



Technical Memorandum

Date: March 5, 2025
To: Phil Baumgartner, Dillingham Public Works Director
From: Beau Counts, P.E. – Project Engineer, CRW Engineering Group, Inc.
Project: Dillingham Dock Lighting Improvements
Project No: (CRW#60143.34)
Subject: Dock Lighting Condition Assessment & Recommendations

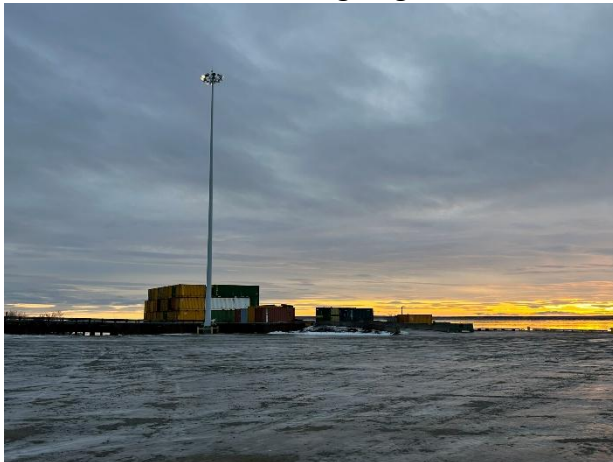
1. INTRODUCTION

The City of Dillingham owns and operates the city dock in Dillingham, Alaska. The existing high-mast lighting system is currently inoperable and has reportedly been in this condition for several years. The dock is a highly utilized facility in the community and the lack of proper lighting creates a potentially dangerous condition for its users. The system is over 20 years old and multiple components are in need of repair, replacement, or upgrade.

CRW Engineers Ian Hoffman and Beau Counts performed site visits in July 2024 and December 2024, respectively. While on site, CRW engineers conducted a condition assessment of the existing lighting system in support of making recommended improvements. This technical memorandum provides a facility description, condition assessment, and recommended improvements for the high-mast lighting at the Dillingham City Dock.

2. FACILITY DESCRIPTION

The existing lighting system includes two (2) tapered steel masts, 150 feet in height. The masts are rated for a wind velocity of 100mph with gusts up to 130mph. Each mast is equipped with a lowering system operated via a motorized pulley. The masts are equipped with 1,000W hi-mast metal halide fixtures. The lowering ring for the mast on the west end of the dock includes ten fixtures while the lowering ring for the mast on the east end includes twelve fixtures.



The existing electrical service is 400A, 277V/480Y, 3Ø connected to a nearby 75kVA utility transformer. The service laterals are landed on a 400A exterior, pad-mounted switchboard with CT cabinet and 480V branch circuit distribution. The switchboard consists of a 400A main breaker, (5) 20A branch circuit breakers, (1) 30A branch circuit breaker, and a switchboard mounted surge protecting device. The branch circuits are distributed via #12AWG and #10AWG conductors to the contacts and relays located in the lower section of the MDP.



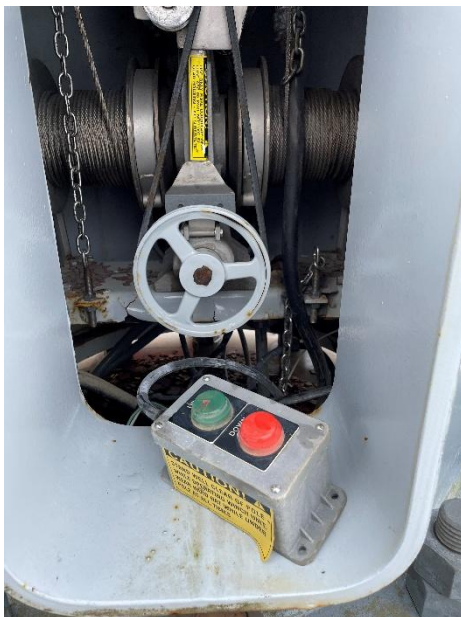
Control relays & coils are located in the lower section of the MDP with lighting control provided via circuit breakers. There are some newer stainless-steel enclosures within the bollard protected area of the west mast which are not associated with the lighting system/controls.



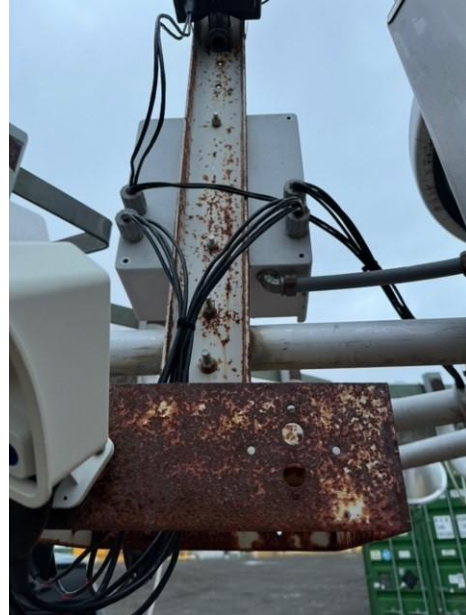
3. CONDITION ASSESSMENT

The steel masts appear to be in good condition overall, however it was reported that the western mast was bumped by a barge and possibly damaged. The west end mast, foundation, and lowering ring should receive further evaluation by a licensed structural engineer to ensure those components are not compromised.

The pulley system appears to be in good working condition. The belts are starting to wear and show cracking. It's recommended that the belts be replaced regularly and a service log maintained onsite at each mast.



The lowering rings on both masts appear to have significant corrosion and some damaged components. Most of the screws used for securing cover plates are heavily corroded and near the point of failure.

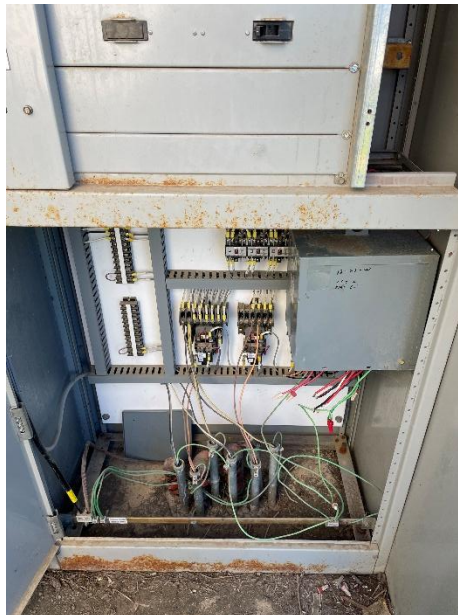


There are multiple instances of damaged wire & insulation including some circuits that have been severed and short circuited on the metallic ring and mounting components.





The lighting controls appear to have been originally designed for multiple mechanically held lighting contactors to be mounted adjacent to the MDP, but a system of relays and coils were installed in the lower portion of the MDP. There are several circuit conductors that have been cut and abandoned. Most of the light fixtures do not turn on when the system is energized.



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The switchboard and components are mildly corroded. The switchboard is missing a cover panel needed to protect personnel from arc flashes. The switchboard is a discontinued model and spare parts may not be readily available.



4. DESIGN OPTIONS

The three options below present varying levels of improvements to the city dock lighting system. Option 1 presents the minimum work required to make the system operational but is not considered a long-term solution; Option 2 presents necessary repairs to make the system operational along with additional upgrades to improve operational efficiencies; and Option 3 presents an entirely new lighting system. Options 2 and 3 represent designs with a minimum 20-year system life. The final determination from the structural inspections will determine which of the following options are viable.

Option 1

All of the branch circuit wiring from the switchboard needs to be tested and the insulation inspected. Any sections of wiring that are damaged or that don't pass testing need to be replaced. At a minimum, testing should include megger testing and conductor continuity testing.

Each metal halide fixture should be inspected and tested for proper operation. Fixtures should be provided with new lamps. Fixture housings should be refurbished to factory operating condition or replaced.

The power and control wiring in the switchboard should be rewired to match existing labeling and provided with complete circuit designations to ensure all lighting is properly connected. The overall condition and configuration of the switchboard should be brought up to code. Any abandoned or unused wiring in the switchboard and light masts should be demolished. Any corroded components on the masts should be refurbished to factory condition and any damaged components should be replaced with factory recommended replacement parts.

The masts, foundations, and lowering ring should be inspected by a qualified structural engineer licensed in the state of Alaska to ensure those components are rated for 100mph wind velocity with 130mph gusts and not compromised.

Option 2

All branch circuit and lighting control wiring from the circuit breakers to the light fixtures would be demolished. The existing metal halide light fixtures would all be demolished and the existing switchboard with lighting control section would be demolished. Service conductors from the transformer to CT cabinet would be salvaged for reuse. Existing underground conduit would be salvaged for reuse.

The corroded components on the masts and lowering ring would be refurbished and any damaged components would be replaced with factory recommended replacement parts. The masts, foundations, and lowering rings would be inspected by a structural engineer licensed in the state of Alaska to ensure those components are rated for 100mph wind velocity with 130mph gusts and not compromised.

A new 480V CT, meter base, and panelboard would be provided and installed on a new strut rack to replace the discontinued switchboard. New control schema would be designed to achieve the desired lighting operation to be discussed with the City of Dillingham. New lighting

control panels would be provided for each mast and would be installed on the strut rack adjacent to the new panelboard.

New LED light fixtures would be provided and installed on the existing lowering rings at each existing 150' mast. Initial calculations indicate the required quantity of new LED light fixtures would be eight for the west mast and ten for the east mast. The final quantity and fixture configuration would be designed to exceed the performance of the existing design. All new wiring for lighting power and controls from the new panelboard branch circuits would be provided and routed in existing conduits.

Option 3

Demolish all existing components including the masts, lowering rings, light fixtures, wiring, conduit, switchboard, CT cabinet, and controls.

A new 400A, 480V, 3Ø CT cabinet with meter base and a new 400A, 480V, 3Ø, 4W panelboard would be provided and installed on a new strut rack. A new control schema would be designed to achieve the desired lighting operation to be discussed with the City of Dillingham. New lighting control panels would be provided and installed on the strut rack adjacent to the new panelboard.

New 60' poles would be installed at five locations around the perimeter of the dock area including at the two existing 150' mast locations. Each 60' pole would have up to six LED light fixtures mounted on them with approximately twenty-five new LED fixtures total. All new wiring and raceways would be provided to the new locations.

The above options are intended to provide guidance for further discussion with the City of Dillingham once key personnel have had an opportunity to review this report.

We're looking forward to discussing these options with you at your convenience. Please call Beau Counts at 907-646-5630 if you have any questions in the meantime.

Sincerely,
CRW Engineering Group, Inc.

Prepared By:



Beau Counts, PE, RCDD
Electrical Engineer



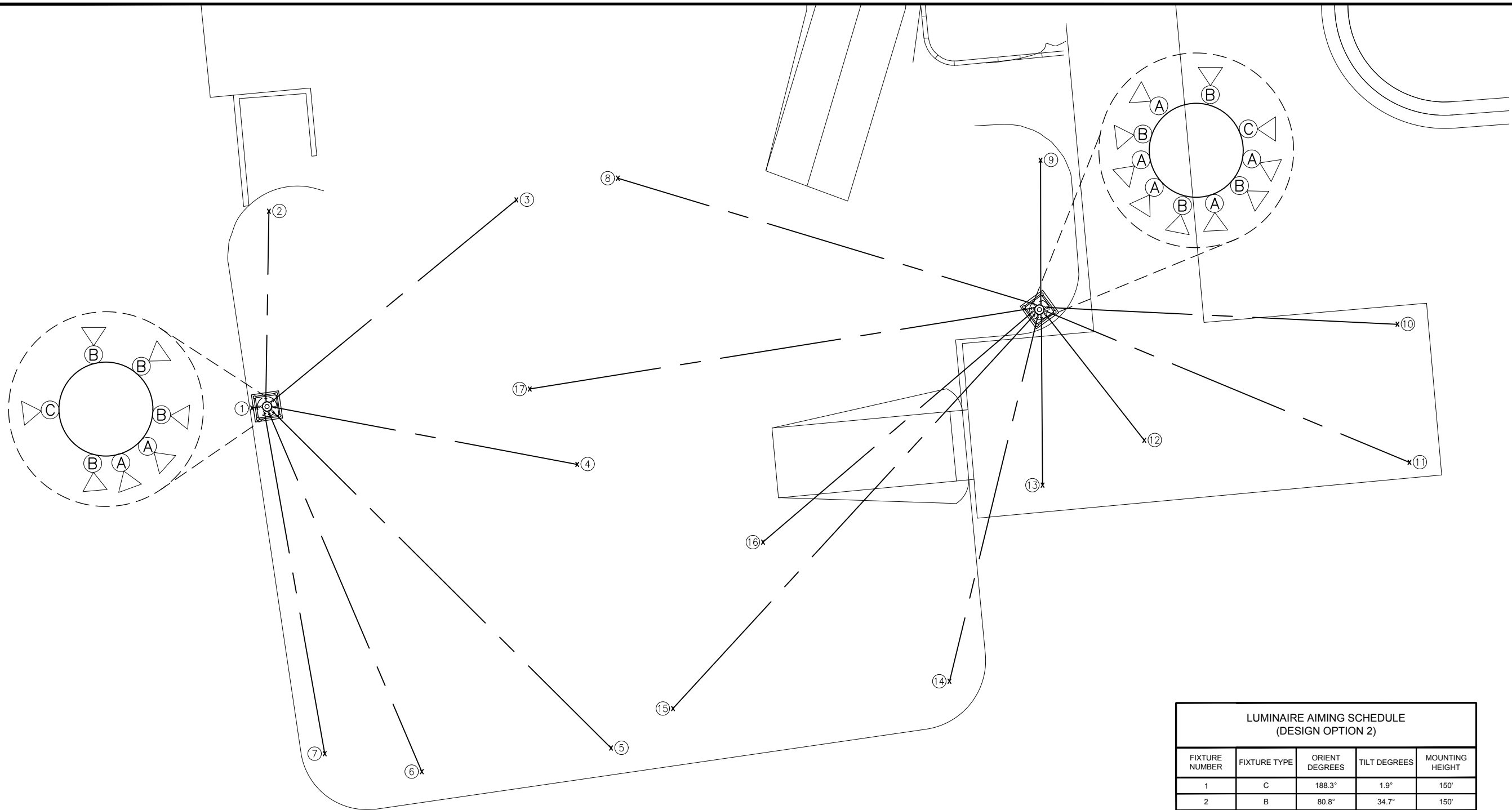
DOCK SITE LIGHTING PLAN - DESIGN OPTION 2

1" = 300' (FOR 22"X34" SIZE SHEETS)

LUMINAIRE SCHEDULE (DESIGN OPTION 2)							
TYPE	MANUFACTURER MODEL/OR APPROVED EQUAL	DESCRIPTION	VOLTS	POWER	OPTIC	INITIAL LUMENS	NOTES
A	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-3S- BH3-TY-CV2-ST	HIGH-MAST TYPE 3S DISTRIBUTION	480V	680 W			
B	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-4S- BH3-TY-CV2-ST	SAME AS TYPE 'A' EXCEPT WITH TYPE 4S DISTRIBUTION	480V	680 W			
C	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-5S- BH3-TY-CV2-ST	SAME AS TYPE 'A' EXCEPT WITH TYPE 5S DISTRIBUTION	480V	680 W			

ILLUMINANCE PLANE CALCULATION SUMMARY (DESIGN OPTION 2)		
	EXISTING	NEW DESIGN
AVERAGE:	6.6 fc	8.2 fc
MAXIMUM:	10.5 fc	10.9 fc
MINIMUM:	5.1 fc	5.8 fc
AVG/MIN RATIO:	1.3 : 1	1.4 : 1
MAX/MIN RATIO:	2.06 : 1	1.9 : 1

LUMINAIRE AIMING SCHEDULE (DESIGN OPTION 2)				
FIXTURE NUMBER	FIXTURE TYPE	ORIENT DEGREES	TILT DEGREES	MOUNTING HEIGHT
1	C	188.3°	1.9°	150'
2	B	80.8°	34.7°	150'
3	B	32.7°	48.4°	150'
4	B	351.1°	43.7°	150'
5	A	317.3°	58.1°	150'
6	A	296.1°	51.3°	150'
7	B	280.1°	41.5°	150'
8	A	193.1°	49.8°	150'
9	B	160.1°	48.9°	150'
10	C	104.7°	15.7°	150'
11	A	355.4°	50.8°	150'
12	B	336.2°	41.3°	150'
13	A	337.3°	51.3°	150'
14	B	272.6°	30.2°	150'
15	A	257.9°	59.8°	150'
16	A	233.3°	51.1°	150'
17	B	223.1°	49.6°	150'



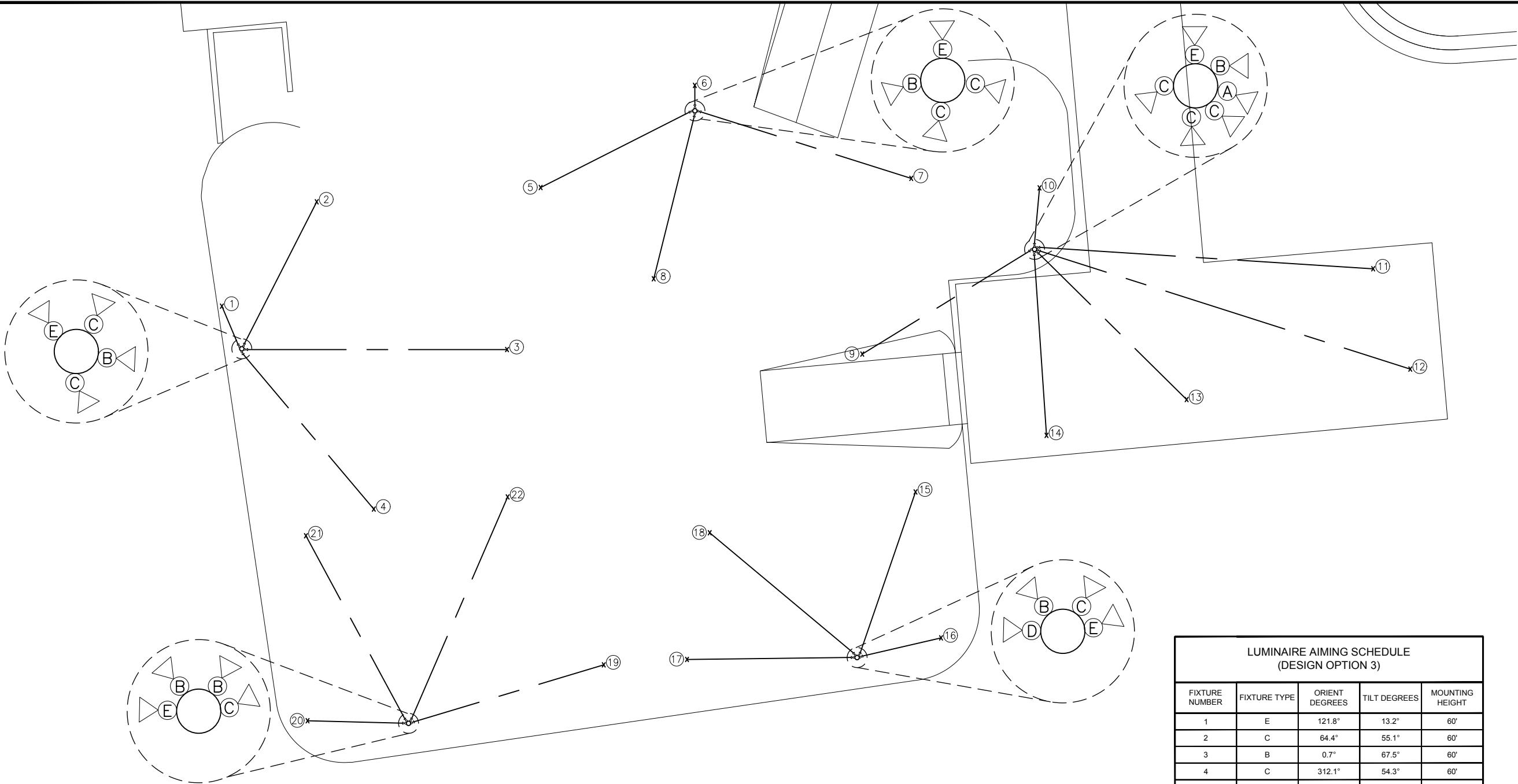
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DOCK SITE LIGHTING PLAN - DESIGN OPTION 3

1" = 300' (FOR 22"x34" SIZE SHEETS)



LUMINAIRE SCHEDULE (DESIGN OPTION 3)							
TYPE	MANUFACTURER MODEL/OR APPROVED EQUAL	DESCRIPTION	VOLTS	POWER	OPTIC	INITIAL LUMENS	NOTES
A	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-2S- BH3-TY-CV2-ST	HIGH-MAST TYPE 2S DISTRIBUTION	480V	680 W			
B	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-3S- BH3-TY-CV2-ST	SAME AS TYPE 'A' EXCEPT WITH TYPE 3S DISTRIBUTION	480V	680 W			
C	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-4S- BH3-TY-CV2-ST	SAME AS TYPE 'A' EXCEPT WITH TYPE 4S DISTRIBUTION	480V	680 W			
D	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-5S- BH3-TY-CV2-ST	SAME AS TYPE 'A' EXCEPT WITH TYPE 5S DISTRIBUTION	480V	680 W			
E	EPHESUS LUMASPORT 8 (COOPER) #EPH-LS-08-0680R-BLK-57-80-7F- BH3-TY-CV2-ST	SAME AS TYPE 'A' EXCEPT WITH TYPE 7F DISTRIBUTION	480V	680 W			

ILLUMINANCE PLANE CALCULATION SUMMARY (DESIGN OPTION 3)		
	EXISTING	NEW DESIGN
AVERAGE:	6.6 fc	13.1 fc
MAXIMUM:	10.5 fc	25.9 fc
MINIMUM:	5.1 fc	3.3 fc
AVG/MIN RATIO:	1.3 : 1	3.97 : 1
MAX/MIN RATIO:	2.06 : 1	7.85 : 1

LUMINAIRE AIMING SCHEDULE (DESIGN OPTION 3)				
FIXTURE NUMBER	FIXTURE TYPE	ORIENT DEGREES	TILT DEGREES	MOUNTING HEIGHT
1	E	121.8°	13.2°	60'
2	C	64.4°	55.1°	60'
3	B	0.7°	67.5°	60'
4	C	312.1°	54.3°	60'
5	B	195.2°	59.9°	60'
6	E	90.1°	5.3°	60'
7	C	346.7°	55.4°	60'
8	C	250.8°	51.5°	60'
9	C	211.8°	55.1°	60'
10	E	81.2°	23.3°	60'
11	B	354.9°	68.7°	60'
12	A	344.3°	71.7°	60'
13	C	319.6°	60.4°	60'
14	C	278.1°	52.6°	60'
15	C	73.6°	55.5°	60'
16	E	16.5°	29.8°	60'
17	D	182.2°	45.1°	60'
18	B	137.2°	58.7°	60'
19	C	17.5°	54.2°	60'
20	E	179.2°	32.9°	60'
21	B	126.3°	60.8°	60'
22	B	69.2°	59.4°	60'

CRW
ENGINEERING GROUP
3840 ARCTIC BLVD. SUITE
300 ANCHORAGE,
ALASKA 99503
PHONE (807) 982-3252
#ACE1882-4K

PROJECT NO.
60141.34

CITY GRID
-

WATER GRID
-

SEWER GRID
-

CITY OF DILLINGHAM
DOCK LIGHTING UPGRADE
DILLINGHAM, AK 99576

STATUS: PRELIMINARY

DATE: 3/5/25

SCALE	REV	DATE	DESCRIPTION	BY
HOR. ### VER. ###				
DESIGNED BY BC				
DRAWN BY BC				
CHECKED BY BC				
APPROVED BY BC				

SHEET NO.

E3