) Fittings: Wrought copper or bronze fittings meeting ASME B16.22.
   g) Joints: Soldered or brazed with unions at valves and equipment.
2) Buried service:
   a) Material: Copper tubing, Type K.
   b) Reference: ASTM B88.
   c) Lining: None.
   d) Coating: None.
   e) Fittings: AWWA C800.
   f) Joints: Flared.

b. Pipe size 3 IN through 24 IN:
1) Exposed service:
   a) Materials:
      (1) Flanged: Ductile iron.
      (2) Grooved type joint system: Use pipe thickness per AWWA C606.
      (3) With both systems, provide screwed on flanges at equipment, valves and structural penetrations.
   b) Reference: AWWA/ANSI C115/A21.15.
   c) Lining: Cement.
   d) Coating: HPIC; See Specification Section 09 96 00.
   e) Fittings: Either AWWA/ANSI C110/A21.10 ductile or gray iron.
   f) Joints:
      (1) Flanged or grooved type mechanical coupling (AWWA C606) joints.
      (2) With both systems, provide screwed-on flanges at valves, equipment, and structure penetration.
2) Buried service:
   a) Materials: Ductile iron.
   b) Reference: AWWA/ANSI C151/A21.51.
   c) Lining: Cement.
   d) Coating: Bituminous.
   e) Fittings:
      (1) Either AWWA/ANSI C110/A21.10 ductile or gray iron.
      (2) Optional: AWWA/ANSI C153/A21.53 ductile iron compact fittings for sizes 3 to 16 IN.
   f) Joints: Push-on with mechanical (stuffing box type) joints at fittings and valves.

c. Pipe size greater than 24 IN:
1) Exposed service:
   a) Material: Steel, fabricated pipe.
   b) Reference: AWWA C200.
   c) Lining: Cement.
   d) Coating: HPIC; See Specification Section 09 96 00.
   e) Fittings: AWWA C208.
   f) Joints: Butt welded with rigid AWWA C207 flanges at equipment, valves, and structure penetrations.
2) Buried service:
   a) Material: Steel, fabricated pipe.
   b) Reference: AWWA C200.
   c) Lining: Cement.
   d) Coating: Bituminous.

e) Fittings: AWWA C208.
f) Joints: Butt welded.

3. Install drain tees with capped nipples of IPS brass 3 IN long at low points.
   a. If low point occurs in concealed piping, provide approved flush access panel.
   b. These drains are not shown on Drawings.
4. Slope water lines down to drain points not less than 1 IN in 60 FT.
5. Install all threaded piping with clean-cut tapered threads and with ends thoroughly reamed after cutting to remove burrs.
   a. Pipe joint cement permitted only on external threads.
6. For screwed nipples for connections to flush valves, lavatory supplies, and other equipment with threaded connections use iron, copper, or brass pipe.
7. Install ball, butterfly and plug valves where indicated or required to adequately service all parts of system and equipment.
   a. Install valves on each branch serving restroom.
   b. Install valves on inlet and outlet connections of heat exchangers and on other equipment connected to water lines.
8. Install unions between valves and connections to each piece of equipment and install sufficient number of unions throughout piping system to facilitate installation and servicing.
   a. On copper pipelines, install wrought, solder-joint, copper to copper unions for lines 2 IN and smaller and, for lines 2-1/2 IN and over install brass flange unions.
9. Construct and equip plumbing fixtures and equipment with anti-siphon devices as to entirely eliminate any danger of siphoning waste material into potable water supply system.
10. Where exposed pipes 6 IN in size and smaller pass through floors, finished walls, or finished ceilings, fit with nickel or chrome-plated plates large enough to completely close hole around pipes.
    a. Secure plates to pipe by set screw in approved manner.
11. Size supply branches to individual fixtures as scheduled or indicated on Drawings.
12. Install piping so as to be free to expand with proper loops, anchors and joints without injury to system or structure.
13. Provide branches to wall hydrants or hose bibbs in exterior locations with interior shutoff and drain valves.
14. Provide approved type vacuum breaker and backflow preventer installations indicated or as required by Code.
15. Install concealed in finished structures such as administration and office facilities and at locations shown on Drawings.

## 3.9 SERVICE SYSTEM SUMMARY

A. Service Systems as defined in the Drawings.

**END OF SECTION**

# SECTION 40 05 31
## PIPE - PLASTIC

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Plastic pipe.

B. Related Specification Sections include but are not necessarily limited to:
   1. Section 40 05 00 - Pipe and Pipe Fittings - Basic Requirements.

### 1.2 QUALITY ASSURANCE

A. See Specification Section 40 05 00.

B. Referenced Standards:
   1. ASTM International (ASTM):
      a. PVC (polyvinyl chloride) materials:
         1) D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
         2) D1785, Standard Specification for Poly(Vinyl Chloride) PVC Plastic Pipe, Schedules 40, 80 and 120.
         3) D2467, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
         4) D3034, Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
         5) D3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
         6) D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
         7) F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
         8) F679, Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
         9) F794, Standard Specification for Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
         10) F949, Standard Specification for Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings.
      b. Installation:
         1) D2321, Standard Practice for Underground Installation of Thermosplastic Pipe for Sewers and Other Gravity-Flow Applications.
   2. American Water Works Association (AWWA):
      a. PVC (polyvinyl chloride) materials:
         1) C900, Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 IN Through 12 IN, for Water Distribution.
         2) C905, Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 IN through 48 IN, for Water Transmission and Distribution.
      b. Polyethylene (PE) materials:
         1) C901, Standard for Polyethylene (PE) Pressure Pipe and Tubing, 1/2 IN through 3 IN, for Water Service.
   3. NSF International (NSF).

### 1.3 SUBMITTALS

A. See Specification Section 40 05 00.

## PART 2 - PRODUCTS

### 2.1 PVC PRESSURE PIPING (EXPOSED)

A. General:
   1. Provide Schedule 80 pipe with Schedule 80 fittings and appurtenances to locations shown on Drawings.
   2. Furnish materials in full compliance to following material specifications:
      a. Manufacture pipe, fittings and appurtenances from polyvinyl chloride (PVC) compound which meets the requirements of Type 1, Grade 1 (12454-B) Polyvinyl Chloride as outlined in ASTM D1784.
      b. Manufacture pipe, fittings and valves from materials that have been tested and approved for conveying potable water by the NSF.

B. Pipe:
   1. Furnish pipe meeting requirements of ASTM D1785.
   2. Pipe 2 IN and less to be solvent welded.
   3. Pipe larger than 2 IN may be either flanged or solvent welded unless shown otherwise on Drawings.

C. Fittings: Provide ASTM D2467 PVC socket type fittings having the same pressure and temperature rating as the pipe.

D. Flanges/Unions:
   1. Furnish flanges and unions at locations shown on Drawings.
   2. Provide either flanges or unions at valves, penetrations through structures and equipment connections.
   3. For pipe larger than 2 IN, provide 150 LB socket type PVC flange.
   4. For pipe 2 IN and less, provide socket type PVC union with Buna O-rings.
   5. Use flat, full faced natural rubber gaskets at flanged connections.
      a. Furnish heavy hex head bolts, each with one heavy hex nut, ASTM F593 Type 316 stainless steel.
   6. Use spacers supplied by pipe manufacturer when mating raised-faced flanges to other flanges.

E. Installation:
   1. Field threading PVC will not be permitted.
      a. Perform required threaded connections or attachments by the use of factory molded socket by threaded adapters.
      b. Female adapters are not acceptable.
   2. Employ installation and pipe support practices and solvent welding all in compliance to the manufacturer's printed recommendation.
      a. Continuously support PVC piping at liquid operating temperatures in excess of 100 DEGF.
      b. For vertical piping, band the pipe at intervals to rigidly support load of twice vertical load.
      c. Support riser clamps on spring hangers.
      d. Do not clamp PVC tightly or restrict movement for expansion and contraction.

### 2.2 PRESSURE PIPING (UNDERGROUND)

A. Materials: Furnish materials in full compliance with following requirements:
   1. 1/2-3 IN: AWWA C901 PE.
   2. 4-12 IN: AWWA C900 PVC.
   3. Joints for polyethylene pipe shall be fusion type in accordance with AWWA C901.
   4. Joints for PVC pipe shall be the elastomeric-gasket type with a pressure rating not less than pipe pressure rating meeting performance requirements of ASTM D3139.

B. Installation:
   1. Field threading of PVC pipe will not be permitted.
   2. Perform installation procedures, handling, thrust blocking, connections, and other appurtenant operations in full compliance to the manufacturer's printed recommendations and in full observance to plan details when more stringent.

### 2.3 PVC DRAINAGE, SEWER PIPING AND UNDERGROUND AIR DUCTS

A. Materials:
   1. Furnish materials in full compliance to the following material specification.
   2. PVC pipe shall be rigid, unplasticized polyvinyl chloride (PVC) made of PVC plastic having a cell classification of 12454-B or 12454-C as described in specification ASTM D1784.
   3. The requirements of this Specification are intended to provide for pipe and fittings suitable for non-pressure drainage of wastewater and surface water.
   4. Joining systems shall consist of an elastomeric gasket joint meeting requirements of ASTM D3212.
   5. Supply to the Engineer all information and sample of joining method for his evaluation.
      a. Only jointing methods acceptable to the Engineer will be permitted.
   6. Provide pipe and fittings meeting or exceeding the following requirements:
      a. 4-27 IN DIA: ASTM D3034 and ASTM F679, SDR 35.
      b. 8-30 IN DIA: ASTM F794.
      c. 4-18 IN DIA: ASTM F949.
   7. Ensure impact strengths and pipe stiffnesses in full compliance to these Specifications.

B. Installation: Install pipe and fittings in accordance with ASTM D2321 and as recommended by the manufacturer.
   1. Provide for a maximum deflection of not more than 3%.

### 2.4 PVC TUBING

A. General: Provide nylon tubing with fittings and appurtenances as shown on Drawings.

B. Materials:
   1. Furnish clear outer braided tubing with braid outside the walls.
   2. Have tubing manufactured of nylon with working temperatures from 5 to 180 DEGF.
   3. Design tubing with a minimum safety factor of 4 to 1 ratio of burst pressure to working pressure at maximum temperature.
   4. Provide tubing with working pressure of 75 PSI at 180 DEGF.
   5. Ensure that tubing is self-extinguishing and fire resistant.

C. Fittings:
   1. Install tubing with nylon fittings and connectors.
   2. Use barbed type adapters with stainless steel clamps.
   3. Provide fittings capable of withstanding temperatures from a -70 to 250 DEGF.
   4. Ensure fittings have the same pressure and temperature rating as the tubing.

## PART 3 - EXECUTION

### 3.1 IDENTIFICATION

A. Identify each length of pipe clearly at intervals of 5 FT or less.
   1. Include manufacturer's name and trademark.
   2. Nominal size of pipe, appurtenant information regarding polymer cell classification and critical identifications regarding performance specifications and NSF approvals when applicable.

### 3.2 PRESSURE PIPING (UNDERGROUND)

A. Installation:

1. Field threading of PVC pipe will not be permitted.
2. Perform installation procedures, handling, thrust blocking, connections, and other appurtenant operations in full compliance to the manufacturer's printed recommendations and in full observance to plan details when more stringent.

**END OF SECTION**

# SECTION 40 05 51
## VALVES - BASIC REQUIREMENTS

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Valving, actuators, and valving appurtenances.

B. Related Sections include but are not necessarily limited to:
   1. Section 40 05 00 - Pipe and Pipe Fittings - Basic Requirements.

### 1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Society of Mechanical Engineers (ASME):
      a. B1.20.1, Pipe Threads, General Purpose.
      b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
      c. B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
   2. ASTM International (ASTM):
      a. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
      b. D256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
      c. D638, Standard Test Method for Tensile Properties of Plastics.
      d. D648, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
      e. D695, Standard Test Method for Compressive Properties of Rigid Plastics.
      f. D2240, Standard Test Method for Rubber Property-Durometer Hardness.
   3. American Water Works Association (AWWA):
      a. C207, Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 IN through 144 IN.
      b. C500, Standard for Metal-Seated Gate Valves for Water Supply Service.
      c. C504, Standard for Rubber-Seated Butterfly Valves.
      d. C507, Standard for Ball Valves, 6 IN through 48 IN (150 MM through 1200 MM).
      e. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.
      f. C550, Standard for Protective Coatings for Valves and Hydrants.
      g. C606, Standard for Grooved and Shouldered Joints.
   4. American Water Works Association/American National Standards Institute (AWWA/ANSI):
      a. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   5. National Electrical Manufacturers Association (NEMA):
      a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
      b. MG 1, Motors and Generators.
   6. National Fire Protection Association (NFPA):
      a. 70, National Electrical Code (NEC).

### 1.3 DEFINITIONS

A. The following are definitions of abbreviations used in this Specification Section or one of the individual valve sections:
   1. CWP: Cold water working pressure.
   2. SWP: Steam working pressure.
   3. WOG: Water, oil, gas working pressure.
   4. WWP: Water working pressure.

### 1.4 SUBMITTALS

A. Shop Drawings:
   1. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
      c. Valve pressure and temperature rating.
      d. Valve material of construction.
      e. Special linings.
      f. Valve dimensions and weight.
      g. Valve flow coefficient.
      h. Wiring and control diagrams for electric or cylinder actuators.
      i. Short Circuit Current Rating (SCCR) nameplate marking per NFPA 70. Include any required calculations per Section 01 61 03.
   2. Test reports.

B. Contract Closeout Information:
   1. Operation and Maintenance Data:
      a. See Contract Documents for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.

C. Informational Submittals:
   1. Verification from valve actuator manufacturer that actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted, and that the valve actuator responds correctly to the valve position command.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to individual valve Specification Sections for acceptable manufacturers.

### 2.2 MATERIALS

A. Refer to individual valve Specification Sections.

### 2.3 VALVE ACTUATORS

A. Valve Actuators - General:
   1. Provide actuators as shown on Drawings or specified.
   2. Counter clockwise opening as viewed from the top.
   3. Direction of opening and the word OPEN to be cast in handwheel or valve bonnet.
   4. Size actuator to produce required torque with a maximum pull of 80 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 FT-pounds torque on the operating nut.
   5. Unless otherwise specified, actuators for valves to be buried, submerged or installed in vaults or manholes shall be sealed to withstand at least 20 FT of submergence.
   6. Extension stem:
      a. Install where shown or specified.
      b. Solid steel with actuator key and nut, diameter not less than stem of valve actuator shaft.
      c. Pin all stem connections.
      d. Center in valve box or grating opening band with guide bushing.

B. Buried Valve Actuators:
   1. Provide screw or slide type adjustable cast iron valve box, 5 IN minimum diameter, 3/16 IN minimum thickness, and identifying cast iron cover rated for traffic load.
   2. Box base to enclose buried valve gear box or bonnet.
   3. Provide 2 IN standard actuator nuts complying with AWWA C500, Section 3.16.

4. Provide at least two tee handle keys for actuator nuts, with 5 FT extension between key and handle.
5. Extension stem:
   a. Provide for buried valves greater than 4 FT below finish grade.
   b. Extend to within 6 IN of finish grade.
6. Provide concrete pad encasement of valve box as shown for all buried valves unless shown otherwise.

C. Plastic Valve Vault:
1. Provide in non-traffic areas only on valve applications 3-1/2 IN and less.
2. Nominal 7-1/2 IN DIA top section.
3. Design unit for screw type extension section having nominal 9 IN DIA bell.
4. Cast iron ring and lid.
5. Constructed of injection molded polyolefin compound with fibrous inorganic component reinforcing and UV stabilization.
6. Armor Access Boxes.

D. Exposed Valve Manual Actuators:
1. Provide for all exposed valves not having electric or cylinder actuators.
2. Provide handwheels for gate and globe valves.
   a. Size handwheels for valves in accordance with AWWA C500.
3. Provide lever actuators for plug valves, butterfly valves and ball valves 3 IN DIA and smaller.
   a. Lever actuators for butterfly valves shall have a minimum of five intermediate lock positions between full open and full close.
   b. Provide at least two levers for each type and size of valve furnished.
4. Gear actuators required for plug valves, butterfly valves, and ball valves 4 IN DIA and larger.
5. Provide gearing for gate valves 20 IN and larger in accordance with AWWA C500.
6. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.
7. Provide chain actuators for valves 6 FT or higher from finish floor to valve centerline.
   a. Cadmium-plated chain looped to within 3 FT of finish floor.
   b. Equip chain wheels with chain guides to permit rapid operation with reasonable side pull without "gagging" the wheel.
   c. For smaller valves with lever or handle operators, provide offset tee handles with attached chain for operation from the operating floor.
8. Provide cast iron floor stands where shown on Drawings.
   a. Stands to be furnished by valve manufacturer with actuator.
   b. Stands or actuator to include thrust bearings for valve operation and weight of accessories.

E. Submerged Actuators:
1. Mount the valve actuator on top of an extension bonnet 3 FT above any adjacent personnel access.
2. The valve and bonnet connection shall be flanged and watertight.
3. Provide a top brace support for the bonnet.
   a. Mount the brace 6 IN below the top of the wall as shown.
4. Materials:
   a. Extension bonnet: Cast iron ASTM A126 or steel.
   b. Brace and anchor bolts: Type 304 stainless steel.

F. Electric Actuators (480 V, 3 PH):
1. Electric Motor Actuators - General:
   a. Provide electric motor actuators for valves and gates so indicated: on the Drawings, in valve schedule in the Specifications, or elsewhere in the Contract Documents.

b. Unless otherwise specified, provide each electric motor actuator with integral control devices for operation, including pushbuttons. When actuator's integral control station would be 6 FT or more above the nearest operating floor, or when integral control station would be out of reach of facility personnel standing on the nearest operating floor: (1) integral control station on actuator is not required; and (2) provide remotely-located control station, with pushbuttons, in accordance with this Section.

2. Furnish electric actuator integral with valve consisting of:
   a. Motor.
   b. Gearing.
   c. Handwheel.
   d. Limit and torque switches.
   e. Lubricants.
   f. Heating elements.
   g. Wiring.
   h. Terminals for motor power and controls.
   i. Drive nut.
3. Housing/enclosure:
   a. Provide cast iron gear housing and cast iron load bearing enclosure.
   b. Non load bearing enclosure and housing: Aluminum or cast iron.
   c. Rated for area classification shown on Drawings.
   d. Provide O-ring seals for covers and entries.
   e. Terminal and limit switch compartment covers are to be fastened to gear housing by stainless steel fasteners with capture device to prevent loss.
4. Motors:
   a. Provide motors that are totally enclosed, high torque design made expressly for valve actuator service and capable of operating the valve under full differential pressure for complete open-close and reverse cycle of travel at least twice in immediate succession without overheating.
   b. Design motors in accordance with NEMA MG 1 standards, with Class B insulation, and to operate successfully at any voltage within 10% above or below rated voltage.
   c. Provide positive method to ensure motor bearings are permanently lubricated.
   d. Provide three thermal switches imbedded in windings:
      1) 120 DEG apart.
      2) Provide motor shutdown at high temperature.
   e. Motor housing:
      1) Aluminum or cast iron.
      2) Totally enclosed nonventilated with cooling fins.
   f. Provide motor capable of operating in any position.
   g. Provide motor sealed from gearcase to allow any mounting position.
   h. Provide motors suitable for 480 V, 3 PH, 60 Hz.
5. Gearing:
   a. Provide power gearing consisting of heat treated steel helical gears, carburized and hardened alloy steel worm, and alloy bronze worm gear, all grease or oil bath lubricated, designed for 100% overload, and effectively sealed against entrance of foreign matter.
   b. Provide gearing mechanism constructed to permit field changes of reduction gear ratio.
   c. Design actuators so that motor comes up to speed before stem load is encountered in either opening or closing operation.
   d. Limit switch gearings and feedback device reduction gearing:
      1) Steel or bronze.
   e. Support rotating shafts with anti-friction bearings.
   f. Provide separate drive nut/thrust bearing assembly:
      1) Mounted to base of actuator.
      2) High tensile bronze.
      3) Quarter turn actuator: Provide 90 DEG mounting intervals.
      4) Provide grease fitting on drive assembly.

6. Handwheel:
    a. Permanently attached for manual operation.
    b. Positive declutch mechanism to engage and disengage handwheel.
    c. Handwheel shall not rotate during motor operation.
    d. Inoperable motor shall not prevent manual operation.
7. Limit torque and thrust loads in both closing and opening directions by torque limit switches.
    a. Provide torque switches with micrometer adjustment and reference setting indicator.
        1) Assure adjustment variation of approximately 40% in torque setting.
    b. Provide switches having rating of not less than 6 A at 120 VAC and 2.2 A at 115 VDC.
    c. Limit and torque switches shall have totally sealed contacts.
8. Furnish electric actuator with two geared limit switch assemblies with each switch assembly having four separate limit switches:
    a. Assure each limit switch assembly is geared to driving mechanism and is independently adjustable to trip at any point at and between the fully open and fully closed valve position.
    b. Provide minimum of two normally open contacts and two normally closed contacts at each end of valve travel.
    c. Provide switches with inductive contact rating of not less than 6 A at 120 VAC, 3 A at 240 VAC, 1.5 A at 480 VAC, 2.2 A at 115 VDC and 1.1 A at 230 VDC.
    d. Limit switches shall be fully adjustable when power is applied to actuator.
9. Provide space heating elements sized to prevent condensation in both motor and geared limit switch compartment(s).
    a. Furnish heating elements rated at 120 VAC with heaters continuously energized.
10. Open-close actuator controls:
    a. Provide control assembly with necessary holding relays, reversing starter, control transformers of sufficient capacity to provide control power, space heating element power and valve position transmitter.
    b. Provide control assembly in an enclosure rated for the defined area classification.
    c. Controls for open/close actuator:
        1) Provide remote pushbutton station with enclosure rated for area classification shown on Drawings with:
            a) Open pushbutton.
            b) Close pushbutton.
            c) Stop pushbutton.
            d) Remote/local switch.
            e) Full open light.
            f) Full close light.
            g) Open and close relays as required.
        2) Provide control enclosure to accept:
            a) Remote open/close switches.
        3) Provide contacts in control enclosure:
            a) Remote/local contact.
            b) Full open contact.
            c) Full close contact.
        4) Wire all components to an internal terminal strip and include mounted wiring diagram inside enclosure.
11. Additional requirements for modulating valve actuators:
    a. Proportional position servo-amplifier mounted integral with the actuator control compartment.
    b. Positioning of valve shall be proportional to a 4-20 mA signal input to the position servo-amplifier when remote control has been selected.
    c. Servo-amplifier adjustments shall include zero, span, gain, and dead-band.
    d. Provide 4-20 mA signal position control as shown on the Drawings that interfaces with the position control/position feedback instrumentation wiring to and from [remote control device] [PLC].

12. Provide equipment or control panels with Short Circuit Current Rating (SCCR) labeling as required by NFPA 70 and other applicable codes. See Section 01 61 03 for information on how to determine the available fault current, such that, the SCCR rating meets or exceeds the available fault current.

G. Electric Actuators (120 V, 1 PH):
   1. Electric Motor Actuators - General:
      a. Provide electric motor actuators for valves and gates so indicated: on the Drawings, in valve schedule in the Specifications, or elsewhere in the Contract Documents.
      b. Unless otherwise specified, provide each electric motor actuator with integral control devices for operation, including pushbuttons. When actuator's integral control station would be 6 FT or more above the nearest operating floor, or when integral control station would be out of reach of facility personnel standing on the nearest operating floor: (1) integral control station on actuator is not required; and (2) provide remotely-located control station, with pushbuttons, in accordance with this Section.
   2. General:
      a. Self contained including motor, gearing, torque switch, limit switches and cast housing.
      b. Electrical enclosure: NEMA 4 or NEMA 7 to comply with area rating classification shown on Drawings.
      c. Factory assembled requiring only field connection of power and control wires.
      d. Comply with Section 01 61 03.
   3. Motors:
      a. Produce 1.5 times the required torque.
      b. Sized for two complete open-close cycles without overheating.
      c. One fully closed to fully open cycle to occur within 60 SEC.
      d. Class F insulation.
      e. Operate at plus or minus 10% voltage.
      f. 120 Volt, single phase, 60 Hz.
      g. Provide thermal cutout switch and internal heater for actuator enclosure.
      h. Control wiring as shown on Drawing control diagrams.
   4. Remote pushbutton station:
      a. Enclosure: NEMA 4 stainless steel.
      b. Control relays shall include:
         1) Open relay.
         2) Closed relay.
         3) [Remote control device] [PLC] interface relay.
      c. Push-to-test indicating lights shall include:
         1) Open.
         2) Closed.
         3) Remote.
      d. Selector switches shall include:
         1) Local-Remote.
         2) Open-Close.
      e. Space heater for enclosure.
      f. Control wiring as shown on control diagrams.
      g. Wire all components to an internal terminal strip and include mounted wiring diagram inside enclosure.
   5. Provide equipment or control panels with Short Circuit Current Rating (SCCR) labeling as required by NFPA 70 and other applicable codes. See Section 01 61 03 for information on how to determine the available fault current, such that, the SCCR rating meets or exceeds the available fault current.

H. Valve Lockout Devices:
   1. Device manufactured from same material as valve operator, preventing access to valve operator, to accept lock shackle.

## 2.4 FABRICATION

A. End Connections:
   1. Provide the type of end connections for valves as required in the Piping Schedules presented in Section 40 05 00 or as shown on the Drawings.
   2. Comply with the following standards:
      a. Threaded: ASME B1.20.1.
      b. Flanged: ASME B16.1, Class 125 unless otherwise noted or AWWA C207.
      c. Bell and spigot or mechanical (gland) type: AWWA/ANSI C111/A21.11.
      d. Soldered: ASME B16.18.
      e. Grooved: Rigid joints per Table 5 of AWWA C606.

B. Refer to individual valve Specification Sections for specifications of each type of valve used on Project.

C. Nuts, Bolts, and Washers:
   1. Wetted or internal to be bronze or stainless steel.
      a. Exposed to be zinc or cadmium plated.

D. On Insulated Piping: Provide valves with extended stems to permit proper insulation application without interference from handle.

E. Epoxy Interior Coating: Provide epoxy interior coating for all ferrous surfaces in accordance with AWWA C550.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Setting Buried Valves:
   1. Locate valves installed in pipe trenches where buried pipe indicated on Drawings.
   2. Set valves and valve boxes plumb.
   3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.
   4. Install in closed position.
   5. Place valve on firm footing in trench to prevent settling and excessive strain on connection to pipe.
   6. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.

C. Support exposed valves and piping adjacent to valves independently to eliminate pipe loads being transferred to valve and valve loads being transferred to the piping.

D. For grooved coupling valves, install rigid type couplings or provide separate support to prevent rotation of valve from installed position.

E. Install electric or cylinder actuators above or horizontally adjacent to valve and gear box to optimize access to controls and external handwheel.

F. For threaded valves, provide union on one side within 2 FT of valve to allow valve removal.

G. Install valves accessible for operation, inspection, and maintenance.

## 3.2 ADJUSTMENT

A. Adjust valves, actuators and appurtenant equipment to comply with Section 01 75 00.
   1. Operate valve, open and close at system pressures.

B. For all 120 VAC and 480 VAC electric actuators, employ and pay for services of valve actuator manufacturer's field service representative to:

1. Inspect valve actuators covered by this Specification Section.
2. Supervise adjustments and installation checks:
   a. Open and close valves electrically under local manual and demonstrate that all limit switches are properly adjusted and that switch contacts are functioning properly by verifying the inputs are received at the remote input/output (RIO) panels or local control panel as appropriate.
   b. Position modulating valves electrically under local manual control and demonstrate that the valve position feedback potentiometer is properly adjusted and that the feedback signal is received at the RIO panels or local control panel as appropriate.
   c. Simulate a valve position command signal at the RIO panel or local control panel as appropriate and demonstrate that the valve is controlled to the desired position without excessive hunting.
3. Provide Owner with a written statement that the valve actuator manufacturer has verified that the actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted and that the valve actuator responds correctly to the valve position command.

**END OF SECTION**