

**PROJECT SPECIFICATIONS  
FOR  
100% SUBMITTAL  
FOR  
OLF-X  
PHASE I – EARTHWORK  
PD 12-13.065**

**SANTA ROSA COUNTY, FL**

**Prepared For:**

**Escambia County, FL**

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## SECTION 31 11 00

## CLEARING AND GRUBBING

## PART 1 GENERAL

## 1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval.

1.2 DELIVERY, STORAGE, AND HANDLING Deliver materials to store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

## PART 2 EXECUTION

## 2.1 PROTECTION

## 2.1.1 Trees, Shrubs, and Existing Facilities

Protect trees and vegetation to be left standing from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

## 2.2 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing.

## 2.3 GRUBBING

Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Remove material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Fill depressions made by grubbing with suitable material and compact to make the surface conform with the original adjacent surface of the ground.

## 2.4 DISPOSAL OF MATERIALS

## 2.4.1 Nonsaleable Materials

Written permission to dispose of such products on private property shall

be filed with the **Owner's Representative**. Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for **non-organic debris**, shall be disposed of by burning, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed. Burn refuse to be burned at specified locations and in a manner to prevent damage to existing structures and appurtenances, construction in progress, trees, and other vegetation. Comply with all Federal and State laws and regulations and with reasonable practice relative to the building of fires. Burning or other disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.

**Non-organic debris, including trash and debris, unsuitable topsoil, and other obstructions, shall be removed and legally disposed of off the owner's property.**

-- End of Section --

## SECTION 31 23 00.00 20

## EXCAVATION AND FILL

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

## AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600	(2010) Installation of Ductile-Iron Water Mains and Their Appurtenances
ASTM C136/C136M	(2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D1556/D1556M	(2015) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1883	(2014) CBR (California Bearing Ratio) of Laboratory-Compacted Soils
ASTM D6938	(2015) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

## 1.2 DEFINITIONS

## 1.2.1 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in [ASTM D1557](#), for general soil types, abbreviated as percent laboratory maximum density.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section [01 33 00](#)  
SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

## Demolition Work Plan and Schedule

Submit 15 days prior to starting work.

#### SD-06 Test Reports

Fill and backfill test

Select material test

Density tests

Moisture Content Tests

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

#### 1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

- a. Surface elevations are as indicated.
- b. Pipes or other artificial obstructions, except those indicated, will not be encountered.
- c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.
- e. Material character is indicated by the boring logs.
- h. Blasting will not be permitted. Remove material in an approved manner.

#### 1.6 QUALITY ASSURANCE

##### 1.6.1 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within **two feet** of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Satisfactory Materials

Any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse. Unsatisfactory material also includes material which contains root and other organic matter, frozen material, and stones larger than 3 inches. The County Representative shall be notified of any contaminated materials.

2.1.3 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.4 Select Material

Provide materials classified as GW,GP,SW,SP, or by ASTM D2487 where indicated.


2.2 UTILITY BEDDING MATERIAL

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 95 percent of ASTM D698 maximum density. Plastic piping shall have bedding

to spring line of pipe. Provide **ASTM D2321** materials as follows:

- a. Class I: Angular, **0.25 to 1.5 inches**, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.
- b. Class II: Coarse sands and gravels with maximum particle size of **1.5 inches**, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in **ASTM D2487**.

2.2.1 Sand

Clean, coarse-grained sand classified as **Silica Sand** in accordance with Section **902** of the DOT **Florida** State Standard.

2.2.2 Gravel

Clean, coarsely graded natural gravel, crushed stone or a combination thereof identified as **57 Stone** in accordance with Section **901** of the DOT **Florida** State Standard.

2.3 MATERIAL FOR RIP-RAP

2.3.1 Bedding Material

Consisting of sand, gravel, or crushed rock, well graded, with a maximum particle size of **2 inches**. Material shall be composed of tough, durable particles. Fines passing the **No. 200** standard sieve shall have a plasticity index less than six.

2.4 BURIED WARNING AND IDENTIFICATION TAPE

**Provide** metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, **3 inch** minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

Warning Tape Color Codes	
Red:	Electric
Orange:	Telephone and Other Communications
Blue:	Potable Water Systems
Green:	Sewer Systems

Warning Tape Color Codes	

2.4.1 Detectable Warning Tape for Non-Metallic Piping

Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.5 DETECTION WIRE FOR NON-METALLIC PIPING

Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.1.1.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, dikes, swales, and other drainage features and equipment as required to maintain dry soils, prevent erosion and undermining of foundations. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

### 3.1.2 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

## 3.2 SURFACE PREPARATION

### 3.2.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations within the clearing limits [in accordance with Section 31 11 00 Clearing and Grubbing](#).

### 3.2.2 Stripping

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling. Locate topsoil so that the material can be used readily for the finished grading. . Protect topsoil and keep in segregated piles until needed.

### 3.2.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

## 3.3 EXCAVATION

Excavate to elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with satisfactory material and compact to 95 percent of [ASTM D698](#) maximum density. satisfactory material and compact to 95 percent of [ASTM D698](#) maximum density. Satisfactory material removed below the depths indicated, without specific direction of the [County Representative](#), shall be replaced with satisfactory materials to the indicated excavation grade; except as specified for spread footings. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the [County representative](#).

### 3.3.1 Structures With Spread Footings

Ensure that footing subgrades have been inspected and approved by the [County Representative](#) prior to concrete placement. Fill over excavations with concrete during foundation placement.

### 3.3.2 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement.

Tamp if necessary to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length.

### 3.3.3 Excavated Materials

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in Paragraph "DISPOSITION OF SURPLUS MATERIAL."

### 3.3.4 Final Grade of Surfaces to Support Concrete

Excavation to final grade shall not be made until just before concrete is to be placed. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond.

## 3.4 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the **County Representative**. The surface shall be scarified to a depth of **6 inches** before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of **6 inches**, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of **12 inches** and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified herein.

## 3.5 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

### 3.5.1 Common Fill Placement

Provide for general site Use satisfactory materials. Place in **6] inch** lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

### 3.5.2 Select Material Placement

Provide under structures not pile supported. Place in **6 inch** lifts. Do not place over wet or frozen areas. Backfill adjacent to structures shall be placed as structural elements are completed and accepted. Backfill

against concrete only when approved. Place and compact material to avoid loading upon or against structure.

### 3.5.3 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under structures and paved areas in 6 inch lifts to top of trench and in 6 inch lifts to one foot over pipe outside structures and paved areas.

### 3.6 BURIED WARNING AND IDENTIFICATION TAPE

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

### 3.7 BURIED DETECTION WIRE

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. The wire shall extend continuously and unbroken. The wire shall remain insulated over its entire length. T

### 3.8 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required.

#### 3.8.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the paved area or structure to 85 percent of ASTM D1557.

#### 3.8.2 Structures, Spread Footings, and Concrete Slabs

Compact top 12 inches of subgrades to 95 percent of ASTM D1557. Compact select material to 95 percent of ASTM D1557.

#### 3.8.3 Adjacent Area

Compact areas within 5 feet of structures to 90 percent of ASTM D1557.

#### 3.8.4 Paved Areas

Compact top 12 inches of subgrades to 95 percent of ASTM D1557. Compact fill and backfill materials to 95 percent of ASTM D1557.

#### 3.8.5 Airfield Pavements

Compact top 24 inches below finished pavement or top 12 inches of subgrades, whichever is greater, to 100 percent of ASTM D1557; compact fill and backfill material to 100 percent of ASTM D1557.

### 13.9 FINISH OPERATIONS

#### 3.9.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and

debris. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

### 3.9.2 Topsoil and Seed

Provide as specified in Section 32 92 19 SEEDING.

### 3.9.3 Protection of Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

## 3.10 FIELD QUALITY CONTROL

### 3.10.1 Sampling

Take the number and size of samples required to perform the following tests.

### 3.10.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

#### 3.10.2.1 Select Material Testing

Test select material in accordance with ASTM C136/C136M for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D698 or ASTM D1557 for moisture density relations, as applicable.

#### 3.10.2.2 Density Tests

Test density in accordance with ASTM D1556/D1556M, or ASTM D6938. When ASTM D6938 density tests are used, verify density test results by performing an ASTM D1556/D1556M density test at a location already ASTM D6938 tested as specified herein. Perform an ASTM D1556/D1556M density test at the start of the job, and for every 10 ASTM D6938 density tests thereafter. Test each lift at randomly selected locations every 2000 square feet of existing grade in fills for structures and concrete slabs, and every 10,000 square feet for other fill areas and every 2000 square feet of subgrade in cut. Include density test results in daily report.

## SECTION 32 11 16.13

## SAND-CLAY [BASE] COURSE

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM C117	(2013) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136/C136M	(2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D1556/D1556M	(2015) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> ) (2700 kN-m/m <sup>3</sup> )
ASTM D1883	(2014) CBR (California Bearing Ratio) of Laboratory-Compacted Soils
ASTM D422	(1963; R 2007; E 2014; E 2014) Particle-Size Analysis of Soils
ASTM D4318	(2010; E 2014) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.]

## SD-06 Test Reports

Materials [sieve and particle size analysis](#)

[Liquid limit](#)

[Plasticity index](#)

[California Bearing Ratio test](#)

Submit for materials to be provided in the work, before materials are delivered.

Sieve and particle size analysis

Smoothness test

Field density tests

Laboratory density tests

Thickness tests

## PART 2 PRODUCTS

### 2.1 SAND-CLAY

Sand-clay for [base] shall consist of soils from selected sources approved by the Contracting Officer. Sand-clay may be either naturally or artificially proportioned and blended. Sand-clay that has been processed and is in place ready for compaction, shall be uniform and homogeneous throughout, free from deleterious materials, vegetation, roots, trash, and organic matter and shall have the following properties (percent by weight):

- a. 100 percent shall pass a 1 inch sieve,
- b. Material passing the No. 10 sieve shall meet the following requirements:

Passing No. 10 sieve 100 percent

Passing No. 60 sieve 15-60 percent

Passing No. 200 6-30 percent

Silt 0-10 percent

Clay 6-20 percent

Distribution of silt and clay particles shall be determined by  
ASTM D422.

- c. Material passing the No. 40 sieve shall have a liquid limit of 25 or less and a plasticity index of 6 or less as determined by ASTM D4318.
- d. Natural, or artificially proportioned and blended material shall have a California Bearing Ratio of not less than [50] at 95 percent of maximum laboratory density as determined by ASTM D1883 and ASTM D1557, respectively.

#### 2.1.1 [Enter Appropriate Subpart Title Here]

At the Contractor's option, materials such as screenings from stone, slag, or other mineral filler, may be provided if necessary to meet specified sand-clay property requirements, if the materials have been approved by the Contracting Officer.

## PART 3 EXECUTION

### 3.1 SURFACE PREPARATION

Clean underlying surface of foreign substances. Provide adequate grade and line stakes for accurate placement and completion of the [base] course. Surface shall be of the specified line, grade, smoothness and compaction immediately before placement of [base] materials.

### 3.2 PLACEMENT AND PROCESSING

Place materials without damaging underlying material. Moisture content of the course shall be increased or decreased to facilitate mixing. During compaction, maintain moisture content uniform and as near optimum as is necessary to obtain the specified density. Before commencing compaction, ensure that materials are uniform and homogeneous throughout and meet specified requirements.

### 3.3 COMPACTING AND FINISHING

Compact each layer of [base] course through full depth to at least 98 percent of the maximum laboratory density obtained in accordance with [ASTM D1557](#), Method B or D. Determine in-place density in accordance with [ASTM D1556/D1556M](#). Surface shall be smooth, free from waves, and shall not deviate by more than 1/4 inch when tested with a 10 foot straightedge. Correct nonconforming areas before applying the next course. Place earth, or other approved materials, along the exposed edges of each course to the same height and for a width of at least one foot and compact with each course.

#### 3.3.1 Layer Thickness

When the specified compacted thickness of the course is greater than 8 inches, construct the course in two or more layers. When the specified compacted thickness is 8 inches or less, one course construction may be used if the Contractor can demonstrate that satisfactory mixture of materials, proper moisture content, and required density can be achieved. Otherwise, two or more layer construction shall be provided.

#### 3.3.2 Maintenance

Perform additional reworking, mixing, shaping, and compacting necessitated by damage from atmospheric conditions, traffic, or other causes. Ensure that the true grade and cross section are maintained, with no rutting or other distortion, and that the [base] meets all requirements at the time the subsequent [surface] course is applied. [Base] shall be properly drained at all times.

### 3.4 FIELD QUALITY CONTROL

Supply samples of coarse aggregate and binder material. Obtain approval for materials and select sources well in advance of the time when materials shall be required in the work.

#### 3.4.1 Sampling

Obtain samples in accordance with [ASTM D75/D75M](#). Place each sample in a clean container and securely fasten to prevent material loss. Identify each sample with a tag containing the following information:

Contract No.:	[_____]	Quantity:	[_____]
Sample No.:	[_____]		
Date of Sample:	[_____]		
Sampler:	[_____]		
Source:	[_____]		
Intended Use:	[_____]		
For Testing:	[_____]		

### 3.4.2 Testing

#### 3.4.2.1 Sieve Analysis

Make **sieve and particle size analysis** from each sample collected during the course of the project. Tests shall include an analysis of each grade of material and an analysis of the combined material representing the blend or mixture. Make sieve analysis in accordance with **ASTM C136/C136M**; determine amount of material passing the **No. 200** sieve in accordance with **ASTM C117**; and determine particle size distribution smaller than **No. 200** sieve in accordance with **ASTM D422**. During construction, take one random sample from each [1000] [\_\_\_\_\_] tons of completed course, but not less than one random sample per day's run. Take samples in accordance with **ASTM D75/D75M**.

#### 3.4.2.2 Smoothness Test

Perform smoothness test with a **10 foot** straightedge applied parallel with and at right angles to the center line of the finished surface. Correct surface deviations in excess of **1/4 inch** by loosening, adding or removing material, reshaping, watering, and compacting. When [base] course is constructed in more than one layer, smoothness requirements apply only to the top layer.

#### 3.4.2.3 Field Density Tests

**ASTM D1556/D1556M**. Perform one field density test for each [500] [\_\_\_\_\_] square yards of each layer of [base] course.

#### 3.4.2.4 Laboratory Density Tests

**ASTM D1557**, Method B or D, for all material.

#### 3.4.2.5 Thickness Tests

Take at least one depth measurement for each [500] [\_\_\_\_\_] square yards of completed [base] course. Make depth measurements by test holes, at least **3 inches** in diameter, through the course. Where thickness deficiency exceeds **1/2 inch**, correct by scarifying, adding mixture of proper gradation, reblading, and recompacting. Where measured thickness exceeds **1/2 inch** thicker than shown, it shall be considered as the indicated or specified thickness plus **1/2 inch** for determining the average. Average thickness shall be the average of the depth measurements and shall not underrun the thickness shown by more than **1/4 inch**.

-- End of Section --

## SECTION 32 31 13

## CHAIN LINK FENCES AND GATES

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM A116	(2011) Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
ASTM A153/A153M	(2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A702	(2013) Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A90/A90M	(2013) Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM C94/C94M	(2015) Standard Specification for Ready-Mixed Concrete
ASTM F1043	(2014) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework
ASTM F1083	(2013) Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures
ASTM F567	(2014a) Standard Practice for Installation of Chain Link Fence
ASTM F626	(2014) Standard Specification for Fence Fittings
ASTM F883	(2013) Padlocks

## U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191	(Rev K) Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)
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FS RR-F-191/1	(Rev F) Fencing, Wire and Post, Metal (Chain-Link Fence Fabric)
FS RR-F-191/2	(Rev E) Fencing, Wire and Post, Metal (Chain-Link Fence Gates)
FS RR-F-191/3	(Rev E; Am 1) Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)
FS RR-F-191/4	(Rev F) Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] SUBMITTAL PROCEDURES:

### SD-02 Shop Drawings

Fence Assembly[; G]

Location of Gate, Corner, End, and Pull Posts[; G]

Gate Assembly[; G]

Gate Hardware and Accessories[; G]

Erection/Installation Drawings[; G]

### SD-03 Product Data

Fence Assembly[; G]

Gate Assembly[; G]

Gate Hardware and Accessories[; G]

Recycled Material Content[; G]

Zinc Coating[; G]

Fabric[; G]

Stretcher Bars[; G]

Concrete[; G]

## 1.3 ASSEMBLY AND INSTALLATION INSTRUCTIONS

Submit manufacturer's erection/installation drawings and instructions that

detail proper assembly and materials in the design for fence, gate, hardware and accessories.

Submit erection/installation drawings along with manufacturer's catalog data for complete [fence assembly](#), [gate assembly](#), [hardware assembly](#) and [accessories](#).

#### 1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

#### 1.5 QUALITY ASSURANCE

##### 1.5.1 Required Report Data

Submit reports of listing of chain-link fencing and accessories regarding weight in [ounces](#) for zinc coating

#### PART 2 PRODUCTS

#### 2.1 GENERAL

Provide fencing materials conforming to the requirements of [ASTM A116](#), [ASTM A702](#), [ASTM F626](#), and as specified.

Submit manufacturer's data indicating percentage of [recycled material content](#) in protective fence materials, including chain link fence, fabric, and gates to verify affirmative procurement compliance.

#### 2.2 ZINC COATING

Provide hot-dip galvanized (after fabrication) ferrous-metal components and accessories, except as otherwise specified.

Provide zinc coating of weight not less than [1.94 ounces per square foot](#), as determined from the average result of two specimens, when tested in accordance with [ASTM A90/A90M](#).

Provide zinc coating conforming to the requirements of the following:

- a. Pipe: [FS RR-F-191/3](#) Class 1 [Grade A in accordance with [ASTM F1083](#)]
- b. Hardware and accessories: [ASTM A153/A153M](#), Table 1
- c. Surface: [ASTM F1043](#)
- d. External: Type B-B surface zinc with organic coating, [0.97 ounce per square foot](#) minimum thickness of acrylated polymer.
- e. Internal: Surface zinc coating of [0.97 ounce per square foot](#) minimum.

Provide galvanizing repair material that is cold-applied zinc-rich coating conforming to [ASTM A780/A780M](#).

#### 2.3 FABRIC

[FS RR-F-191](#) and detailed specifications as referenced and other requirements as specified.

FS RR-F-191/1; Type [I, zinc-coated steel, [\_\_\_\_] gage] Mesh size, 2 inches. Provide selvage [knuckled at both selvages]. Height of fabric, as indicated.

Provide fabric consisting of No. 9-gage wires woven into a [2-inch] diamond mesh, with dimensions of fabric and wire conforming to ASTM A116, ASTM A702 and ASTM F626, with [1.20] ounces per square foot zinc galvanizing.

Provide one-piece fabric widths for fence heights up to 12 feet.

#### 2.4 TOP AND BOTTOM SELVAGES

Provide knuckled selvages at top and bottom for fabric with 2 inch mesh and up to 60 inches high, and if over 60 inches high, provide twisted and barbed top selvage and knuckled bottom selvage.

Knuckle top and bottom selvages for 1-3/4-inch and 1-inch mesh fabric.

#### 2.5 POSTS [, TOP RAILS] AND BRACES

FS RR-F-191/3 line posts; Class [1, steel pipe, Grade [A] [or] [B]] End, corner, and pull posts; Class [1, steel pipe, Grade [A] [or] [B]], Braces [and rails]; Class [1, steel pipe, Grade [A] [or] [B]]

#### 2.6 LINE POSTS

Minimum acceptable line posts are as follows:

Up to 6-feet high:

Grade A: 1.900 inch O.D. pipe weighing 2.72 pounds per linear foot.

Grade B: 2.375 inch O.D. pipe weighing 3.12 pounds per linear foot.

Over 6-feet high:

2.0 inch O.D. pipe weighing 3.65 pounds per linear foot.

#### 2.7 END, CORNER, AND PULL POSTS

Provide minimally acceptable end, corner, and pull posts as follows:

Up to 6 feet high:

Grade A: 2.375 inch O.D. pipe weighing 3.65 pounds per linear foot.

Grade B: 2.375 inch O.D. pipe weighing 3.12 pounds per linear foot.

Over 6 feet high:

Grade A: 2.875 inch O.D. pipe weighing 5.79 pounds per linear foot.

Grade B: 2.875 inch O.D. pipe weighing 4.64 pounds per linear foot.

## 2.8 SLEEVES

Provide sleeves for setting into concrete construction of the same material as post sections, sized 1-inch greater than the diameter or dimension of the post. Weld flat plates to each sleeve base to provide anchorage and prevent intrusion of concrete.

## 2.9 TOP RAIL

Provide [a minimum of 1.660 inches O.D. pipe rails.][Grade A weighing 2.27 pounds per linear foot.] [Grade B weighing 1.82 pounds per linear foot.] Provide expansion couplings 6-inches long at each joint in top rails.

## [2.10 CENTER RAILS BETWEEN LINE POSTS

For fencing over 6-feet high, provide 1.660 inches O.D. pipe center rails, [Grade A weighing 2.27 pounds per linear foot] [Grade B weighing 1.82 pounds per linear foot.]

## ]2.11 POST-BRACE ASSEMBLY

Provide bracing consisting of 1.660 inches O.D. pipe [Grade A weighing 2.27 pounds per linear foot] [Grade B weighing 1.82 pounds per linear foot ] and 3/8 inch adjustable truss rods and turnbuckles.

## 2.12 TENSION WIRE

Provide galvanized wire, No. 7-gage, coiled spring wire, provided at the bottom of the fabric only. Provide zinc coating that weighs not less than [1.2] ounces per square foot.

## 2.13 STRETCHER BARS

Provide bars that have one-piece lengths equal to the full height of the fabric with a minimum cross section of 3/16 by 3/4 inch, in accordance with ASTM A116, ASTM A702 and ASTM F626.

## 2.14 POST TOPS

Provide tops that are steel, wrought iron, or malleable iron designed as a weathertight closure cap. Provide one cap for each post, unless equal protection is provided by a combination post-cap and barbed-wire supporting arm. Provide caps with an opening to permit through passage of the top rail.

## 2.15 STRETCHER BAR BANDS

Provide bar bands for securing stretcher bars to posts that are steel, wrought iron, or malleable iron spaced not over 15 inches on center. Bands may also be used in conjunction with special fittings for securing rails to posts. Provide bands with projecting edges chamfered or eased.

## 2.16 GATE POSTS

Provide a gate post for supporting each gate leaf as follows:

[ Up to 6-feet wide:

2.875 inch O.D. pipe [Grade A weighing 5.79 pounds per linear foot.]

[Grade B weighing 4.64 pounds per linear foot.]

] [Over 6 feet wide and up to 13 feet wide:

2.875 inch O.D. pipe [Grade A weighing 5.79 pounds per linear foot.]  
[Grade B weighing 4.64 pounds per linear foot.]

]

## ] 2.17 GATES

FS RR-F-191/2; Type [I, single swing] [II, double swing] Shape and size of gate frame, [as indicated]. Framing and bracing members, [square] of [steel] alloy. [Steel member finish, [zinc-coated] Provide gate frames and braces of minimum sizes listed in FS RR-F-191/3 for each Class and Grade, except that steel pipe frames are a minimum of 1.90 inches o.d., 0.120 inches minimum wall thickness and aluminum pipe frames and intermediate braces are 1.869 inches o.d. minimum, 0.940 lb/ft of length. Gate fabric, is as specified for fencing fabric. Coating for steel latches, stops, hinges, keepers, and accessories, [galvanized] Provide [fork] [indicated] type gate latches. [Provide intermediate members as necessary for gate leaves more than 8 feet wide, to provide rigid construction, free from sag or twist.] Attach gate fabric to gate frame in accordance with manufacturer's standards, except that welding is not permitted. Arrange padlocking latches to be accessible from both sides of gate, regardless of latching arrangement.

[

] [For gate leaves over 6 feet high or 6 feet wide, provide perimeter gate frames of 1.90 inch O.D. pipe [Grade A weighing 2.72 pounds per linear foot.] [Grade B weighing 2.28 pounds per linear foot.]

] Provide gate frame assembly that is welded or assembled with special malleable or pressed-steel fittings and rivets to provide rigid connections. Install fabric with stretcher bars at vertical edges; stretcher bars may also be used at top and bottom edges. Attach stretcher bars and fabric to gate frames on all sides at intervals not exceeding 15 inches. Attach hardware with rivets or by other means which provides equal security against breakage or removal.

Provide diagonal cross-bracing, consisting of 3/8-inch diameter adjustable-length truss rods on welded gate frames, where necessary to obtain frame rigidity without sag or twist. Provide nonwelded gate frames with diagonal bracing.

## 2.18 GATE HARDWARE AND ACCESSORIES

Provide gate hardware and accessories that conforms to ASTM A116, ASTM A702, ASTM F626, and be as specified:

Provide [forged steel] hinges to suit gate size, non-lift-off type, offset to permit 180-degree opening.

Provide latch that permits operation from either side of the gate, with a padlock eye provided as an integral part of the latch.

Provide stops and holders of malleable iron for vehicular gates. Provide stops that automatically engage the gate and hold it in the open position until manually released.

[ Provide double gates with a cane bolt and ground-set keeper, with latch or locking device and padlock eye designed as an integral part.

#### 2.19 WIRE TIES

FS RR-F-191/4. Provide wire ties constructed of the same material as the fencing fabric.

#### 2.20 CONCRETE

Provide concrete conforming to ASTM C94/C94M, and obtaining a minimum 28-day compressive strength of 3,000 psi.

#### 2.21 GROUT

Provide grout of proportions one part portland cement to three parts clean, well-graded sand and a minimum amount of water to produce a workable mix.

#### 2.22 PADLOCKS

Provide padlocks conforming to ASTM F883, with chain.

### PART 3 EXECUTION

Provide complete installation conforming to ASTM F567.

#### 3.1 GENERAL

Ensure final grading and established elevations are complete prior to commencing fence installation.

#### 3.2 EXCAVATION

Provide excavations for post footings which are in virgin or compacted soil, of minimum sizes as indicated.

Space footings for line posts 10 feet on center maximum and at closer intervals when indicated, with bottoms of the holes approximately 3-inches below the bottoms of the posts. Set bottom of each post not less than 36-inches below finished grade when in firm, undisturbed soil. Set posts deeper, as required, in soft and problem soils and for heavy, lateral loads.

[ Uniformly spread soil from excavations adjacent to the fence line or on areas of Government property, as directed.]

]

#### 3.3 SETTING POSTS

Remove loose and foreign materials from holes and the soil moistened prior to placing concrete.

Provide tops of footings that are trowel finished and sloped or domed to shed water away from posts. Set hold-open devices, sleeves, and other accessories in concrete.

Keep exposed concrete moist for at least 7 calendar days after placement or cured with a membrane curing material, as approved.

[ Grout all posts set into sleeved holes in concrete with an approved grouting material.

] [Maintain vertical alignment of posts set in concrete construction until concrete has set.

#### ]3.3.1 Earth and Bedrock

Provide concrete bases of dimensions indicated. Compact concrete to eliminate voids, and finish to a dome shape.

#### ]3.3.2 Bracing

Brace gate, corner, end, and pull posts to nearest post with a horizontal brace used as a compression member, placed at least 12 inches below top of fence, and [a diagonal tension rod].

### 3.4 CONCRETE STRENGTH

Provide concrete that has attained at least 75 percent of its minimum 28-day compressive strength, but in no case sooner than 7 calendar days after placement, before rails, tension wire, or fabric are installed. Do not stretch fabric and wires or hang gates until the concrete has attained its full design strength.

Take samples and test concrete to determine strength as specified.

### 3.5 TOP RAILS

Provide top rails that run continuously through post caps or extension arms, bending to radius for curved runs. Provide expansion couplings as recommended by the fencing manufacturer.

#### [3.6 CENTER RAILS

Provide single piece center rails between posts set flush with posts on the fabric side, using special offset fittings where necessary.

#### ]3.7 BRACE ASSEMBLY

Provide bracing assemblies at end and gate posts and at both sides of corner and pull posts, with the horizontal brace located at midheight of the fabric.

Install brace assemblies so posts are plumb when the diagonal rod is under proper tension.

Provide two complete brace assemblies at corner and pull posts where required for stiffness and as indicated.

### 3.8 TENSION WIRE INSTALLATION

Install tension wire by weaving them through the fabric and tying them to each post with not less than 7-gage galvanized wire or by securing the wire to the fabric with 10-gage ties or clips spaced 24 inches on center.

### 3.9 FABRIC INSTALLATION

Provide fabric in single lengths between stretch bars with bottom barbs placed approximately 1-1/2-inches above the ground line. Pull fabric taut and tied to posts, rails, and tension wire with wire ties and bands.

Install fabric on the security side of fence, unless otherwise directed.

Ensure fabric remains under tension after the pulling force is released.

### 3.10 STRETCHER BAR INSTALLATION

Thread stretcher bars through or clamped to fabric 4 inches on center and secured to posts with metal bands spaced 15 inches on center.

### 3.11 GATE INSTALLATION

Install gates plumb, level, and secure, with full opening without interference. Install ground set items in concrete for anchorage as recommended by the fence manufacturer. Adjust hardware for smooth operation and lubricated where necessary.

### 3.12 TIE WIRES

Provide tie wires that are U-shaped to the pipe diameters to which attached. Twist ends of tie wires not less than two full turns and bent so as not to present a hazard.

### 3.13 FASTENERS

Install nuts for tension bands and hardware on the side of the fence opposite the fabric side. Peen ends of bolts to prevent removal of nuts.

### 3.14 ZINC-COATING REPAIR

Clean and repair galvanized surfaces damaged by welding or abrasion, and cut ends of fabric, or other cut sections with specified galvanizing repair material applied in strict conformance with the manufacturer's printed instructions.

### 3.15 TOLERANCES

Provide posts that are straight and plumb within a vertical tolerance of 1/4 inch after the fabric has been stretched. Provide fencing and gates that are true to line with no more than 1/2 inch deviation from the established centerline between line posts. Repair defects as directed.

### 3.16 SITE PREPARATION

#### 3.16.1 Clearing and Grading

Clear fence line of trees, brush, and other obstacles to install fencing. Establish a graded, compacted fence line prior to fencing installation.

### 3.17 FENCE INSTALLATION

Install fence on prepared surfaces to line and grade indicated. Install fence in accordance with fence manufacturer's written installation instructions except as modified herein.

#### 3.17.1 Post Spacing

Provide line posts spaced equidistantly apart, not exceeding 10 feet on center. Provide gate posts spaced as necessary for size of gate openings. Do not exceed 500 feet on straight runs between braced posts. Provide corner or pull posts, with bracing in both directions, for changes in direction of 15 degrees or more, or for abrupt changes in grade. Provide drawings showing location of gate, corner, end, and pull posts.

#### 3.17.2 Top and Bottom Tension Wire

Install [top] [and] [bottom] tension wires before installing chain-link fabric, and pull wires taut. Place top and bottom tension wires within 8 inches of respective fabric line.

### 3.18 ACCESSORIES INSTALLATION

#### 3.18.1 Post Caps

[Design post caps to accommodate top rail.] Install post caps as recommended by the manufacturer.

#### 3.18.2 Padlocks

Provide padlocks for gate openings and provide chains that are securely attached to gate or gate posts. Provide padlocks keyed alike, and provide two keys for each padlock.

#### [3.19 GROUNDING

Ground fencing as [indicated on drawings].

#### 3.20 CLEANUP

Remove waste fencing materials and other debris from the work site.

-- End of Section --

## SECTION 32 31 26

## WIRE FENCES AND GATES

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA C1 (2003) All Timber Products - Preservative Treatment by Pressure Processes

AWPA C4 (2003) Poles - Preservative Treatment by Pressure Processes

## ASTM INTERNATIONAL (ASTM)

ASTM A116 (2011) Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric

ASTM A153/A153M (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A780/A780M (2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM F1043 (2014) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework

ASTM F1083 (2013) Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures

ASTM F1184 (2005; R 2010) Industrial and Commercial Horizontal Slide Gates

ASTM F626 (2014) Standard Specification for Fence Fittings

ASTM F900 (2011) Industrial and Commercial Swing Gates

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation;

#### SD-02 Shop Drawings

- Installation Drawings
- Fence Installation
- Location of Gate, Corner, End, and Pull Posts
- Gate Assembly
- Gate Hardware and Accessories

#### SD-03 Product Data

- Manufacturer's Instructions
- Gate Assembly
- Gate Hardware and Accessories

#### SD-04 Samples

- Fence Fabric; G
- Posts; G
- Braces; G
- Top Rail; G
- Bottom Rail; G
- Tension Wire; G
  
- Stretcher Bars; G
- Gate Posts; G
- Gate Hardware and Accessories; G
- Padlocks; G

### 1.3 QUALITY ASSURANCE

Provide [manufacturer's instructions](#) that detail proper assembly and materials in the design for fence, [gate assembly](#), [gate hardware and accessories](#). Submit [Installation drawings](#) clearly indicating [Fence Installation Location of gate, corner, end, and pull posts](#); Gate Assembly, Gate Hardware, catalog data and Accessories.

### 1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact. Prior to shipment, submit the following samples for review and approval:

- Fence Fabric
- Posts
- Braces
- Top Rail
- Bottom Rail
- Tension Wire
- Stretcher Bars
- Gate Posts
- Gate Hardware and Accessories
- Padlocks

## PART 2 PRODUCTS

## 2.1 FENCE FABRIC

Provide fence fabric conforming to the following:

## 2.1.1 Woven Wire

ASTM A116 [No. 9 farm] fence; grade, size as indicated. [ Applicable fittings shall conform to ASTM F626.]

## 2.2 GATES

Provide gate type and swing shown conforming to ASTM F900 and/or ASTM F1184, ASTM A153/A153M. Gate frames shall conform to strength and coating requirements of ASTM F1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate leaves more than 8 feet wide shall have either intermediate members and diagonal truss rods or tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Provide intermediate braces on all gate frames with an electro-mechanical lock. Furnish latches, hinges, stops, keepers, rollers, and other hardware items as required for the operation of the gate. Arrange latches for padlocking so that the padlock will be accessible from both sides of the gate. Provide stops for holding the gates in the open position.

## 2.3 POSTS

## 2.3.1 Wood Posts

Provide wood posts cut from sound and solid trees free from short or reverse bends in more than one plane. Provide posts free of ring shake, season cracks more than 1/4 inch wide, splits in the end, and unsound knots. Provide posts of size and shape indicated. Treat posts in accordance with AWPA C1 or AWPA C4 as applicable.

## 2.4 BRACES

ASTM F1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, meeting the strength and coating requirements of ASTM F1043. Group II, formed steel sections, size 1-21/32 inch, shall conform to ASTM F1043, if used as braces and rails when Group II line posts are furnished.

## 2.5 CONCRETE

ASTM C94, using 3/4 inch maximum size aggregate, and having minimum compressive strength of 3000 psi at 28 days. Provide grout consisting of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

## PART 3 EXECUTION

## 3.1 INSTALLATION

Install fence to the lines and grades indicated. Clear the area on either side of the fence line to the extent indicated. Space line posts equidistant at intervals not exceeding 16 feet. Set terminal (corner,

gate, and pull) posts at abrupt changes in vertical and horizontal alignment. Provide continuous fabric between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A780/A780M.

### 3.2 EXCAVATION

Clear loose material from all post holes. Spread waste material where directed. Eliminate ground surface irregularities along the fence line to the extent necessary to maintain a [2] inch max clearance between the bottom of the fabric and finish grade.

### 3.3 POST INSTALLATION

For wood posts (Farm Style Fence), excavate to depth indicated and brace post until backfill is completed. Place backfill in layers of 9 inches or less, moistened to optimum condition, and compacted with hand tampers or other approved method. Set posts plumb and in proper alignment. Drive metal posts or set in concrete as indicated.

### 3.4 GATE ASSEMBLY

For farm style fencing, provide standard metal gate assemblies with frame and fittings necessary for complete installation or wood gates as shown.

-- End of Section --