Submittal Review Response

Project Name:	***Hilo WWTP Rehabilitation and Replacement Project Phase 1***
Submittal No.:	***16133-001.0***
Date:	***5/30/2025***

Client:	County of Hawai‘i	**Carollo Project No.:**	203975
Contractor:	Nan, Inc.		
Submittal Name:	Underground Marking Tape		
Reviewed By:	Gavin Goo		

SUBMITTAL REVIEW		
Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically addressed in these review comments. Refer to Section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements.		
Approved	☒	No Exceptions
	☐	Make Corrections Noted - See Comments
	☐	Make Corrections Noted - Confirm
Not Approved	☐	Correct and Resubmit
	☐	Rejected - See Remarks
Receipt Acknowledged	☐	Filed for Record
	☐	With Comments - Resubmit

Review Comments:

1. No additional comments.

CONTRACTOR SUBMITTAL TRANSMITTAL FORM

Owner:	County of Hawaii	**Date:**	5/28/2025
Contractor:	Nan, Inc.	**Project No.:**	WW-4705R
Project Name:	Hilo WWTP Phase 1	**Submittal Number:**	16133-001.0
Submittal Title:	Underground Marking Tape		
To:	Engineer		
From:	Nan, Inc.		

Specification No. and Subject of Submittal / Equipment Supplier			
Spec ##:	16133	**Subject:**	Underground Marking Tape
Authored By:	Mark McCarthy	**Date Submitted:**	5/28/2025

Submittal Certification

Check Either (A) or (B):

[X] (A) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with no exceptions.

[ ] (B) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings except for the deviations listed.

Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

General Contractor's Reviewer's Signature: 

Printed Name and Title: Mark McCarthy, QC

In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.

Firm:	**Signature:**	**Date Returned:**

PM/CM Office Use

Date Received GC to PM/CM:

Date Received PM/CM to Reviewer:

Date Received Reviewer to PM/CM:

Date Sent PM/CM to GC:

Nan, Inc

PROJECT: HILO WWTP REHABILITATION AND REPLACEMENT PROJECT - PHASE 1

JOB NO. WW-4705R

THIS SUBMITTAL HAS BEEN CHECKED BY THIS CONTRACTOR. IT IS CERTIFIED CORRECT, COMPLETE, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL (UPON APPROVAL) INTO THEIR OWN WORK.

DATE RECEIVED 5/28/2025
SPECIFICATION SECTION #16133
SPECIFICATION Duct Bank
PARAGRAPH 1.02 B2
DRAWING N/A
SUBCONTRACTOR N/A
SUPPLIER N/A
MANUFACTURER Panduit

CERTIFIED BY: M. McCarthy

SECTION 16133

DUCT BANKS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Electrical underground duct banks.
   2. Duct bank installation requirements.

1.02 SUBMITTALS

A. Furnish submittals as specified in Section 01330 - Submittal Procedures.

B. Product data:
   1. PVC conduit spacers.
   2. Detectable underground marking tape.
   3. Pull line.

C. Shop drawings:
   1. Submit site plan drawings of duct banks including underground profiles indicating all underground utilities.
   2. Submit cross section of each duct bank with dimensions.
   3. For duct bank routings crossing under building footers or foundations alternative to designed routings indicated on the Drawings:
      a. Submit shop drawings detailing the new building footer crossing locations and plan drawings labeling all equipment to be installed on top of the new routing for approval by the project Structural Engineer.

1.03 PROJECT OR SITE CONDITIONS

A. As specified in Section 01850 - Design Criteria.

B. Field conditions and related requirements:
   1. Underground water table may be near or above the location of new duct banks.
   2. Include cost for necessary dewatering, and cleaning equipment to perform work in underground duct banks, pullboxes and manholes, before installation.

1.04 WARRANTY

A. As specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Duct bank sections indicated on the Drawings are an initial arrangement and may need to be modified due to existing site conditions, existing underground utilities, and infrastructure.
   1. Reorganize duct bank section with approval of Engineer.
   2. Make changes required to accommodate duct bank configuration and routing changes due to field conditions.
      a. Where changes in a duct bank configuration extend to a manhole or handhole, coordinate manhole/handhole blockouts and size with the new configuration.

B. Provide location and protection of existing underground utilities, duct bank, trenching, forming, rebar, spacers, conduit, concrete, backfill, and compaction necessary for the complete installation of the duct banks.

C. Provide reinforced concrete duct banks for all conduits installed below grade, on the site, below structures, or in contact with the earth, unless otherwise indicated on the Drawings.

2.02 MANUFACTURERS

A. Conduit spacers:
   1. One of the following or equal:
      a. Cantex.
      b. Osburn Associates, Inc.

B. Detectable underground marking tape:
   1. One of the following or equal:
      a. Blackburn Manufacturing Co.
      b. Panduit.

C. Pull line:
   1. One of the following or equal:
      a. Arnco.
      b. Greenlee.
      c. Osburn Associates, Inc.

D. Duct seal:
   1. The following or equal:
      a. O-Z/Gedney type DUX.

2.03 MATERIALS

A. Provide conduit as specified in Section 16130 - Conduits.

B. Provide reinforcing steel as specified in Section 03200 - Concrete Reinforcing:
   1. Provide minimum Number 4 reinforcing steel.

C. Concrete:
   1. Mix requirements as specified in Section 03300 - Cast-in-Place Concrete.
   2. Provide a red-oxide conduit encasement coloring agent as specified in Section 03300 - Cast-in-Place Concrete.

2.04 MANUFACTURED UNITS

A. Conduit spacers:
   1. Provide conduit spacers recommended by the conduit manufacturer or specified above.
   2. Saddle type.
   3. Non-metallic, non-corrosive, non-conductive.
   4. Interlocking type:
      a. Vertical interlocking.
      b. Horizontal interlocking.
   5. Suitable for concrete encasement.
   6. Molded-in rebar holder.
   7. Accommodates 2-inch through 6-inch conduit sizes.
   8. Relieves the conduit from both horizontal and vertical stresses.

B. Pull line:
   1. Minimum 1/4-inch wide, flat design.
   2. Polyester.
   3. Minimum pulling strength 1,200 pounds.

C. Detectable marking tape:
   1. Provide a detectable tape, locatable by a cable or metal detector from above the undisturbed grade.
   2. Aluminum core laminated between polyethylene film.
   3. 6-inch-wide red tape imprinted with black lettering stating "CAUTION - BURIED ELECTRIC LINE BELOW" or equivalent.

D. Duct seal:
   1. Non-hardening sealing compound.
   2. Flexible, can be applied by hand.
   3. UL Listed for use with installed conductors.

PART 3 EXECUTION

3.01 INSTALLATION

A. Duct banks:
   1. Install duct banks encased in concrete at least 24 inches below finish grade, unless otherwise indicated on the Drawings.
   2. Damage minimization:
      a. Conduit should not be left exposed in an open trench longer than is necessary.
      b. Protect all underground duct banks against damage during pouring of concrete or backfilling.

3. All plastic conduit fittings to be joined should be exposed to the same temperature conditions for a reasonable length of time before assembly.
4. Provide No. 4/0 American Wire Gauge bare copper ground wire the entire length of duct bank and bond to the grounding system at each end of the duct bank.
5. Install underground ducts to be self-draining:
    a. Slope duct banks away from buildings to manholes, handholes, or pullboxes.
    b. Slope duct banks uniformly from manholes, handholes, or pullboxes to manholes, handholes, or pullboxes or both ways from high points between manholes, handholes, or pullboxes.
    c. Slope a minimum of 1/4 inch per 10 feet.
6. Where new duct banks join to existing manholes, handholes, or pullboxes, make the proper fittings and fabricate the concrete envelopes to ensure smooth durable transitions, as indicated on the Drawings.
7. Install pull line in spare conduits:
    a. Provide adequate pull line at both ends of conduits to facilitate conductor pulling.
    b. Cap above ground spare conduit risers at each end with screw-on conduit caps.

B. Trenching:
1. Perform trenching as specified in Section 02318 - Trenching.
2. Trench must be uniformly graded with the bottom, rock free and covered with select material.
3. Whenever possible, use the walls of the trench as forms for concrete encasement:
    a. Forms are required where the soil is not self-supporting.
4. Damage occurring to existing ducts, conduits, cables, and other utilities during duct bank installation shall be remediated to the satisfaction of the Owner.

C. Duct spacing:
1. Separate conduits with manufactured plastic spacers using a minimum space between the outside surfaces of adjacent conduits of 2 inches, unless otherwise indicated on the Drawings:
    a. Separate medium voltage ducts a minimum of 7.5 inches on center.
2. Install spacers to maintain uniform spacing of duct assembly a minimum of 4 inches above the bottom of the trench during concrete pour. Install spacers on 8-foot maximum intervals:
    a. Due to some distortion of conduit from heat, and other means, it may be necessary to install extra spacers within the duct bank:
        1) Install the intermediate set of spacers within normal required spacing to maintain the proper horizontal clearance:
            a) Clearance is required to allow the proper amount of concrete to infiltrate vertically among the duct to ensure proper protection.
3. Spacers shall not be located at the center of a bend:
    a. Locate spacer in the tangent, free of the coupling on fabricated bends.
    b. Locate spacers midway between the tangent and the center bend on trench formed sweeps.

D. Terminating:
   1. Use bell ends in duct at entrances into cable vaults.
   2. Make conduit entrances into cable vaults tangential to walls of cable vault.
   3. Form trapezoidal transitions between duct bank and cable vaults as needed in order to ensure adequate cable bending radius for the duct bank-to-vault transition.
   4. Install duct seal in all conduits including spare conduits, at both ends, entrance to manholes/handholes , and building/equipment stub-ups. Form by hand to conduit and around cables to develop moisture barrier.
   5. New manhole or handhole applications, provide a single opening or "window" per duct bank, sized to accommodate the duct bank envelope.

E. Concrete:
   1. Install concrete as specified in Section 03300 - Cast-in-Place Concrete.
   2. Provide tie wires in accordance with Section 03200 - Concrete Reinforcing to prevent displacement of the conduits during pouring of concrete:
      a. Tie wire shall not act as a substitute for spacers.
   3. Install minimum 3-inch cover around conduit and rebar.
   4. Consolidation of encasement concrete around duct banks shall be by hand puddling. Mechanical vibrators are acceptable for use outside of the rebar cage.
   5. Conduit is subject to temperature rise. As concrete cures, allow the free end to expand by pouring the concrete from the center of the run or from one tie in point.

F. Marking tape:
   1. Install a detectable marking tape 12 inches above the duct bank the entire length of the duct bank.

G. For conduit installations beneath building slabs:
   1. Duct banks shall be continued under building slabs to the final destination of the conduits.
      a. Construct separate duct banks as required.
      b. Concrete for encasement under building slabs need not be colored red.
      c. For duct banks crossing under building footers or foundations, install the top of the duct bank a minimum of 6 inches below the footer.
      d. Where duct banks enter through building walls, foundation walls, stem walls, etc. make connections as indicated on the Drawings.
      e. Where duct banks terminate with conduit risers entering building walls, install an expansion/deflection fitting or a flat-wise elbow (elbow parallel to building wall) in order to accommodate differential movement between the conduits and structure.

H. Restore all surfaces to their original condition as specified in Section 02952 - Pavement Restoration and Rehabilitation, unless otherwise specified.

3.02 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

3.03 CLEANING

A. Clean conduits of dirt and debris by use of an appropriately sized steel mandrel no less than 1/2 inch smaller than the inside diameter of the conduit.

3.04 PROTECTION

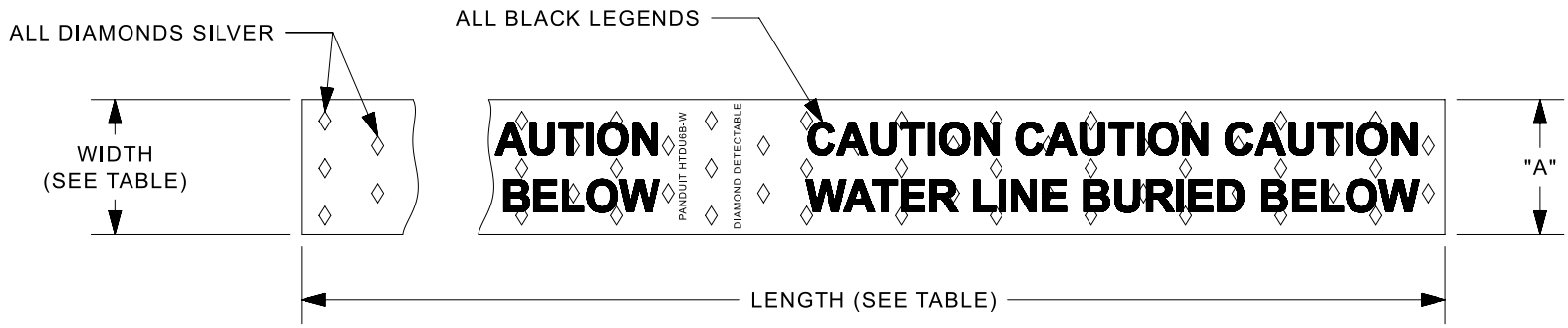
A. Provide shoring and pumping to protect the excavation and safety of workers.

B. Protect excavations with barricades as required by applicable safety regulations.

END OF SECTION

B

PART NUMBER	LEGEND	COLOR		WIDTH	LENGTH +15%/ -5%	STD. PKG.	LEGEND HEIGHT "A"
		LEGENDS	BACKGROUND				
HTDU3R-E	CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW	BLACK	RED	3" +/-.17	1000 FT.	1 ROLL	2" +/-.375
HTDU6R-E				6" +/-.27			4.25" +/-.75
HTDU3O-FO	CAUTION CAUTION CAUTION FIBER OPTIC CABLE BURIED BELOW		ORANGE	3" +/-.17			2" +/-.375
HTDU6O-FO				6" +/-.27			4.25" +/-.75
HTDU6O-T	CAUTION CAUTION CAUTION TELEPHONE LINE BURIED BELOW			6" +/-.27			4.25" +/-.75
HTDU3B-W	CAUTION CAUTION CAUTION WATER LINE BURIED BELOW		BLUE	3" +/-.17			2" +/-.375



NOTES:
1. MATERIAL IS AN ALUMINUM FOIL CORE ENCAPSULATED IN CLEAR PLASTIC FILM. OVERALL THICKNESS IS 4.5-6.5 MIL. MATERIAL IS NOT BIODEGRADABLE.

REV	DATE	BY	CHK	APR	DESCRIPTION	ECN
09A	7/18/2024	RVU	MSAD	MSAD	B. OBSOLETED PN: HTDU2R-E, HTDU2O-FO, HTDU3R-HE, HTDU3G-S, HTDU2O-T, HTDU3O-T, AND HTDU2B-W. A. TITLE, REVISED FROM "CONTROL DRAWING" TO "CUSTOMER DRAWING".	GAECN07185
8	9/22/2021	RVU	RCMC	JADE	ARTWORK WILL REMAIN THE SAME WORDING AND LAYOUT EXCEPT ADDING THE WORDING "Diamond Detectable" UNDER THE PANDUIT PART NUMBERS. ADDED NEW SYMBOLS REPEAT OF DIAMOND ON TAPE. UPDATE NOTE 1. MATERIAL IS AN ALUMINUM FOIL CORE ENCAPSULATED IN CLEAR PLASTIC FILM. OVERALL THICKNESS IS 4.5-6.5 MIL. ADDED NOTES 8.	GAECN06073
7	6/2/17	RVU			REMOVE OPTION 2 COLUMN. REMOVE NOTES 3, & 4.	GAECN04173
6	3/122/12	RVU			ADD HTDU3R-HE ON TABLE. SEQUENCE PART LISTED.	6732

TITLE

HTDU UNDERGROUND DETECTABLE TAPE

CUSTOMER DRAWING A

ITEM REVISION NAME: I00318HJ/16

DATASET FILE NAME: I00318HJ_DC/16B C10627 R09A CUST DWG

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE: IN [mm]

.x ± .25 [6.35] .xxx ± .045 [1.143]

.xx ± .145 [3.683] ANGLES ±

THIRD ANGLE PROJECTION

MATERIAL: SEE NOTE 1.

DRAWING NUMBER: C10627

DRAWN BY	DATE	CHK	SCALE	SIZE
RVU	10/29/07	JHAC	NTS	A

SHT 1 OF 1