PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

SECTION 02815 CANTILEVER SLIDE GATE

1.0 General

1.1 Scope

The work covered by this specification includes furnishing of all labor, equipment, and materials required for installation of manually operated cantilever gates constructed with aluminum or steel frame members, galvanized chain link or expanded metal mesh security fabric and hardware as shown on the drawings and specified herein.

1.2 Related Work

01300	Submittals
02121	General Excavation and Backfill
02810	Chain Link Fencing and Gates
02812	Security Fencing and Gates
03100	Reinforced Concrete

1.3 Codes and Standards

Comply with the provisions of the following codes, specifications, and standards, except as otherwise shown or specified. The latest edition of the code or standard shall govern.

International Building Code

American Society of Testing and Materials (ASTM)

ASTM A 121	Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
ASTM A 123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 307	Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A 370	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM A 392	Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 563	Standard Specification for Carbon and Alloy Steel Nuts

ASTM A 615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 780	Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A 817	Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcelled Tension Wire
ASTM B 221	Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
ASTM F 606	Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM F 626	Standard Specification for Fence Fittings
ASTM F 668	Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric
ASTM F 934	Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials
ASTM F 1043	Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
ASTM F 1083	Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F 1184	Standard Specification for Industrial and Commercial Horizontal Slide Gates
ASTM F 1267	Standard Specification for Metal, Expanded Steel
ASTM F 2200	Standard Specification for Automated Vehicular Gate Construction
ASTM F 3000	Standard Specification for Polymer Privacy Insert Slats for Chain Link Fabric and Privacy Chain Link Fabric Manufactured Containing Pre-Installed Privacy Slats

1.4 Submittals

A. Bid Documents

The Contractor shall submit with the bid documents manufacturer's product data sheets, details, and drawings on each product to be used, including warranties.

Manufacturer drawings shall show elevations and details for each gate depicting the actual products specified, incorporating proper design considerations and installation procedures. Coordinate submittals with the fencing plan, general details and notes indicated on the Contract Drawings.

B. Permit and Construction Documents

After the award of a contract, the Contractor shall provide a set of construction shop drawings and design calculations for the gate, gate posts, and foundations. The drawings and calculations shall be submitted six weeks prior to starting any fabrication or construction.

The Contractor (Company) will be responsible for submitting these documents for building permits. All questions and revisions from the building agency shall be compiled by the Contractor and submitted after review with the Company. The Company requires five working days for this review.

Drawings shall be provided electronically (AutoCAD and PDF files) along with two full-size prints. These drawings will become part of the construction drawing package. Two sets of paper stamped and signed calculations shall be submitted for permitting and one PDF file for Company records.

C. Product Warranty

Gate: All structural gate components (i.e. rails, track, rollers, and posts) shall be warrantied within specified limitations, by the manufacturer for a period of 15 years from date of installation. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

Fence Fabric: Fence expanded metal fabric, chain link, and all materials for assembly shall be warrantied within specified limitations, by the manufacturer for a period of 15 years from date of installation. Warranty shall cover any defects in material finish, coatings, concrete cracking, and splitting.

1.5 Engineering Requirements

Engineer shall be Professional Civil Engineer registered in the State the project is located.

Cantilever gate frame, posts, and all components shall be designed in accordance with the International Building Code for site specific wind and seismic design loads. However, wind forces shall not be less than that corresponding to a 115-mph, 3-second gust wind speed, with Exposure “C”. The importance factor for seismic loading shall be assumed to be 1.25.

Foundations shall be designed in accordance with the recommendations provided in the Geotechnical Engineering Report. The foundations shall be designed to support the fence/screening wall and gate design loads with a minimum safety factor of 1.5.

Completed gate frame shall be capable of supporting a minimum 400 pound load (applied at mid-span) without permanent deformation in the closed but not locked position.

Calculations shall be stamped and signed by a registered professional engineer registered in the State in which the fence/screening wall is to be installed.

1.6 Start of Construction

Contractor assembly or purchase of prefabricated gate components and foundation installation shall not commence until the Company review and approval of the drawings and calculations are complete.

2.0 Materials

2.1 General

All materials shall conform to the Codes and Standards in Section 1.3 and following specifications unless otherwise approved by Company.

The width of gates shown on Company plans are from the centerline of the gate posts.

All openings shall be designed, guarded, or screened from the bottom of the gate to the top to prevent a 2¼-inch diameter sphere from passing through the openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position.

Gates shall be designed, constructed, and installed such that their movement shall not be initiated by gravity.

All gates and associated hardware shall be fabricated for future electrical operation. Electrically operated horizontal slide gates must be manufactured and installed to comply with the safety requirements of ASTM F2200.

2.2 Height

The total installed gate height shall match the adjacent fence or screening wall. Minimum height shall be eight (8) feet above subgrade. The bottom seven (7) feet being expanded metal mesh security fabric or chain link and the top one (1) foot consisting of three strands security wire installed on vertical brackets.

2.3 Gate Frame

Fabricate cantilever slide gates in accordance with ASTM F 1184, Type II Cantilever Slide, Class 2.

Zinc-Coated Steel Gate Frames

Gate frames shall be in accordance with ASTM F 1043 or ASTM F 1083. Welded joints shall be cleaned and protected with zinc-rich paint per ASTM A 780.

Aluminum Alloy Gate Frames

Gate frames shall be in accordance with ASTM F 1043 and constructed of ASTM B 221 aluminum members.

The shape and size is to be determined by the engineer for the height and width shown on the drawings. Members shall be welded together forming rigid one-piece frame integral with top track.

The fabricated gate shall meet the Performance Criteria for Maximum Allowable Distances per Table 3 of ASTM F 1184. Provide two truck assemblies for each gate leaf except on gates larger than 30 feet. Frame sizes over 27 feet in length may be shipped in two parts and field spliced with special attachments provided by the manufacturer.

For gate leaf sizes 31 to 40 feet, weld two top track/rails together forming a dual enclosed track. Provide two truck assemblies for each track for each gate leaf, totaling four truck assemblies.

For gate leaf sizes 41 to 50 feet, fabricate a 24-inch-wide, rigid, box frame truss. Truss shall consist of dual side frames, constructed similar to standard single leaf gates, separated by square cross members and diagonal truss rod bridging. Dual side frames shall each contain top track/rail to provide support for truss from both sides. Provide four trucks for each track, total eight (8) for each gate leaf. Weld steel plate between top of support posts to maintain truck assemblies in alignment with tracks. See drawings for additional information.

2.4 Fabric

A. Chain Link

Chain link fabric shall conform to ASTM A 392 made from #9 gage (0.148″ nominal diameter), galvanized wire, spirally wound and interwoven into a two (2) inch diamond mesh, with twisted and barbed selvage on top and bottom.

Minimum breaking strength of the fabric wire shall be 1,290 pounds after galvanizing. Fabric wire shall be galvanized to Class 1, with a minimum weight of 1.20 ounces of zinc per square foot of uncoated wire surface. Galvanized fabric wire shall be tested in accordance with to ASTM A 370.

All chain link fittings shall comply with ASTM F 626. Fittings shall be from malleable or pressed steel and shall be hot-dipped galvanized with a minimum 1.20 oz./ft^2 of zinc coating, per ASTM A 817 unless noted otherwise. No aluminum fittings are allowed. Refer to Specification 02810 *Chain Link Fencing and Gates*, section 2.5 for material detailed requirements.

Fabric tension (stretcher) bars shall be galvanized steel, one piece length equal to two (2) inches less than full height of fabric, with a minimum cross-section of 3/16 x ¾ inches per ASTM F 626.

B. Security Fabric

Security fabric shall be expanded metal mesh conforming to ASTM F 1267, Type II Flattened, Class 2, Hot-Dip Galvanized with Grade A (0.0025 inch) minimum coating thickness. Hot-Dip Galvanize per ASTM A 123. Specific security fabric type will be indicated on the drawings.

All security fabric fittings shall comply with ASTM F 626. Fittings shall be from malleable or pressed steel and shall be hot-dipped galvanized with a minimum 1.20 oz./ft^2 of zinc coating, per ASTM A 123 unless noted otherwise. No aluminum fittings are allowed.

Security fabric attachment fittings and hardware shall be provided by the fabric manufacturer to install the expanded metal fence panels using hot-dipped galvanized steel fittings sized to match the framework specific to the project. The minimum thickness is 10 gage.

Bolts, U-bolts, nuts, and washers shall be galvanized or stainless steel, carriage style with breakaway nut and washer, per ASTM A 307, A 563 & F 606 respectively. Bolt size is contingent on mesh and fittings.

[OPTIONAL COLOR COATING of FRAME and FABRIC]

Polyolefin or PVC Coated Finish

The gate frame, track, and fabric shall be color coated with a coating as follows:

Gate Frame:	Polymer, Polyolefin elastomer or PVC, 10-mils minimum thickness, or polyester 3-mils minimum thickness, per ASTM F 1043 after fabrication. Coatings shall be applied to all exposed exterior surfaces.
Chain Link Fabric:	Polymer thermally fused coating per ASTM F 668, Class-2b over zinc coated fabric, minimum 15, and maximum 25 mils thickness.

Contractor shall provide color samples per section 1.4. Colors available are Black, Brown, Olive Green, Green per ASTM F 934. Color choice is shown on the drawings.

2.5 Gate and Guide Posts

Gate and guide posts are to be selected and spaced to meet the site specific geographic and weather conditions with due consideration to additives to the gate such as ice and snow, or signage. The Chain Link Fence Manufacturers Institute's, *Chain Link Fence Wind Load Guide for the Selection of Line Post and Line Post Spacing, WLG 2445* may be used as a guide to select the post diameter and spacing.

Posts shall conform to ASTM F 1043 and ASTM F 1083, with pipe post material selection per Table 3 of ASTM F 1043, Material Group 1A. Weight shall not vary more than ±10% from that prescribed. Lengths shall be sufficient for depth of required concrete embedment and security wire attachment. Material grade shall be shown on the Contractors shop drawings.

Gate posts shall be hot dipped galvanized per ASTM A 123 and shall have a minimum of 1.8 ounces hot dipped zinc per square foot of surface.

The use of re-rolled, re-galvanized or open-seam posts or rails are not allowed.

Group IA: Steel pipe shall be Schedule 40 pipe and shall conform to ASTM F 1083:

Regular Grade 30,000 psi minimum yield strength (minimum tensile strength = 48,000 psi)

Intermediate Strength Grade 50,000 psi minimum yield strength (minimum tensile strength = 60,000 psi). Available in 5.563 inch outside diameter and larger.

High Strength Grade 83,000 psi minimum yield strength (minimum tensile strength = 85,000 psi)

Alternatively gate posts may be fabricated from welded steel pipe or HSS structural tubing per ASTM A 500. Steel plates shall be structural grade and as detailed on the drawings.

Tubular and pipe posts shall be equipped with tops designed to exclude moisture from the posts center. Caps shall be fabricated from pressed steel, hot-dipped galvanized per ASTM A 123.

Sizes and grade of material used for posts, rails and gate frames shall be listed on the design drawings provided by the Contractor/Manufacturer.

2.6 Bracing

Provide bracing through diagonal adjustable length truss rods of ⅜″, galvanized steel, or diagonal welded panel frame members, in each panel of the gate frame. Truss rod assembly shall be capable of withstanding a tension of 2,000 pounds.

2.7 Top Track/Rail

The track and rail shall be an enclosed one-piece, combination if required, aluminum extrusion or steel. Track to withstand a minimum vertical reaction load of 2,000 pounds.

2.8 Roller Assembly

The internal roller assembly shall be swivel type, zinc-coated, die-cast steel, with sealed lubricant ball bearing rollers, and a means to assure that the trucks remain properly aligned in the track during all normal operations of the gate. The truck assembly shall withstand same vertical reaction load as track, or 2,000 pounds minimum.

Gate hangers, latches, brackets, guide assemblies, and stops shall be malleable iron or steel, hot dipped galvanized per ASTM A 123 after fabrication. Provide positive latch with provisions for padlocking.

Bottom guide wheel assemblies: Each assembly shall consist of two, rubber wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each guide post.

2.9 Stops

Positive stops shall be installed to limit travel to the fully open and fully closed positions. These stops shall be installed at either the top of the gate, or at the bottom of the gate. Stops shall not interfere with safe entry while the gate is open.

2.10 Security Wire

Security Wire shall be made of two strands of galvanized, Coating Type Z, twisted 12-½-gage carbon steel wire per ASTM 121, Design Number 12-4-5-14H. Barbs shall be four-point pattern on approximately 5" centers. Barbs shall be 14-gage carbon steel wire.

Three strands of security wire shall be securely fastened to gate framing that extend above the fabric covered part of the cantilever gate. Horizontal spacing of the security wire supports shall not exceed 10′. Security wire shall be installed with sufficient tension to maintain tautness during temperature changes.

2.11 Extension Arms

The gate frame shall be fitted with 90 degree security wire extension arms with wire positioned outside the gate. Arms shall be, at a minimum, made from 14-gage pressed steel designed to hold the top rail and three strands of security wire with the top strand located 12 inches above the fabric. Arms having projections that bent down over security wire may not be used. Arms shall withstand 250 pounds downward pull at end of arm without failure.

2.12 Gate Latches

All gates shall be designed with sufficient lateral stability to assure that the gate will enter a catcher which has a 12-inch width (six [6] inches on each side from the center) under site wind loads.

A linked security chain shall be supplied to allow a PacifiCorp standard padlock to secure the gate. The chain shall be attached with U-bolt to a plate welded to the gate frame with breakaway nut and washer. The free end shall be padlocked to a lug welded to gate frame. The attachment point shall be six (6) inches below the latch.

2.13 Grounding

Grounding for the gate frame and each gate post shall be provided with an unpainted lug for connection to the station ground grid while open or closed. The lug shall be three (3) inch square plate with a ⅝-inch diameter hole at the center and mounted about one (1) foot above finished grade. Installation and materials for the grounding will be by others.

2.14 Field Adjustment

All gates shall be designed with a means to adjust the vertical alignment of the gate in the field.

2.15 Slats

Slats shall be pre-woven into the chain link fabric and self-locked when manufactured. Slats shall be extruded from High Density Polyethylene (HDPE) per ASTM F 3000, Type PI-V with color pigments and ultra violet (UV) inhibitors added that are specifically formulated to retard the harmful effects of the sun and lengthen the life of the slat for 25-year warranty. See drawing notes for color to be provided.

Note: Wind load on slated fence is significantly higher than one with bare chain link fabric. Effects of increased wind loading shall be considered in the design of the cantilever gate, support posts and all connection hardware.

3.0 Execution

3.1 General

The cantilever slide gate shall be installed in compliance with the manufacturer's drawings and specifications.

3.2 Excavation and Concrete Work

Excavations shall be in accordance with specification 02121, *General Excavation and Backfill*.

Install gateposts in accordance with manufacturer's instructions and as specified below.

Post foundations shall be excavated with a power auger to the diameter and depth shown on the drawings. Post hole shall be clear of debris or standing water and shall not be left open more than 24 hours prior to placing concrete. All excavated materials shall be removed from the site or disposed as directed by the Company.

Gate support posts shall be embedded in the augured holes with concrete, in a vertical position, plumb and in line. The top six (6) inches shall be formed if ground is not firm enough to permit excavation of the post hole to neat lines to prevent a mushroom top that are susceptible to frost heave.

Curbs and aprons shall be placed with forms. Post and curbs may be poured at the same time. All reinforcing steel bars and ties shall conform to ASTM A 615, Grade 60, placed as show on approved drawings

Ready-mix concrete for post installation shall have a minimum 28-day compressive strength of 3,000 psi, maximum slump of five (5) inches, air content of 5% +/- 1%, and water-cement weight ratio not exceeding 0.53 at time of placement.

Concrete for gate aprons or curbs shall be per the structural concrete specification 03100, with a minimum 28-day compressive strength of 4,000 psi.

Where solid rock is encountered a hole shall be cored or air hammered into the rock that is ½-inch larger than the post diameter. Depth of holes are shown on the drawings, otherwise a minimum in solid rock of eighteen (18) inches, but not less than three times the post diameter or as shown on the drawings. Clear the hole of all loose debris and water, then half-fill the void with non-shrink grout approved by the Company. Then force the post to the bottom of the hole and plumb. Thoroughly work additional grout into the hole so as to leave no voids. Crown the grout to shed water.

Where solid rock is covered with an overburden of soil, the post shall be set in the solid rock and grouted to the depth as listed above, and the portion around the post to the depth of the overburden shall be completed as a standard concrete footing. The sides of this concrete footing shall be formed (or sleeved).

3.3 Gate Installation

Only after the concrete or grout has sufficiently cured (minimum seven [7] days after placing) the gate frame may be installed.

Install gates plumb, level, and secure for full opening without interference. Attach hardware by means, which will prevent unauthorized removal.

Adjust hardware for smooth operation by one person. The fabricated gate as installed shall meet the Performance Criteria for Maximum Allowable Distances per Table 3 of ASTM F 1184.

Gates must be installed to comply with the safety requirements of ASTM F 2200 for possible future electrical operation.

Security fabric shall be tied to line posts, top, mid, and bottom rails at a spacing that does not exceed the maximum spacing recommended by the manufacturer. Each panel shall be lapped over the adjacent panel a minimum of three inches, but not less than an overlap of three diamonds of the mesh. The fabric shall be placed on the outside of the gate frame, with its lower edge two (2) inched above the gate curb.

Chain link fabric shall be stretched taut, with its lower edge two (2) inches above the gate curb. Fabric shall be stretched between the gate frame ends and terminated on tension bars, which are held by fabric bands spaced not to exceed 15 inches.

The chain link fabric shall be sufficiently stretched taut so as not to deflect more than two (2) inches in the center of the gate panel when subjected to a 30-pound horizontal force.

3.4 Extension Arms and Security Wire

All extension arms shall be attached to the top of the gate frame with the blade portion of the arm installed vertical. Anchor extension arms to the frame with screws or spot welds to prevent rotation and removal. Three strands of security wire shall be installed with sufficient tension to maintain tautness during temperature changes and shall be securely fastened to the slots in the extension arms.

Field welded areas shall be cleaned and protected with zinc rich paint per ASTM A 780 (“Cold Galvanizing Compound” as manufactured by ZRC Corporation is an acceptable product for this application).

3.5 Warning and Station Signs

The “Warning! Hazardous Voltage Inside, Keep Out” signs shall be supplied by Company and installed by Contractor as shown on the drawings. Signs shall be placed on each fence run starting five (5) feet from the corner and then at 65-foot maximum spacing and at the gates. Signs shall be attached to the fence fabric five (5) feet six (6) inches from bottom of sign to finished grade. The “No Trespassing” sign shall be placed at the same five (5) foot six (6) inch level and immediately to the right or left.

Station sign shall be supplied by the Company and installed on the main entry gate only.

Warning! Hazardous Voltage Inside Keep Out (PP)
SI# 7999851

Warning! Hazardous Voltage Inside Keep Out (RMP)
SI# 7999852

No Trespassing
SI# 8252306

Mounting Hardware
SI# 7999092

The mounting hardware is comprised of aluminum brackets with one inch temper-proof bolts and locking nuts. The bolts are installed through the sign's front, and screw into the aluminum brackets located on the interior of the gate. Four sets of mounting hardware are needed for each sign.

3.6 Attachments

Field welding or drilling of tapped holes for attachments to the gate posts must be prepared and repainted with zinc rich paint prior to installation of the attachment. Zinc rich paint shall conform to ASTM A 780.

3.7 Cleanup

Pieces of fabric or other scrap materials shall be removed. Dirt from excavations and left over concrete shall be removed or deposited as instructed by Company and the area shall be left clean and orderly.

END OF SECTION