

# NATURAL ENERGY LABORATORY OF HAWAII AUTHORITY

## Pipe Hold Back Hardware

eRFQ 24-05-NELHA

### 1.0 Scope of Work

This solicitation is to purchase custom fabricated and prefabricated hardware and fasteners that will be used to secure an 18-inch offshore HDPE pipeline to the sea floor. Hardware to be supplied by the vendor includes: (A) Saddle clamp, (B) Anchor plates, (C) Shackles, (D) Turnbuckles, (E) Chain and (F) Various hardware fasteners. Vendor is to supply hold back hardware as defined in the Hardware Design Specifications section of this solicitation. Assembly and installation of pipe hold back hardware will be performed by "others". Rendering of assembled pipe hold back hardware is represented in Figure 1 below:

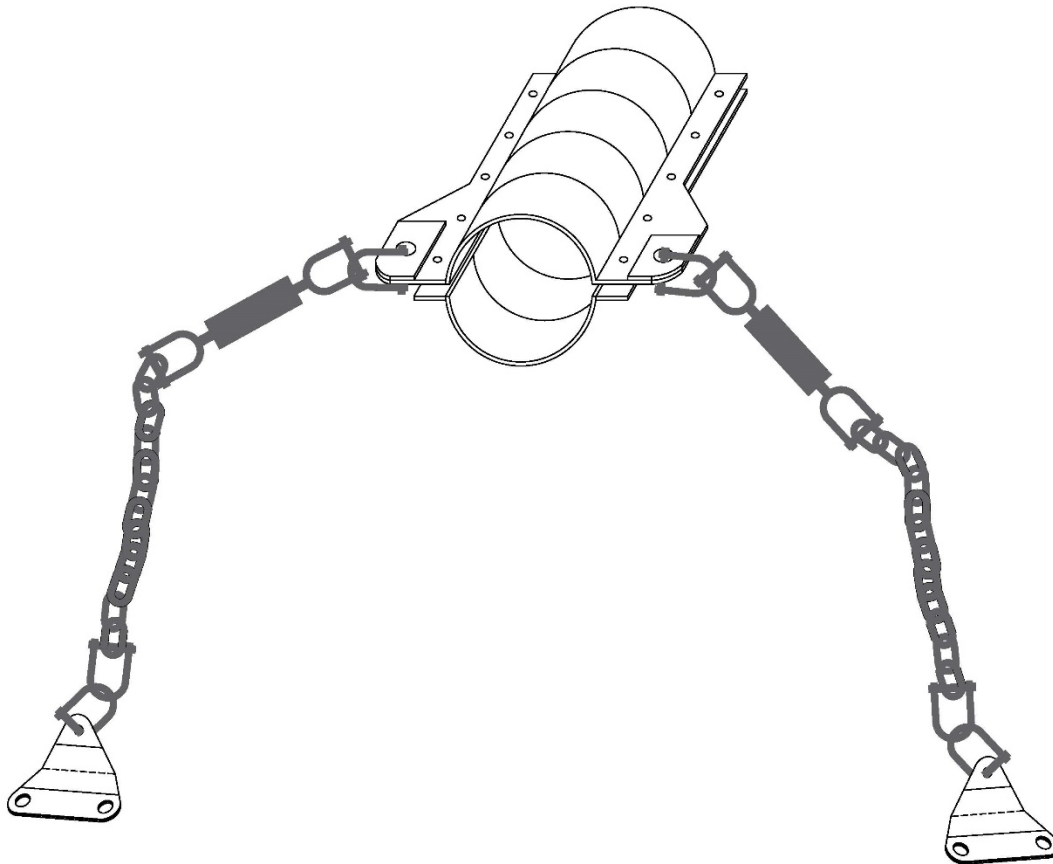


Figure 1: Assembled Hold Back Hardware

### 2.0 Hardware Design Specifications

All custom fabricated hardware shall be made using US-made steel plate and bar. Holes of specific diameters are to be drilled through the metal hardware in the locations shown in the design specifications. All prefabricated hardware (turnbuckles, shackles & chain) shall be manufactured domestically in the United States (No imported prefabricated hardware will be accepted).

## 2.1 Saddle Clamp

The saddle clamp will securely attach to the outside surface of 18-inch HDPE pipe. Fabricate one (1) pipe hold back saddle clamp according to the dimensions specified in Shop Drawing 1. The curved sections of the upper and lower saddle clamp halves are to be fabricated from ½-inch thick US-made steel plate. ¾-inch US-made flat bar or plate is cut to shape then welded to each side of the clamp halves to create side tabs. Each cut side tab includes ears on the front end of the clamp where chain will be attached. The side tab ears will be reinforced with ½-inch thick cut steel flat bar or plate and welded to the ¾-inch side tabs. 1¾-inch diameter holes are drilled in each side tab ear where the chain attaches. Five (5) 1-inch diameter holes are drilled in each side tab on the upper and lower halves. Opposing side tab holes on the saddle clamp must line up (top to bottom) with each other. Four rows of welded bead will be added to the inside of the upper and lower clamp halves for better grip on the pipe. Saddle clamps shall be hot-dipped galvanized corrosion treated after fabrication according to ASTM A123 specification.

## 2.2 Anchor Plate

Anchor plates provide the sturdy attachment point to the seafloor for securing the saddle clamps and hence the pipe. Fabricate two (2) anchor plates according to the dimensions specified in Shop Drawing 2. Anchor plates shall be cut from ¾-inch thick US-made steel plate and reinforced with ½-inch thick US-made cut steel flat bar or plate where the holes are located. Two (2) 2¼-inch diameter holes will be drilled in bottom reinforced section of anchor plate. One (1) 1¼-inch diameter hole will be drilled in top reinforced section of anchor plate. Anchor plate will have 45-degree bend at specified location. Finished anchor plates shall be hot-dipped galvanized corrosion treated after fabrication according to ASTM A123 specification.

## 2.3 Shackles

Supply two (2) shackles of three different sizes according to the dimensions specified in Figure 2 below. All shackles shall be Crosby G-2130 carbon steel bolt type anchor shackles (or approved equal). Cotter pins shall be 316 stainless steel. Shackles shall be hot-dipped galvanized corrosion treated according to ASTM A153 specification. Shackles shall conform to ASME B30.26 inspection criteria requirements.

Qty	2	2	2
Nominal Size (in):	7/8	1	1-3/8
Working Load Limit (t):	6.50	8.50	13.50
Dimension A (in):	1.44	1.69	2.25
Dimension B (in):	1.02	1.15	1.53
Dimension C (in):	3.31	3.75	5.25
Dimension D (in):	0.88	1.00	1.42
Dimension E (in):	2.28	2.69	3.63
Dimension F (in):	2.09	2.38	3.31
Dimension H (in):	5.83	6.56	9.16
Dimension L (in):	4.03	4.69	6.38
Dimension M (in):	4.82	5.39	7.21
Dimension N (in):	0.97	1.06	1.50

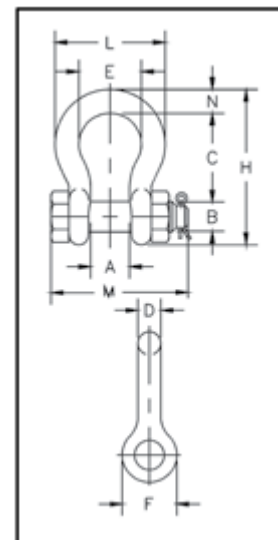
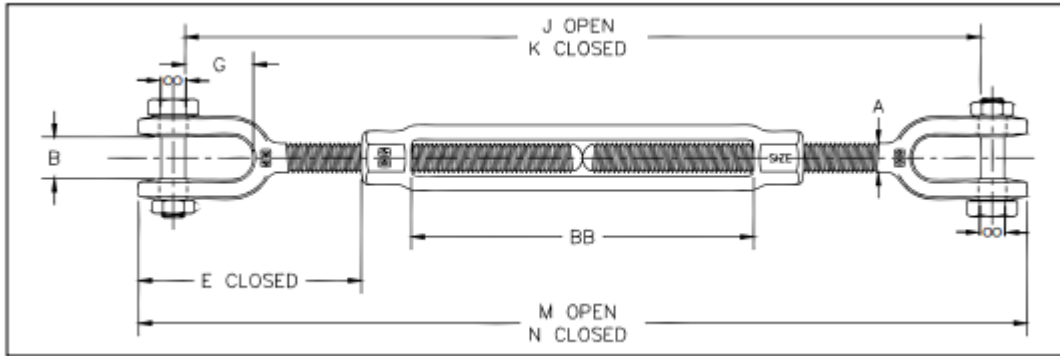


Figure 2: Shackle

## 2.4 Turnbuckles

Supply two (2) 1¼-inch x 18-inch turnbuckles according to the dimensions specified in Figure 3 below. All turnbuckles shall be Crosby HG-228 jaw & jaw type (or approved equal). Cotter pins shall be 316 stainless steel. Turnbuckles shall be hot-dipped galvanized corrosion treated according to ASTM A153 specification. Turnbuckles shall conform to ASME B30.26 inspection criteria requirements. Turnbuckles shall meet or exceed ASTM F-1145 performance requirements.



Qty	2
Thread Diameter & Take Up (in):	1¼ x 18
Working Load Limit (lbs):	15,200
Dimension A (in):	1.25
Dimension B (in):	1.84
Dimension E Closed (in):	8.09
Dimension G (in):	2.82
Dimension J Open (in):	51.37
Dimension K Closed (in):	33.37
Dimension M Open (in):	55.58
Dimension N Closed (in):	37.58
Dimension BB (in):	18.06

Figure 3: Turnbuckle

## 2.5 Chain

Supply 15 lineal feet of US-made steel 7/8-inch grade 30 proof coil chain. Chain shall conform to ASTM A413 requirements. Chain shall be hot-dipped galvanized corrosion treated according to ASTM A123 specification. Required chain-link dimension and performance specifications are listed in Table 1 below.

Qty (ft)	15
Nominal Chain Size (in):	7/8
Material Diameter (in):	0.866
Working Load Limit (lbs):	12,800
Proof Load Test (lbs):	25,600
Minimum Breaking Load (lbs):	51,200
Inside Length (in):	3.03
Inside Width (in):	1.08

Table 1: Chain Specification

## 2.6 Hardware Fasteners

Supply various hardware fasteners as listed below:

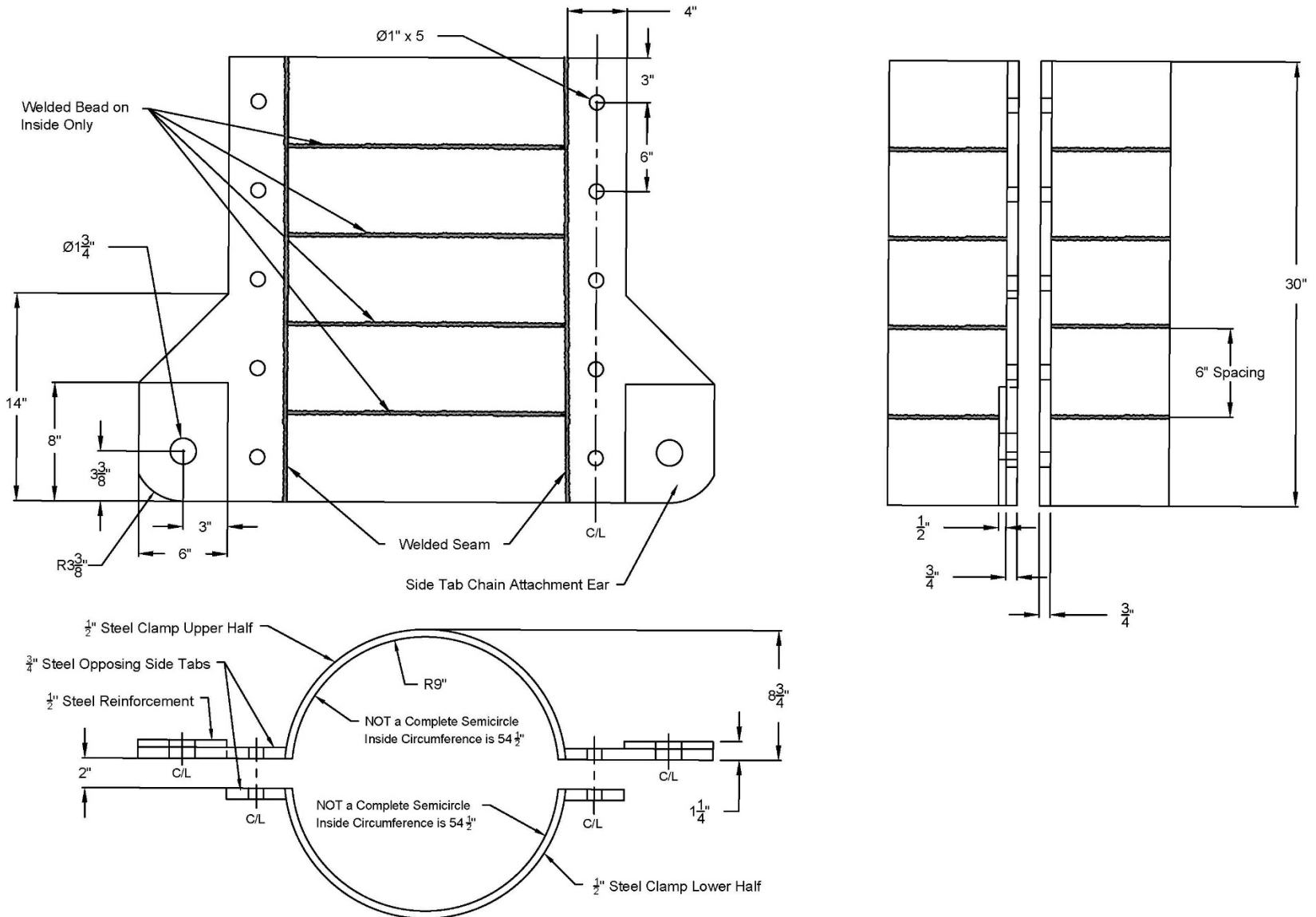
- Qty (4) 1½" x 24" hot-dipped galvanized all thread rod
- Qty (8) 1½" hot-dipped galvanized hex nuts
- Qty (8) 1½" hot-dipped galvanized flat washers
- Qty (10) 7/8-inch x 7" hot-dipped galvanized hex bolts
- Qty (10) 7/8" hot-dipped galvanized hex nuts
- Qty (10) 7/8" hot-dipped galvanized flat washers

All threaded fasteners shall be hot-dipped galvanized corrosion treated according to ASTM A153 specification. All non-threaded hardware fasteners shall be hot-dipped galvanized corrosion treated according to ASTM A123 specification.

## 3.0 Submittals

For shackles and turnbuckles that are not specified Crosby brand and model, technical data sheets shall be submitted to NELHA for approval of equivalent.

**Shop Drawing 1: Saddle Clamp**



**Shop Drawing 2:** Anchor Plate

