

CITY AND BOROUGH OF WRANGELL, ALASKA

INVITATION TO BID

PORTS AND HARBORS
SURVEILLANCE SYSTEM

ADDENDUM TO THE PROJECT DOCUMENTS

Addendum No:	1	Previous Bid Date: May 16, 2023 at 3:00 pm AK Standard Time
Addendum Date:	May 11, 2023	Current Bid Date: May 23, 2023 at 3:00 pm AK Standard Time
Pages This Addendum:	Seventy (70) Including Attachments	
Previous Addenda:	None	

To: All Proposers.

The following corrections, changes, additions, deletions, revisions and/or clarifications are hereby made a part of the Documents for the Invitation to Bid for the Ports and Harbors Surveillance System project. In case of conflicts between this Addendum and previously issued documents, this Addendum shall take precedence. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This addendum X **does**, does not change the bid opening date.

Item 1: SECTION 00030 NOTICE INVITING BIDS, RECEIPT OF BIDS

Replace Receipt of Bids section, in its entirety, with the following:

RECEIPT OF BIDS. Sealed bids will be received by the City and Borough of Wrangell, Post Office Box 531, Wrangell, Alaska 99929, located at the Borough Clerk's Office, 205 Brueger Street, Wrangell, Alaska 99929, ***until 3:00 PM prevailing time on May 23, 2023***, at which time they shall be opened and read aloud. Opening date and time may be changed to a later date or time via Addendum. Clearly mark on the outside of the envelope "Sealed Bid for WRANGELL PORTS AND HARBORS SURVEILLANCE SYSTEM".

Item 2: SECTION 26 05 19 LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- a. Remove Section 1.2 Action Submittals, B. Buy American in its entirety.
- b. Remove Section 2.1 BUY AMERICAN in its entirety. The Buy American Act is not required on this project.

Item 3: SECTION 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

- a. Remove Section 1.2 Action Submittals, B. Buy American in its entirety.
- b. Remove Section 2.1 BUY AMERICAN in its entirety. The Buy American Act is not required on this project.

Item 4: SECTION 26 05 33.13 CONDUITS FOR ELECTRICAL SYSTEMS

- a. Remove Section 1.3 Action Submittals, B. Buy American in its entirety.
- b. Remove Section 2.1 BUY AMERICAN in its entirety. The Buy American Act is not required on this project.

Item 5: SECTION 26 05 33.16 BOXES AND COVERS FOR ELECTRICAL SYSTEMS

- a. Remove Section 1.2 Action Submittals, B. Buy American in its entirety.
- b. Remove Section 2.1 BUY AMERICAN in its entirety. The Buy American Act is not required on this project.

Item 6: SECTION 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

- a. Remove Section 1.2 Action Submittals, B. Buy American in its entirety.
- b. Remove Section 2.1 BUY AMERICAN in its entirety. The Buy American Act is not required on this project.

Item 7: SECTION 07 05 28 PATHWAYS FOR COMMUNICATIONS SYSTEMS

- a. Remove Section 1.2 Action Submittals, B. Buy American in its entirety.
- b. Remove Section 2.1 BUY AMERICAN in its entirety. The Buy American Act is not required on this project.

Item 8: SECTION 28 20 00 VIDEO SURVEILLANCE

- a. Remove Section 1.2 Action Submittals, B. Buy American in its entirety.
- b. Remove Section 2.1 BUY AMERICAN in its entirety. The Buy American Act is not required on this project.

Item 9: SECTION 28 20 00 VIDEO SURVEILLANCE, Subsection 2.5 NETWORK VIDEO RECORDER

Remove and replace Section 282000, 2.5, in its entirety, with the following:

2.5 NETWORK VIDEO RECORDERS

- A. Network Video Recorder (referred to as “NVR”) system with component, storage and application redundancy for continuous uninterrupted operation, RAID protection. Hardware Accelerated Analytics, Hardware Accelerated Protection and Hardware Accelerated Encryption. NVR offers proven capacity of minimum 25 cameras with continuous recording, based on camera configuration to Full HD (1080p) video stream resolution at 20 frames per

second and a data rate of 4 megabits per second, and a minimum retention time of 30 days.

Item 10: DRAWING SHEETS

Replace the following Drawing Sheets with those re-issued under this Addendum No 1:

Sheet E-002
Sheet E-400
Sheet E-401
Sheet E-500
Sheet E-501

Item 11: Bidder Questions and Owner Responses

Question 1: In the CCTV spec, there is no mention of variables that can be used to size the server.

Response: The network video recorder (NVR) requirements are listed in specification section 282000, subsection 2.5. Subsection 1.2(C)(7) requires the contractor to “show expected storage requirements and estimate of total time in days video will be stored based on the size of the NVR.” A minimum retention time of 30 days has been added to 282000, subsection 2.5, through Addendum No. 1.

Question 2: No spec for the wireless nor cellular network was provided. Is this available?

Response: The specification section 282000, subsection 2.8 and 2.9 language for radio make/models is "shall be adequate for all expected loads". Subsection 1.2(C)(6) requires the contractor to “show expected bandwidth requirements for all video surveillance equipment. Show that wired and wireless network design exceeds those bandwidth requirements.”

Question 3: There are a lot of residences along the water between Heritage and Shoemaker Harbors. Is GCI or APT or another provider of internet providing services down that road? If we have any wired internet infrastructure down there, it would be significantly less expensive with less latency to use that over a cellular link for Heritage or Shoemaker Harbors.

Response: The Borough will provide a CGI hardwired internet service at Heritage Harbor and Shoemaker Harbor. A wireless point to point connection from the GCI drop to the headlands will replace the cellular antenna. The cellular to ethernet bridge will be removed. Modifications are identified in Addendum No. 1.

Question 4: Does the city have any access to provide a repeater at the sawmill site across the bay from the harbor? That would allow for better bandwidth and less cost, as it appears to possibly have line of sight with Heritage harbor.

Heritage Harbor breakwater appears to have a line of sight with the City Dock,

that would alleviate the cellular requirement at Heritage Harbor as well. Has that been considered?

Response: The change from Cellular to hardwire internet at Heritage Harbor and Shoemaker Harbor is the preferred to solution.

Question 5: At Reliance Harbor, will the conduit be located on the exterior of the pole?

Response: Cable inside the pole is preferred. Stainless steel strapping is acceptable when there isn't a way to get the cables in or out of the pole as required to install the cameras/antennas.

Question 6: At Reliance Harbor, would it be acceptable to route the conduit around the perimeter of the dock instead of underneath the dock?

Response: Routing the cable around the perimeter of the dock is acceptable.

Question 7: At Marine Service Center, are electrical plans and a cut sheet for light poles available for review?

Response: Drawings for the Marine Service Center electrical infrastructure and a cutsheet for the high mast light pole are attached to Addendum No. 1.

Question 8: At Marine Service Center, can holes be drilled in the light poles? If not, how is the conduit and mounting to be attached?

Response: Camera equipment panel, conduit, camera, and antennas should be mounted to the exterior of the pole with stainless steel strapping. Power should follow existing routing to the lighting panel and then through conduit to the camera equipment panel.

Question 9: At Marine Service Center, is the Borough's man lift available for Contractor use?

Response: The Borough will make available to the Contractor, through a rental agreement, the Borough-owned Genie Z45 Self-Propelled Articulating Manlift (spec sheet attached to Addendum No. 1). The rental cost shall be \$100 for the project. The Contractor's equipment operation personnel must show proof of manlift operation and safety training or attend training offered by the Borough and/or online manlift safety training. The Contractor shall provide their operator with OSHA-approved safety gear while operating the manlift. Contractor shall provide rental insurance coverage.

Question 10: At City Dock, can the foundation for the new mast be to attach it to the existing equipment rack and anchor to the rack post?

Response: The intent is to install the mast in a manner that eliminates the need for dirt work at the head lands. New mast should be installed as shown.

Question 11: At City Dock, can the camera on P3 be moved to P2 to eliminate the conduit run across the approach dock?

Response: The camera has been placed on P3 to for a better view of security screening when cruise ships are docked. Install camera on P3 as shown.

Question 12: At Heritage Harbor, near the Mariners Memorial, it was suggested that relocating the last camera to the pole at the top of loading ramp could reduce the 3-lens camera to a 2-lens camera for savings and better video capture at the ramp and parking lot. Additionally, there would be the potential for line of sight from the top of the ramp to Reliance Harbor, to eliminate the cellular requirement.

Response: Install camera in location indicated on the drawings. The Borough will provide a CGI hardwired internet service at Heritage Harbor. A wireless point to point connection from the GCI drop to the headlands will replace the cellular antenna. The cellular to ethernet bridge will be removed. Modifications are identified in Addendum No. 1.

Question 13: At Heritage Harbor, it appears the cameras at 10' are only seeing the top of entrance ramp.

Response: One camera is intended to monitor the top of the ramp and the other is to monitor the dumpsters and restrooms. Cameras can be adjusted between 8 and 10' to get the best view. Intention with the 10' height was to limit vandalism.

Question 14: At Inner Harbor, the electrical panel is shown on the wrong side of the approach dock.

Response: The electrical panel at Inner Harbor is shown on the wrong side of the approach dock. In its correct location, there is no need to run conduit under the dock.

Question 15: At Inner Harbor, should the mast change location or be located higher?

Response: The goal is to monitor the top of the ramp.

Question 16: At Standard Oil Float, can we use the existing light pole for mounting camera and antenna?

Response: Install new mast as shown on the drawing.

Question 17: At Fish & Game Float, can we use the existing light pole for mounting camera and antenna?

Response: Install new mast as shown on the drawing. One camera is to watch the top of the gangway the other is aimed at the USFS float.

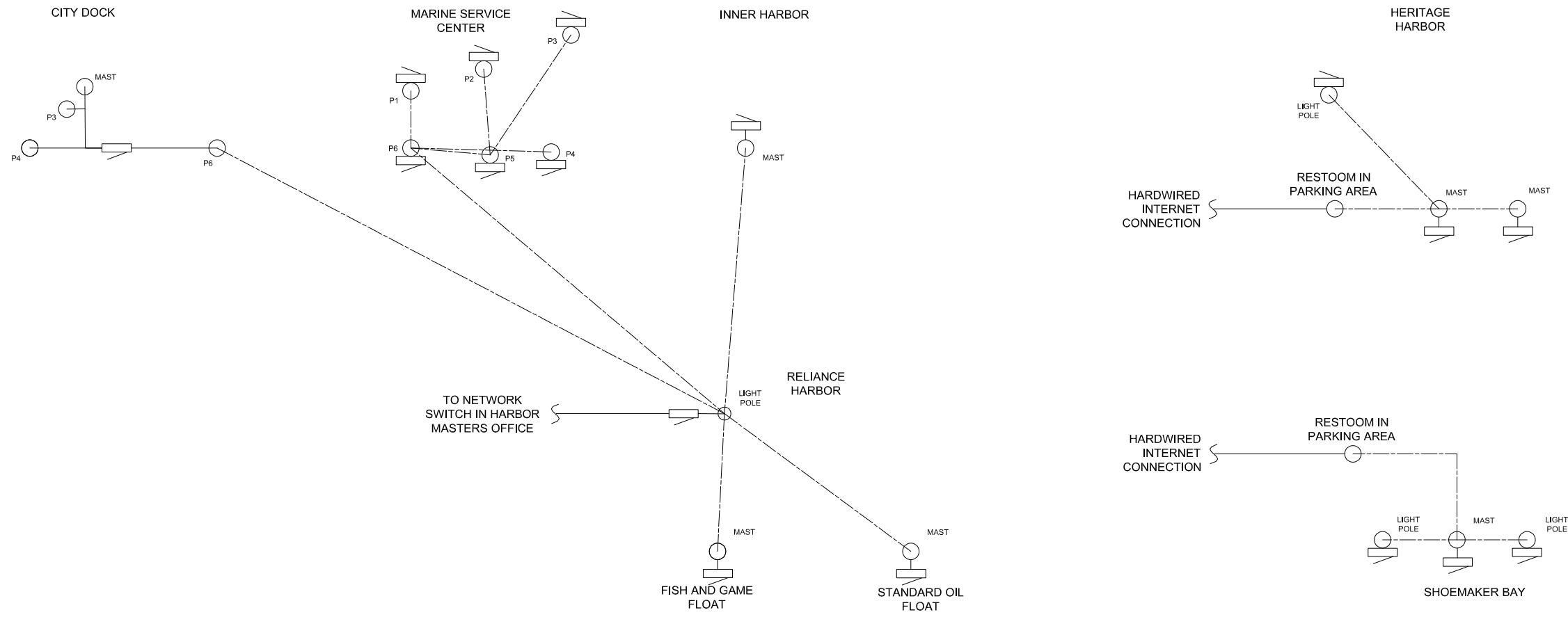
Question 18: In the Harbor Master Office, identify where the rack and the viewer will be located inside the building.

Response: The rack will be mounted in the “Employee Commons” area. A vertical wall mount rack is the preferred versus a free standing or wall mount standard rack. The viewing workstation will be in the front “Office,” and the Owner will provide a UPS for that equipment if desired. UPS for the head end equipment (NVR and Switch) is still required by Contractor. See attached Harbor Master Office at Reliance Harbor Floorplan, Sheet 1 for location details.

Question 19: A new electrical circuit is required to be installed between the electrical panel and the rack. Is adequate attic and/or crawl space available for this circuit installation?

Response: There is both an attic and crawl space with adequate access. Match existing wire path from the panel for power to the rack location. See attached Harbor Master Office at Reliance Harbor Floorplan, Sheet 1 for location details.

END OF ADDENDUM NO. 1



1 NETWORK DIAGRAM NO SCALE

CONSULTANT :

Juneau, AK
 9103 Mendota Hall Rd, Ste. 4
 Juneau, AK 99801
 Phone: 907.780.0660
 Fax: 907.596.3771
 AECC 63270

PROJECT :

WRANGELL DOCKS & HARBORS SURVEILLANCE CAMERA SYSTEM

WRANGELL, ALASKA

SHEET TITLE :

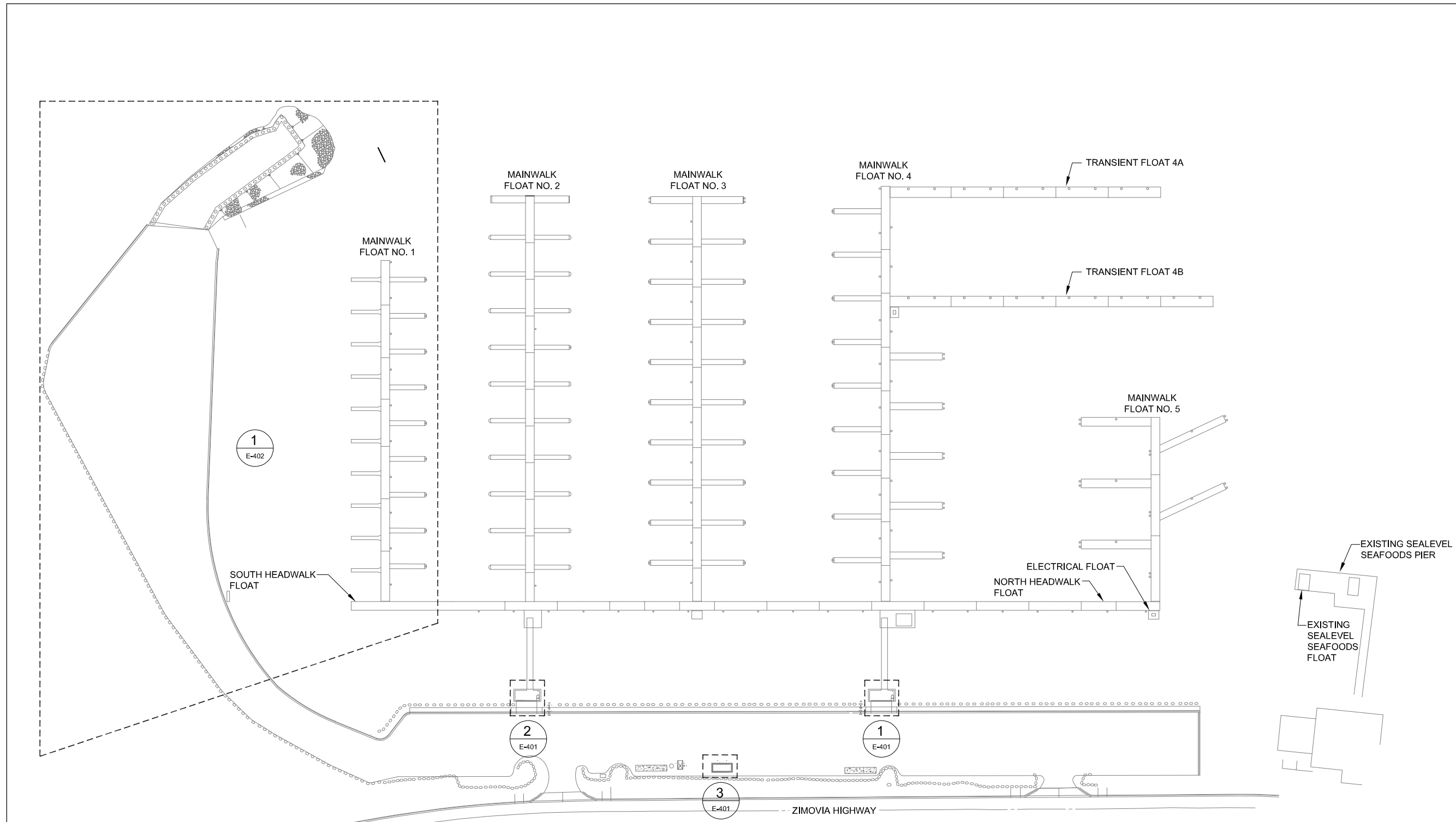
NETWORK DIAGRAM

DESIGN	May 10, 2022	Addendum No. 1
DRAWN		
CHECKED		
DATE	MAY 10, 2023	
PROJECT No. i0296.22003		
SHEET NUMBER		
E-002		
No.	Date	Item
REVISIONS		

1" IF THIS BAR DOES NOT MEASURE EXACTLY ONE INCH, THE SCALE OF THIS DRAWING HAS BEEN ALTERED DURING IT'S PRODUCTION, AFFECTING ALL LABELED SCALES

HERITAGE HARBOR CAMERA LEGEND

CAMERA	DESCRIPTION	TYPE	SENSORS	RESOLUTION PER SENSOR
HH-1	NORTH UPLANDS MAST	DOME	1	4K
HH-2	NORTH UPLANDS MAST	DOME	1	4K
HH-3	SOUTH UPLANDS MAST	DOME </td <td>1</td> <td>4K</td>	1	4K
HH-4	SOUTH UPLANDS MAST	DOME	1	4K
HH-5	WEST LIGHT POLE	MULTISENSOR DOME	3	5MP



1 SITE PLAN - HERITAGE HARBOR



CONSULTANT :

Juneau, AK
 9103 Mendenhall Mall Rd, Ste. 4
 Juneau, AK 99801
 Phone: 907.586.0660
 Fax: 907.586.3771
 AECC 65270

PROJECT :
WRANGELL DOCKS & HARBORS SURVEILLANCE CAMERA SYSTEM
 WRANGELL, ALASKA

SHEET TITLE :
SITE PLAN - HERITAGE HARBOR

DESIGN	
DRAWN	
CHECKED	
DATE	MAY 10, 2023
PROJECT No.	i0296.22003
SHEET NUMBER	E-400

May 10, 2022 Addendum No. 1		
No.	Date	Item
REVISIONS		

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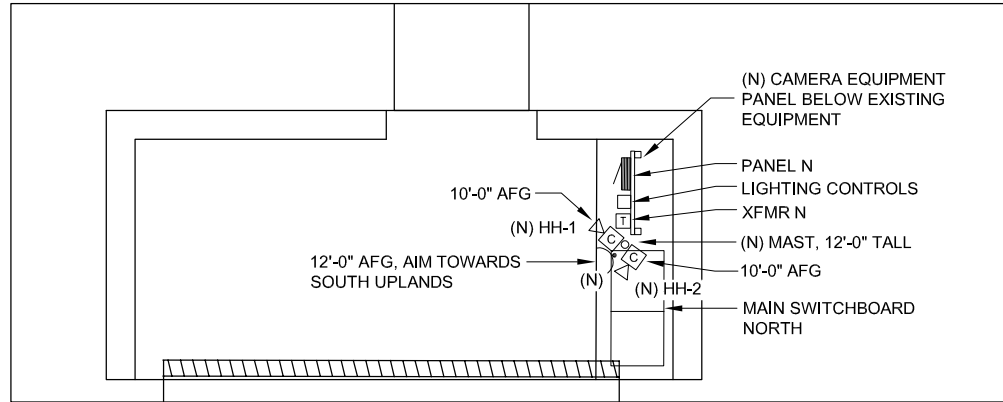
1" IF THIS BAR DOES NOT MEASURE EXACTLY ONE INCH, THE SCALE OF THIS DRAWING HAS BEEN ALTERED DURING IT'S PRODUCTION, AFFECTING ALL LABELED SCALES

HERITAGE HARBOR CAMERA LEGEND

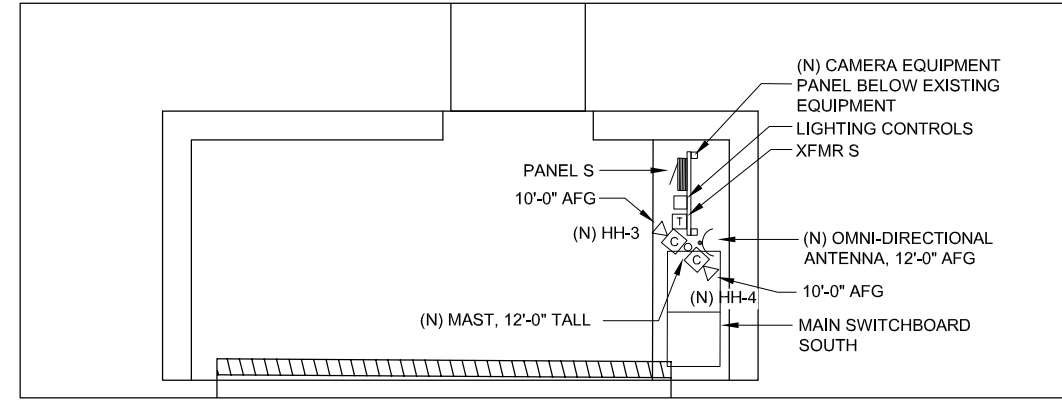
CAMERA	DESCRIPTION	TYPE	SENSORS	RESOLUTION PER SENSOR
HH-1	NORTH UPLANDS MAST	DOME	1	4K
HH-2	NORTH UPLANDS MAST	DOME	1	4K
HH-3	SOUTH UPLANDS MAST	DOME	1	4K
HH-4	SOUTH UPLANDS MAST	DOME	1	4K
HH-5	WEST LIGHT POLE	MULTISENSOR DOME	3	5MP

SHEET NOTES:

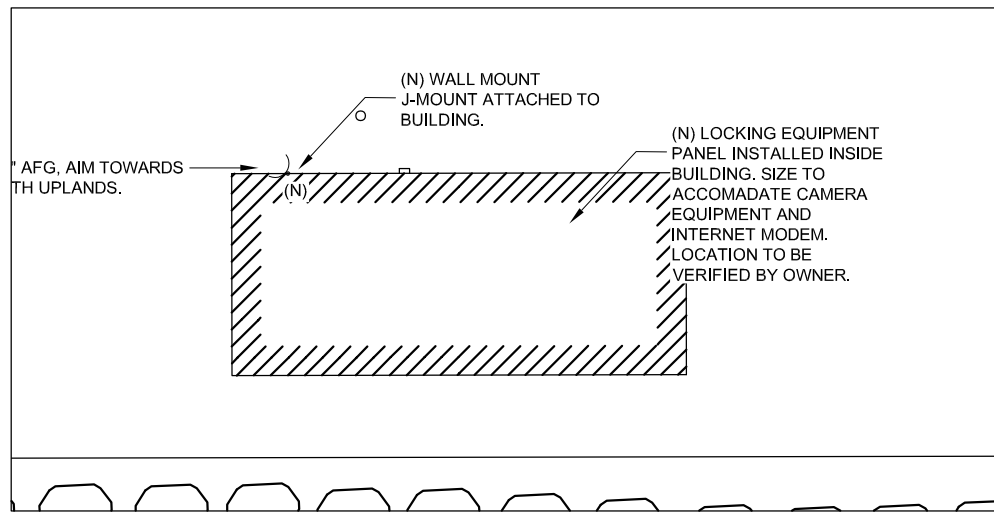
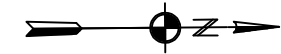
- EXISTING SITE FEATURES WITH NEW CAMERA EQUIPMENT, CIRCUITS AND ACCESSORIES IDENTIFIED.
- NEW MASTS AT NORTH AND SOUTH UPLANDS SHALL BE MINIMUM 10FT, 4IN SQUARE, HOT DIPPED GALVANIZED STEEL RATED FOR WIND VELOCITY OF 100MPH WITH A MAXIMUM ETA OF 3.0 SQ FT.
- MASTS MOUNTED ON THICK CONCRETE DECKS OR PADS SHALL USE EPOXY ANCHOR BOLTS. INSTALLER SHALL LOCATE STEEL REINFORCEMENT IN CONCRETE BEFORE CUTTING OR DRILLING AND AVOID DAMAGING THE REINFORCING STEEL.
- PROVIDE CAT6 CABLES IN 3/4" CONDUIT FROM EACH CAMERA TO THEIR RESPECTIVE EQUIPMENT CABINET.



1 ENLARGED SITE PLAN - NORTH UPLANDS
E-401 SCALE: 0' 1' 3' 5' 10'



2 ENLARGED SITE PLAN - SOUTH UPLANDS
E-401 SCALE: 0' 1' 3' 5' 10'



3 ENLARGED SITE PLAN - RESTROOM
E-401 SCALE: 0' 1' 3' 5' 10'



CONSULTANT :

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PROJECT :
WRANGELL DOCKS & HARBORS
SURVEILLANCE CAMERA SYSTEM

WRANGELL, ALASKA

SHEET TITLE :
ENLARGED SITE PLANS - UPLANDS
HERITAGE HARBOR

DESIGN	May 10, 2022 Addendum No. 1
DRAWN	
CHECKED	
DATE	MAY 10, 2023
PROJECT No.	i0296.22003
SHEET NUMBER	E-401

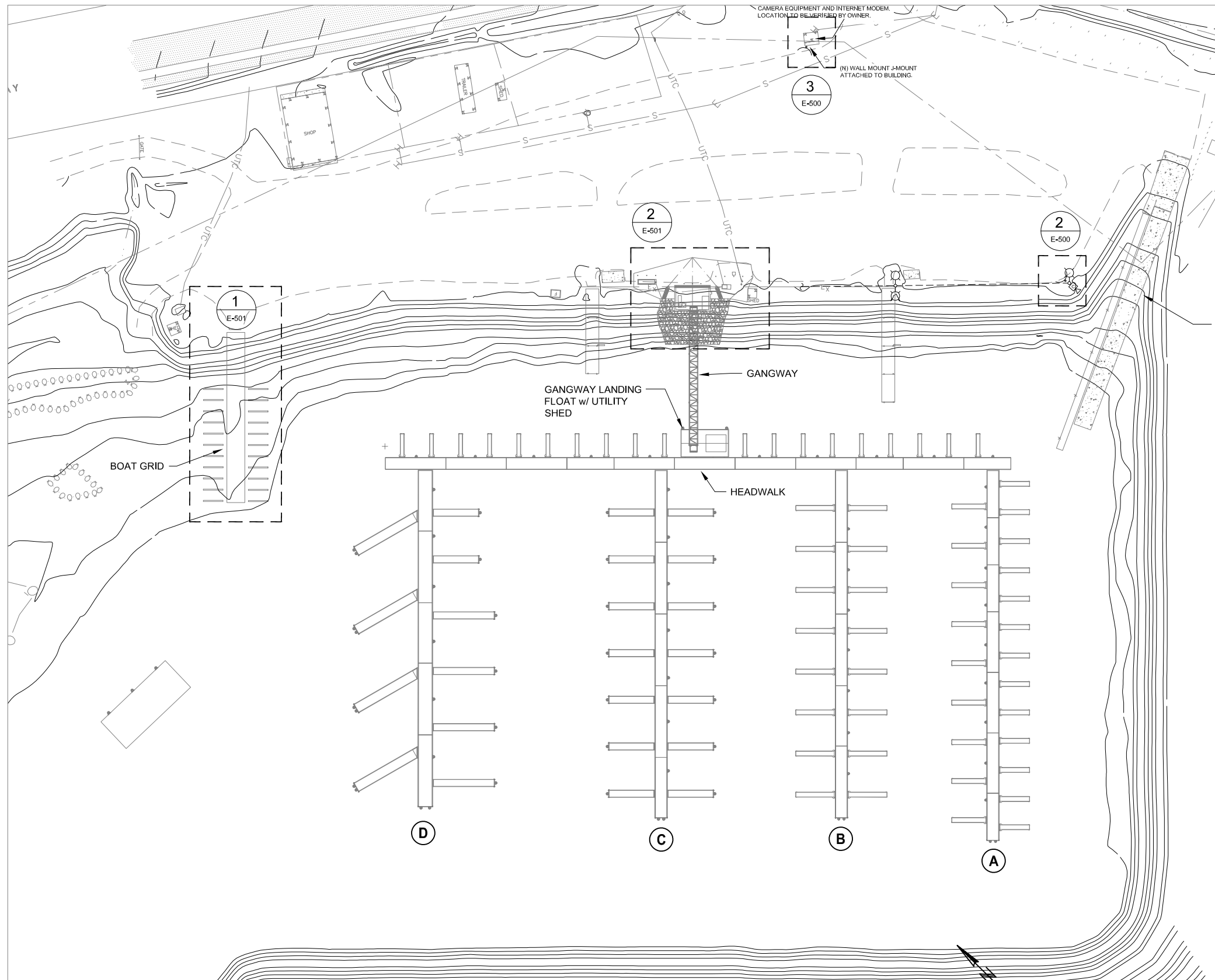
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REVISIONS		

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SHOEMAKER BAY CAMERA LEGEND

CAMERA	DESCRIPTION	TYPE	SENSORS	RESOLUTION PER SENSOR
SB-1	SOUTH EAST PARKING LIGHT POLE	DOME	1	4K
SB-2	UPLANDS MAST	MULTISENSOR DOME	2	5MP
SB-3	BOAT GRID LIGHT POLE	MULTISENSOR DOME	2	5MP

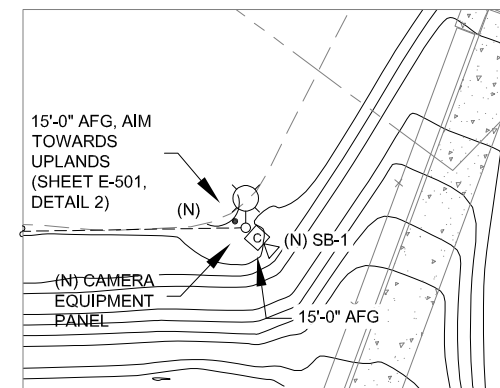


1 E-500 SITE PLAN - SHOEMAKER BAY

SCALE: 0' 25' 50' 100'

SHEET NOTES:

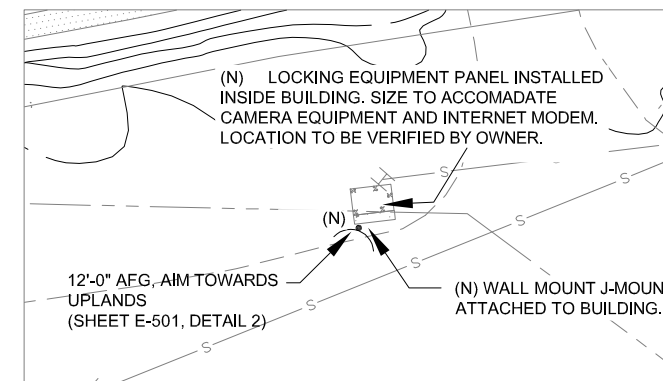
- EXISTING SITE FEATURES WITH NEW CAMERA EQUIPMENT, CIRCUITS AND ACCESSORIES IDENTIFIED.



2 E-500 ENLARGED SITE PLAN - LIGHT POLE

SCALE: 0' 15' 30' 60'

EXISTING CONCRETE BOAT LAUNCH RAMP w/ BOARDING FLOAT



3 E-500 ENLARGED SITE PLAN - RESTROOM

SCALE: 0' 15' 30' 60'

CONSULTANT:

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9102 Mendocino Mall Rd, Ste. 4
Juneau, AK 99801
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Fax: 907.596.3771
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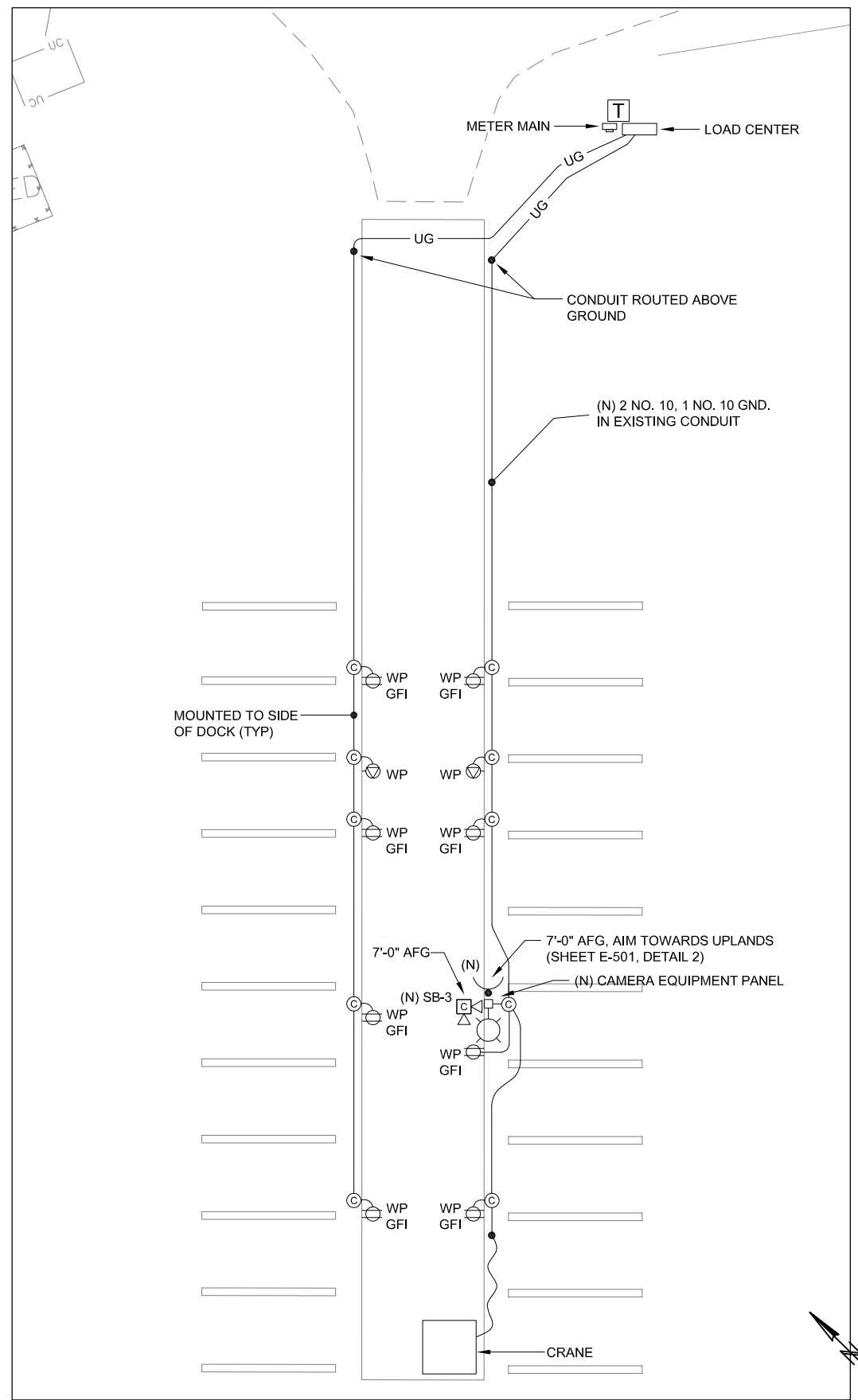
PROJECT: WRANGELL DOCKS & HARBORS SURVEILLANCE CAMERA SYSTEM

WRANGELL, ALASKA

SHEET TITLE: SITE PLAN - SHOEMAKER BAY

DESIGN	May 10, 2022 Addendum No. 1	
DRAWN		
CHECKED		
DATE	MAY 10, 2023	
PROJECT No.	i0296.22003	
SHEET NUMBER	E-500	
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1
E-501 ENLARGED SITE PLAN - BOAT GRID

SCALE: 0' 5' 10' 20'

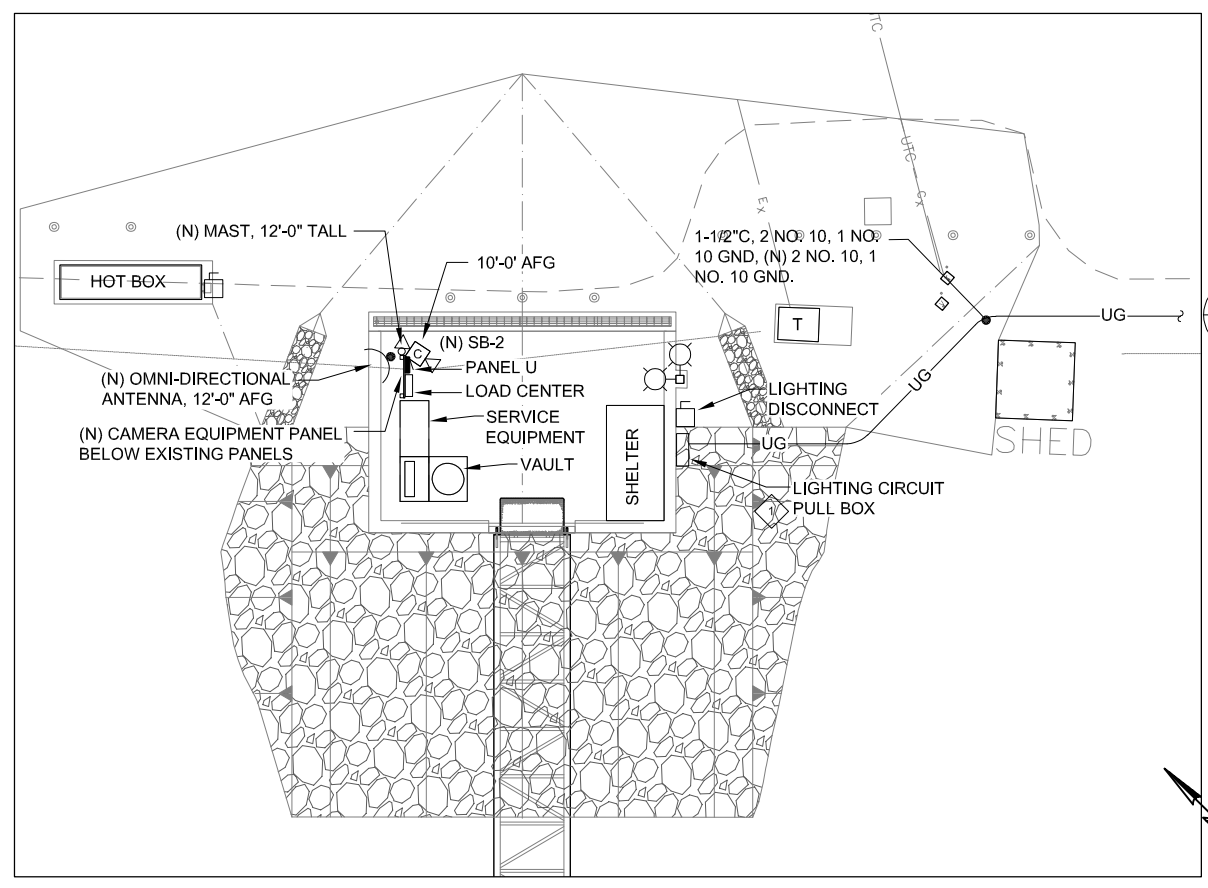
CAMERA	DESCRIPTION	TYPE	SENSORS	RESOLUTION PER SENSOR
SB-1	SOUTH EAST PARKING LIGHT POLE	DOME	1	4K
SB-2	UPLANDS MAST	MULTISENSOR DOME	2	5MP
SB-3	BOAT GRID LIGHT POLE	MULTISENSOR DOME	2	5MP

SHEET NOTES:

- EXISTING SITE FEATURES WITH NEW CAMERA EQUIPMENT, CIRCUITS AND ACCESSORIES IDENTIFIED.
- NEW CAMERA MAST SHALL BE 12FT TALL, 4IN SQUARE, HOT DIPPED GALVANIZED STEEL RATED FOR WIND VELOCITY OF 100MPH WITH A MAXIMUM ETA OF 3.0 SQ FT.
- MASTS MOUNTED ON THICK CONCRETE DECKS OR PADS SHALL USE EPOXY ANCHOR BOLTS. INSTALLER SHALL LOCATE STEEL REINFORCEMENT IN CONCRETE BEFORE CUTTING OR DRILLING AND AVOID DAMAGING THE REINFORCING STEEL.
- PROVIDE CAT6 CABLES IN 3/4" CONDUIT FROM EACH CAMERA TO THEIR RESPECTIVE EQUIPMENT CABINET.
- NEW CONDUCTOR ADDED TO EXISTING UNDERGROUND CONDUITS.

SHEET KEYNOTES: #

- EXTEND THE SPARE CIRCUIT IN THE LIGHTING CIRCUIT PULL BOX TO THE NEW CAMERA EQUIPMENT



2
E-501 ENLARGED SITE PLAN - UPLANDS

SCALE: 0' 5' 10' 20'

CONSULTANT :

Juneau, AK
 9103 Mendenhall Mall Rd, Ste. 4
 Juneau, AK 99801
 Phone: 907.780.0660
 Fax: 907.586.3771
 AECC163270

PROJECT :
WRANGELL DOCKS & HARBORS SURVEILLANCE CAMERA SYSTEM

WRANGELL, ALASKA

SHEET TITLE :
ENLARGED SITE PLANS - UPLANDS & DRY DOCK

DESIGN	May 10, 2022	Addendum No. 1
DRAWN		
CHECKED		
DATE	MAY 10, 2023	
PROJECT No.	i0296.22003	
SHEET NUMBER	E-501	
No.	Date	Item
REVISIONS		

Self-Propelled Articulating Booms

Z™ -45/25 & Z™ -45/25J DC/Bi-Energy

Specifications

Models	Z-45/25 DC & Bi		Z-45/25J DC & Bi	
Measurements	US	Metric	US	Metric
Working height maximum*	51 ft 6 in	15.87 m	51 ft 9 in	15.94 m
Platform height maximum	45 ft 6 in	13.87 m	45 ft 9 in	13.94 m
Horizontal reach maximum	25 ft	7.62 m	25 ft 1 in	7.65 m
Up and over clearance maximum	23 ft 1 in	7.04 m	23 ft 1 in	7.04 m
A Platform length	2 ft 6 in	0.76 m	2 ft 6 in	0.76 m
B Platform width	6 ft	1.83 m	6 ft	1.83 m
C Height - stowed	6 ft 7 in	2.00 m	6 ft 7 in	2.00 m
D Length - stowed	18 ft 3 in	5.56 m	22 ft 5 in	6.83 m
E Width	5 ft 10.3 in	1.79 m	5 ft 10.3 in	1.79 m
A Wheelbase	6 ft 8 in	2.03 m	6 ft 8 in	2.03 m
A Ground clearance - center	9.5 in	0.24 m	9.5 in	0.24 m

Productivity

Lift capacity	500 lbs	227 kg	500 lbs	227 kg
Platform rotation	180°		160°	
Vertical jib rotation			135°	
Turntable rotation	355° non-continuous		355° non-continuous	
Turntable tailswing	zero		zero	
Drive speed - stowed	3.0 mph	4.8 km/h	3.0 mph	4.8 km/h
Drive speed - raised**	0.61 mph	1.0 km/h	0.61 mph	1.0 km/h
Gradeability - stowed***	30%		30%	
Turning radius - inside	6 ft	1.83 m	6 ft	1.83 m
Turning radius - outside	14 ft	4.27 m	14 ft	4.27 m
Controls	24V DC proportional		24V DC proportional	
Tires	9 x 14.5 in		9 x 14.5 in	

Power

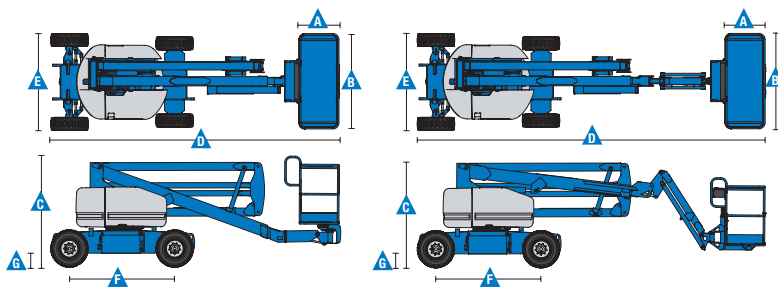
Power source - DC	48V DC (eight 6 V batteries, 350 Ah capacity)		
Power source - Bi-Energy	48V DC (eight 6 V batteries, 350 Ah capacity) with 13.3hp (9.9kW) Kubota T4f Z482 diesel driven alternator		
Auxiliary power unit	24V DC	24V DC	
Hydraulic tank capacity	8 gal	30.3 L	8 gal 30.3 L
Fuel tank capacity- Bi-Energy	9 gal	34.1 L	9 gal 34.1 L

Weight****

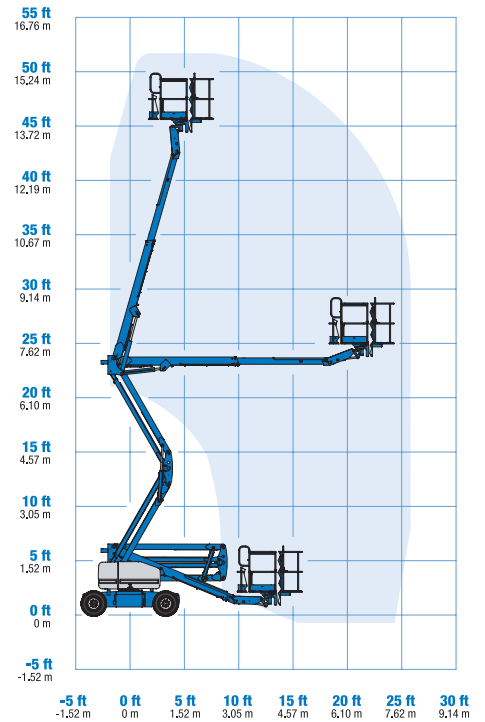
DC	15,350 lbs	6,963 kg	16,300	7,394 kg
Bi-Energy	15,850 lbs	7,190 kg	16,800	7,620 kg

Standards Compliance

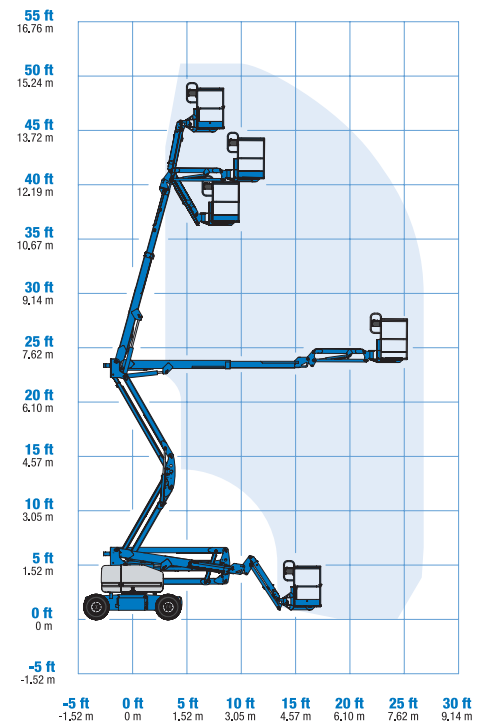
ANSI A92.5, CSA B354.4, EN 280, AS 1418.10



Range Of Motion Z-45/25



Range Of Motion Z-45/25J



* The metric equivalent of working height adds 2 m to platform height. U.S. adds 6 ft to platform height.

** In lift mode (platform raised), the machine is designed to operate on firm, level surfaces only.

*** Gradeability applies to driving on slopes. See operator's manual for details regarding slope ratings.

**** Weight will vary depending on options and/or country standards.

Features

Standard Features

Measurements

Z-45/25

- 51 ft 6 in (15.87 m) working height
- 25 ft (7.62 m) horizontal reach
- 23 ft 1 in (7.04 m) up and over clearance
- Up to 500 lbs (227 kg) lift capacity

Z-45/25J

- 51 ft 9 in (15.94 m) working height
- 25 ft 1 in (7.65 m) horizontal reach
- 22 ft 1 in (6.73 m) up and over clearance
- Up to 500 lbs (227 kg) lift capacity

Productivity

- Self-leveling platform
- Hydraulic platform rotation
- Proportional joystick controls
- Thumb rocker steer
- Drive enable
- AC power to platform
- Horn
- Hour meter
- Tilt alarm
- Zero tailswing
- 355° non-continuous turntable rotation

Power

- 48V deep cycle battery pack
- 24V DC auxiliary power
- 13.3hp (9.9kW) Kubota T4f Z482 diesel driven alternator. (Bi-energy model only)
- Battery charge indicator-BCI (Bi-energy model only)
- Universal 30A battery smart charger

Easily Configured To Meet Your Needs

Platform Options

- Steel 6 ft (1.83 m) (standard)
- Steel 6 ft (1.83 m) tri-entry

Jib Options

- Non-jib
- Articulating 5 ft (1.52 m) jib boom

Power

- 48V DC (eight 6V 350 Ah batteries)

Drive

- 2WD

Tire Options

- Industrial foam-filled (standard)
- Industrial non-marking foam-filled

Options & Accessories

Productivity

- Platform swing gate
- Half-mesh platform inserts with swing gate
- Platform top auxiliary rail
- Air line to platform
- Biodegradable hydraulic oil
- Fire resistant hydraulic oil
- Aircraft protection package*
- Pipe cradle (pair)
- Alarm package
- Panel cradle package**
- Light package
- Lockable platform control box cover
- Tow package
- Operator Protective Structure

Power

- AGM batteries
- EE UL583 Fire Protection rating (DC only)
- Battery charge indicator-BCI (DC only)
- Low voltage interrupt with BCI
- Cold Weather Package (Bi-Energy only)
- 800 watt inverter (DC only)
- Diesel catalytic muffler (Bi-Energy only)



* Reduces platform capacity to 440 lbs (only available on Jib models)

** Requires tri-entry platform

Genie United States

18340 NE 76th Street
P.O. Box 97030
Redmond, Washington 98073-9730
Telephone +1 (425) 881-1800
Toll Free in USA/Canada +1 (800)-536-1800
Fax +1 (425) 883-3475

Distributed By:



The Lifting Professionals

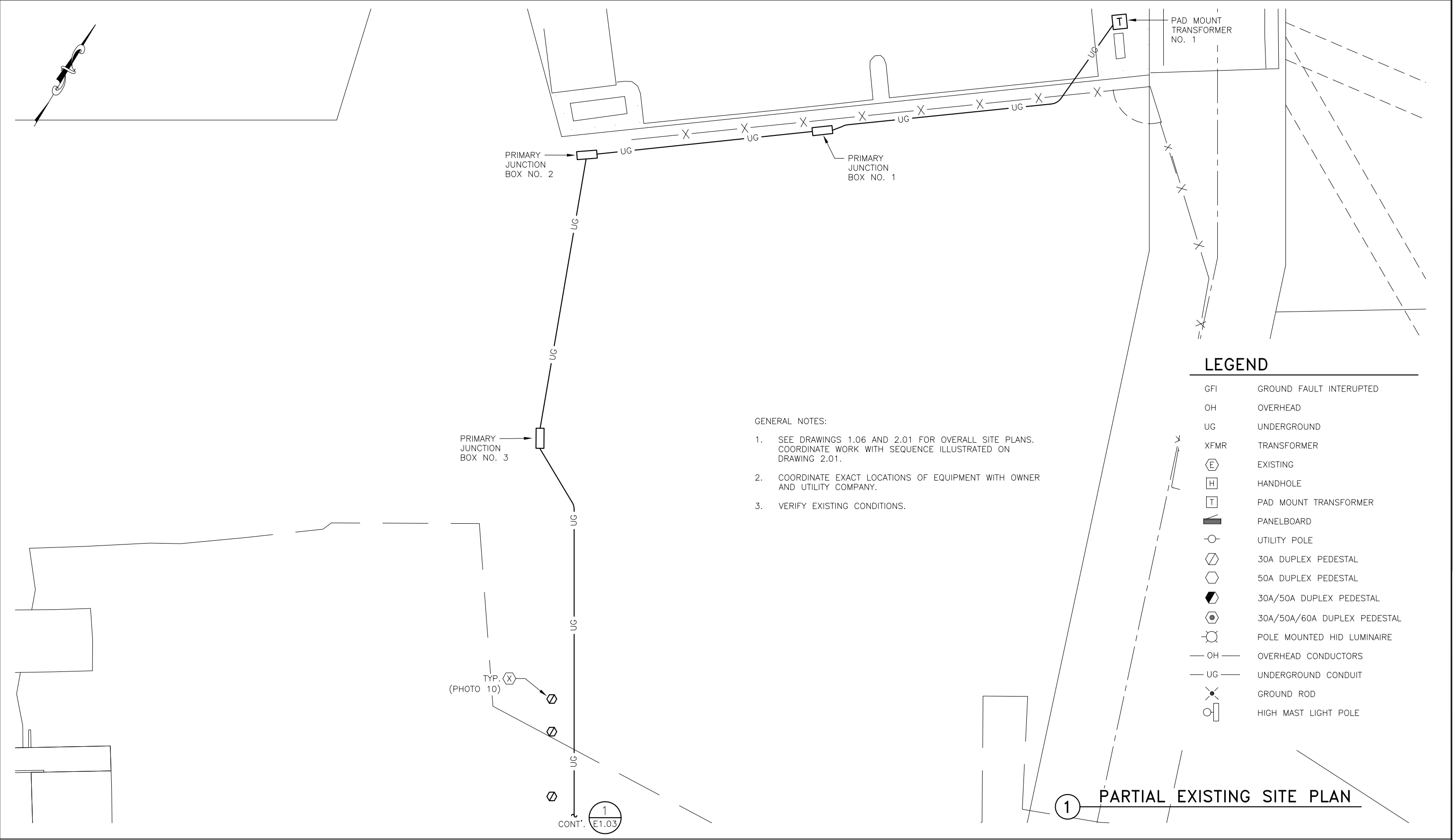
Bolingbrook, IL
(630) 972-9199

South Holland, IL
(219) 972-9199

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Feb 11, 2011 - 11:26am
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- GENERAL NOTES:
1. SEE DRAWINGS 1.06 AND 2.01 FOR OVERALL SITE PLANS. COORDINATE WORK WITH SEQUENCE ILLUSTRATED ON DRAWING 2.01.
 2. COORDINATE EXACT LOCATIONS OF EQUIPMENT WITH OWNER AND UTILITY COMPANY.
 3. VERIFY EXISTING CONDITIONS.

LEGEND

GFI	GROUND FAULT INTERRUPTED
OH	OVERHEAD
UG	UNDERGROUND
XFMR	TRANSFORMER
⊕	EXISTING
⊞	HANDHOLE
⊞	PAD MOUNT TRANSFORMER
▬	PANELBOARD
○	UTILITY POLE
◇	30A DUPLEX PEDESTAL
◇	50A DUPLEX PEDESTAL
◐	30A/50A DUPLEX PEDESTAL
⊙	30A/50A/60A DUPLEX PEDESTAL
⊙	POLE MOUNTED HID LUMINAIRE
— OH —	OVERHEAD CONDUCTORS
— UG —	UNDERGROUND CONDUIT
⊗	GROUND ROD
⊞	HIGH MAST LIGHT POLE

1 PARTIAL EXISTING SITE PLAN

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Fax: 907-586-2099
www.pndengineers.com

DESIGN: BJB CHECKED: BJB
DRAWN: PEL APPROVED: _____

SCALE: SCALE IN FEET
0 20 40 FT.

DATE: 2/11/11

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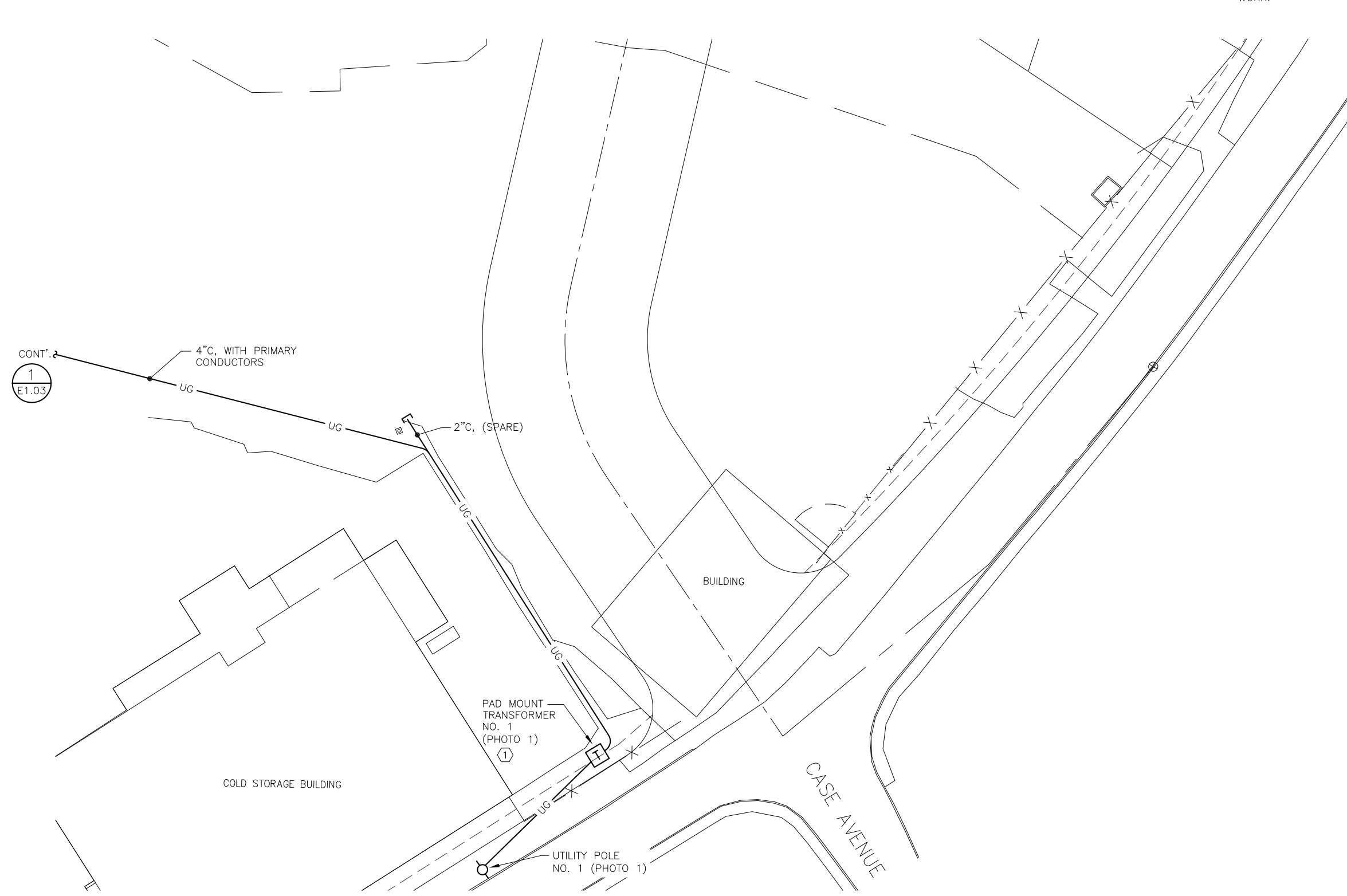
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PND PROJECT NO. 052023.04 DWG. FILE: E2.01.DWG

E1.01
SHEET 1 OF 16

NOTES:

- ① 50 KVA, SINGLE PHASE TRANSFORMER SHALL BE REPLACED BY UTILITY AS INDICATED ON THE SINGLE LINE DIAGRAM. COORDINATE WORK.



CONT'.

1
E1.03

① PARTIAL EXISTING SITE PLAN

Feb 11, 2011 - 9:31am
F:\Projects\137_PND\75 Wrangell Marine Center Ph. 3 Utilities\Drawings\Working\E1.02.dwg (Layout1 tab)

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SCALE: SCALE IN FEET
0 20 40 FT.

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Barry J. Begeny
EE 10453
PROFESSIONAL ENGINEER
DATE: 2/11/11

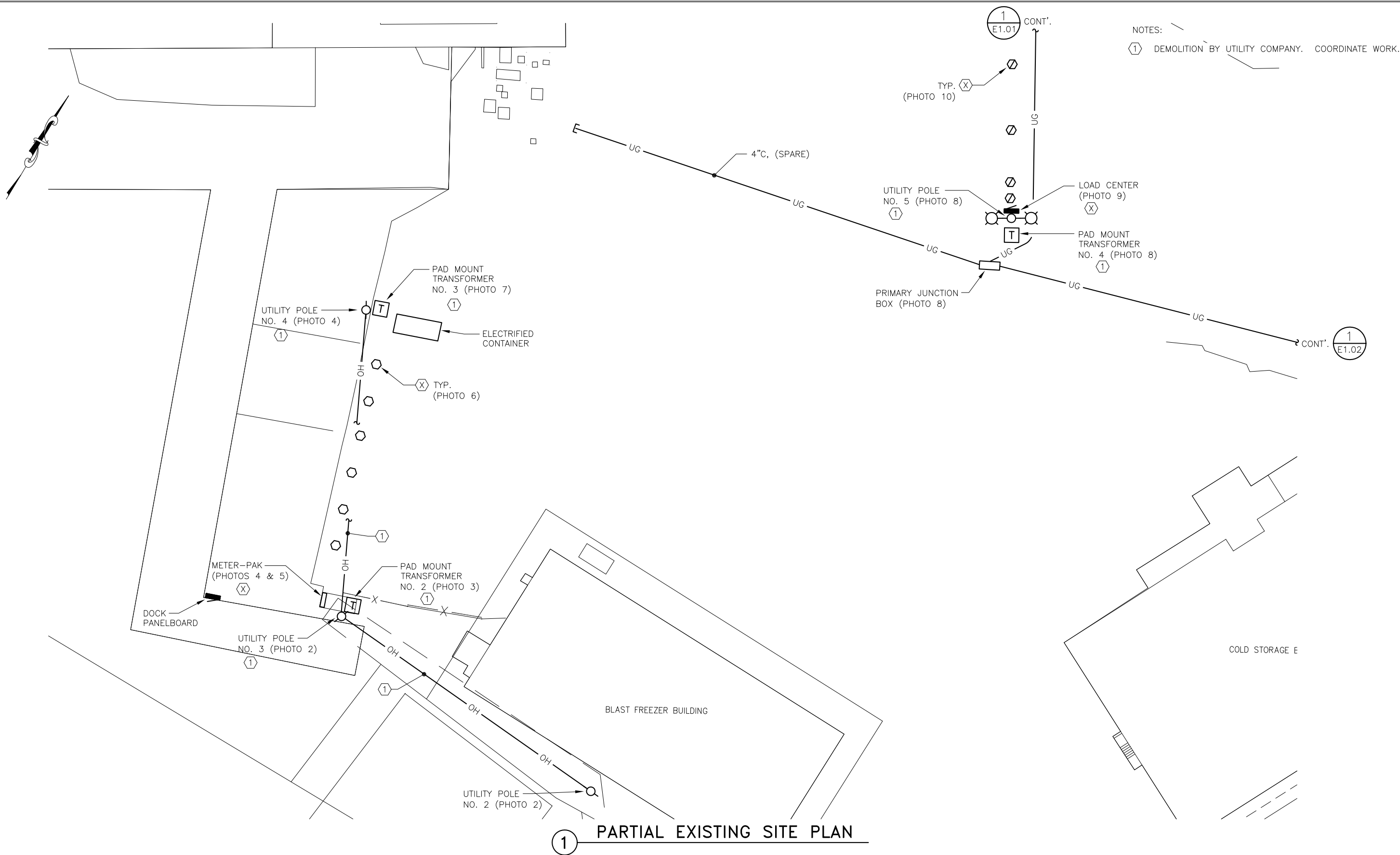
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PN&D PROJECT NO.: 052023.04 DWG. FILE: E2.02.DWG

E1.02
SHEET 2 OF 16

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 F:\Projects\137_PND\2\5 Wrangell Marine Center Ph. 3 Utilities\Drawings\Working\E1.03.dwg (Layout1 tab)



NOTES:
 (1) DEMOLITION BY UTILITY COMPANY. COORDINATE WORK.

1 PARTIAL EXISTING SITE PLAN

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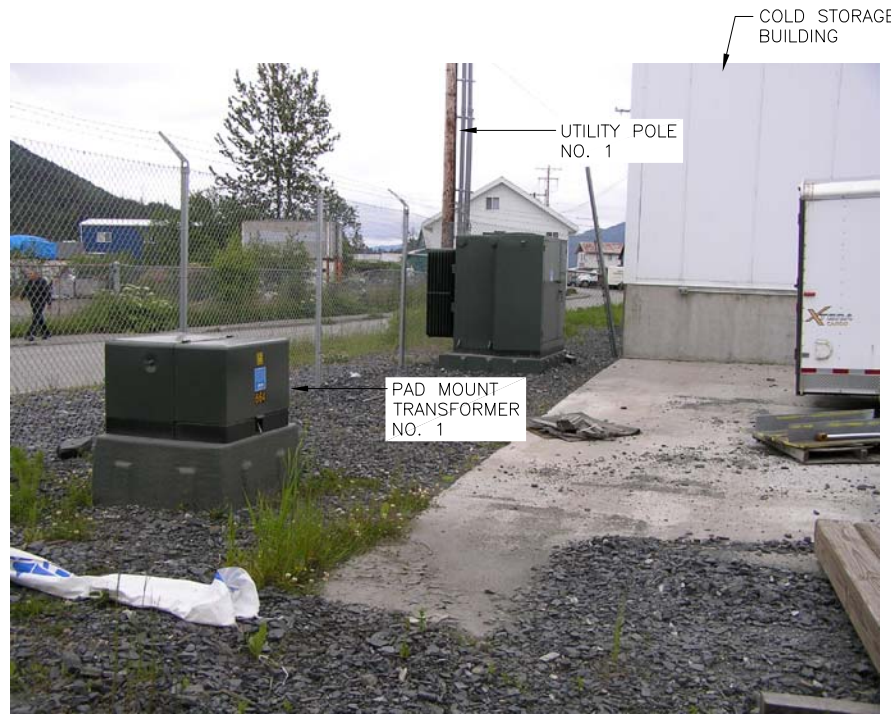
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Barry J. Begenyi
 EE 10453
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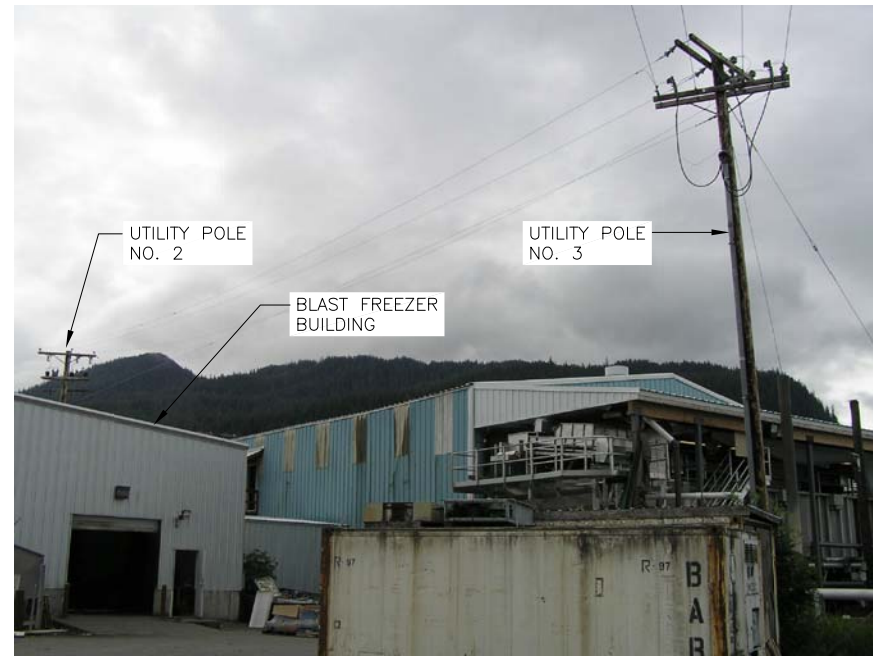
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SHEET TITLE: **EXISTING SITE PLAN**
 SHEET: **E1.03**
 3 OF 16
 PND PROJECT NO.: 052023.04 DWG. FILE: E2.03.DWG

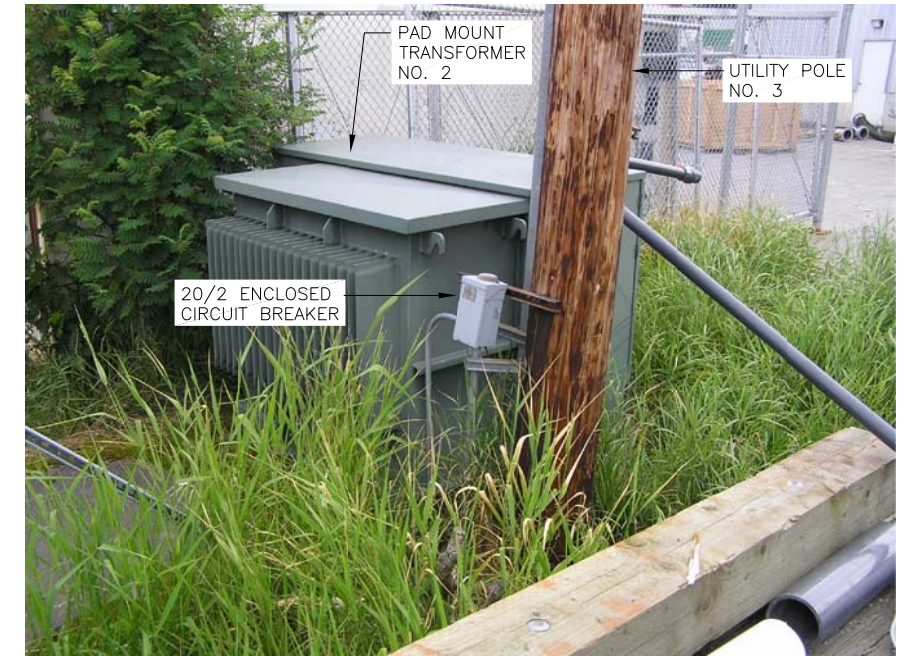
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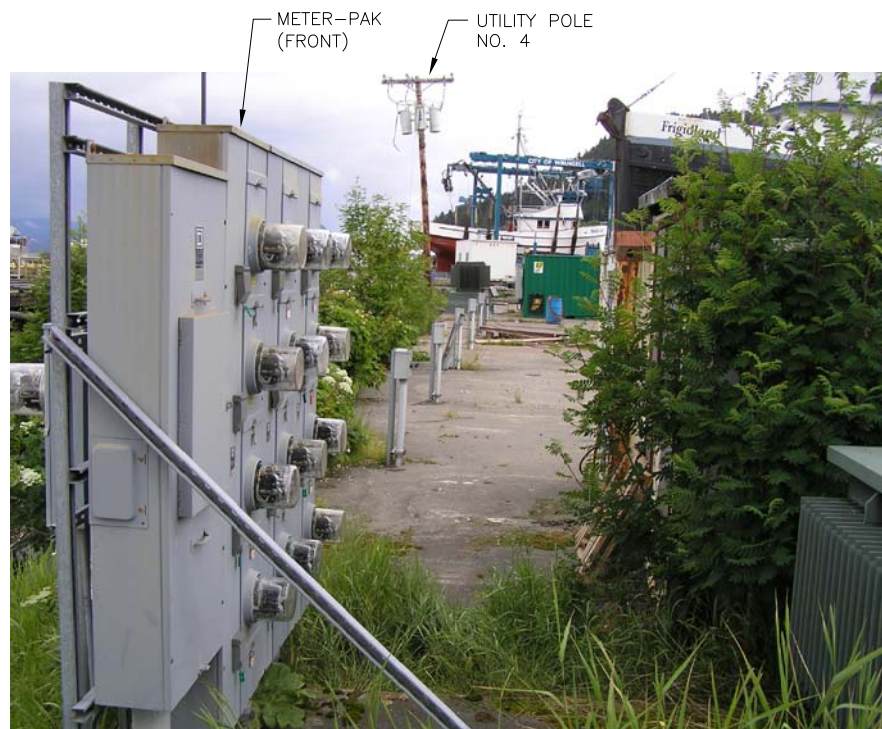
① PHOTO 1



② PHOTO 2



③ PHOTO 3



④ PHOTO 4



⑤ PHOTO 5

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SHEET TITLE:
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PN&D PROJECT NO. 052023.04 DWG. FILE: E1.04.DWG

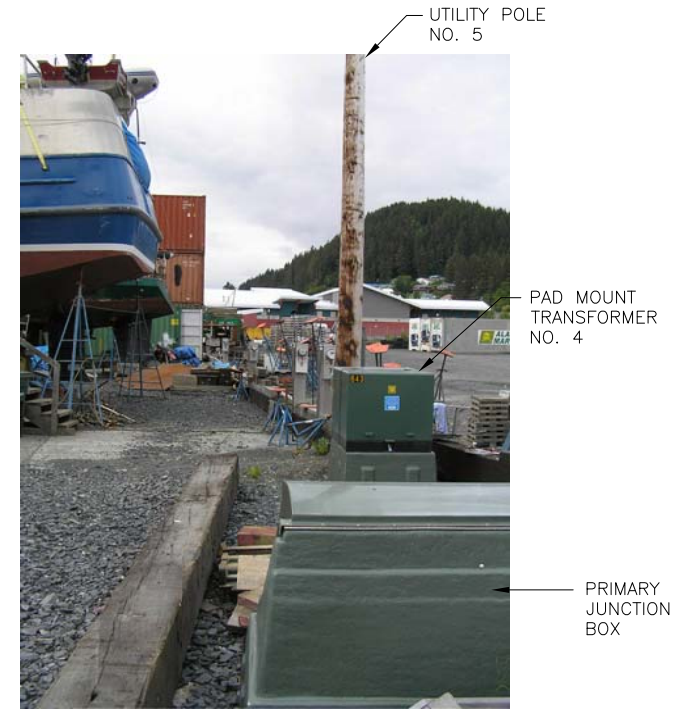
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SHEET 4 OF 16



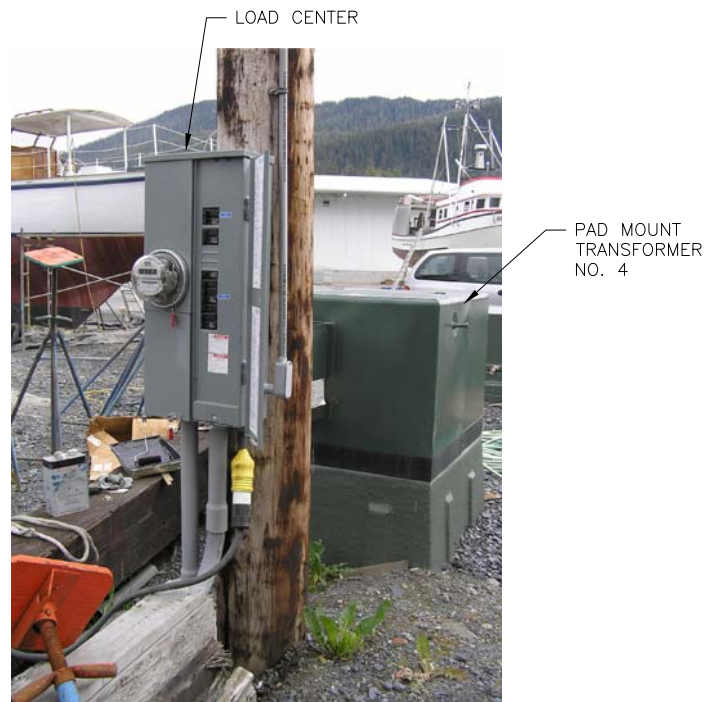
1 PHOTO 6



2 PHOTO 7



3 PHOTO 8



4 PHOTO 9



5 PHOTO 10

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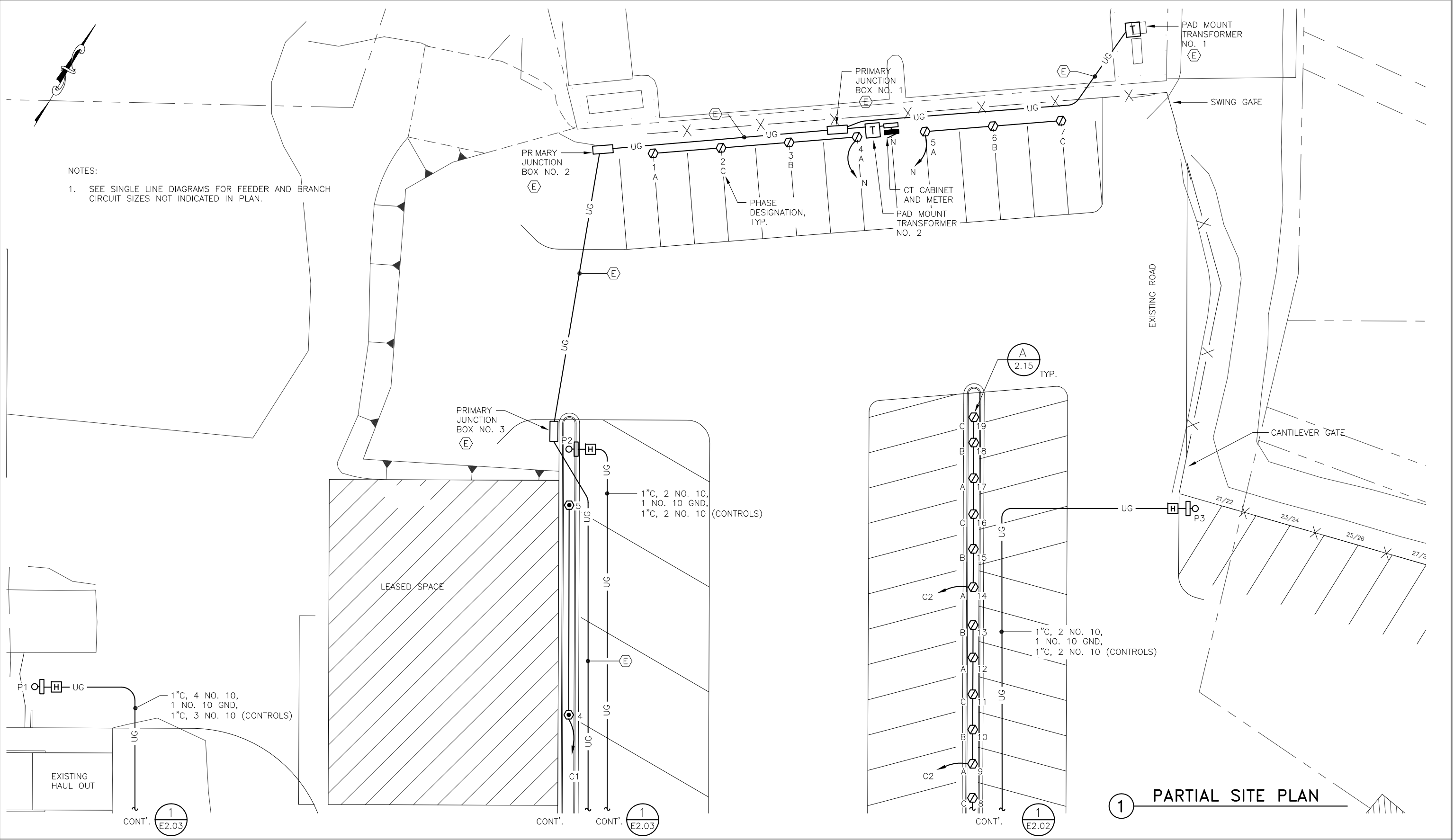
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E1.05
SHEET 5 OF 16

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NOTES:
 1. SEE SINGLE LINE DIAGRAMS FOR FEEDER AND BRANCH
 CIRCUIT SIZES NOT INDICATED IN PLAN.

1 PARTIAL SITE PLAN

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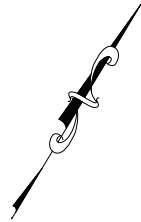
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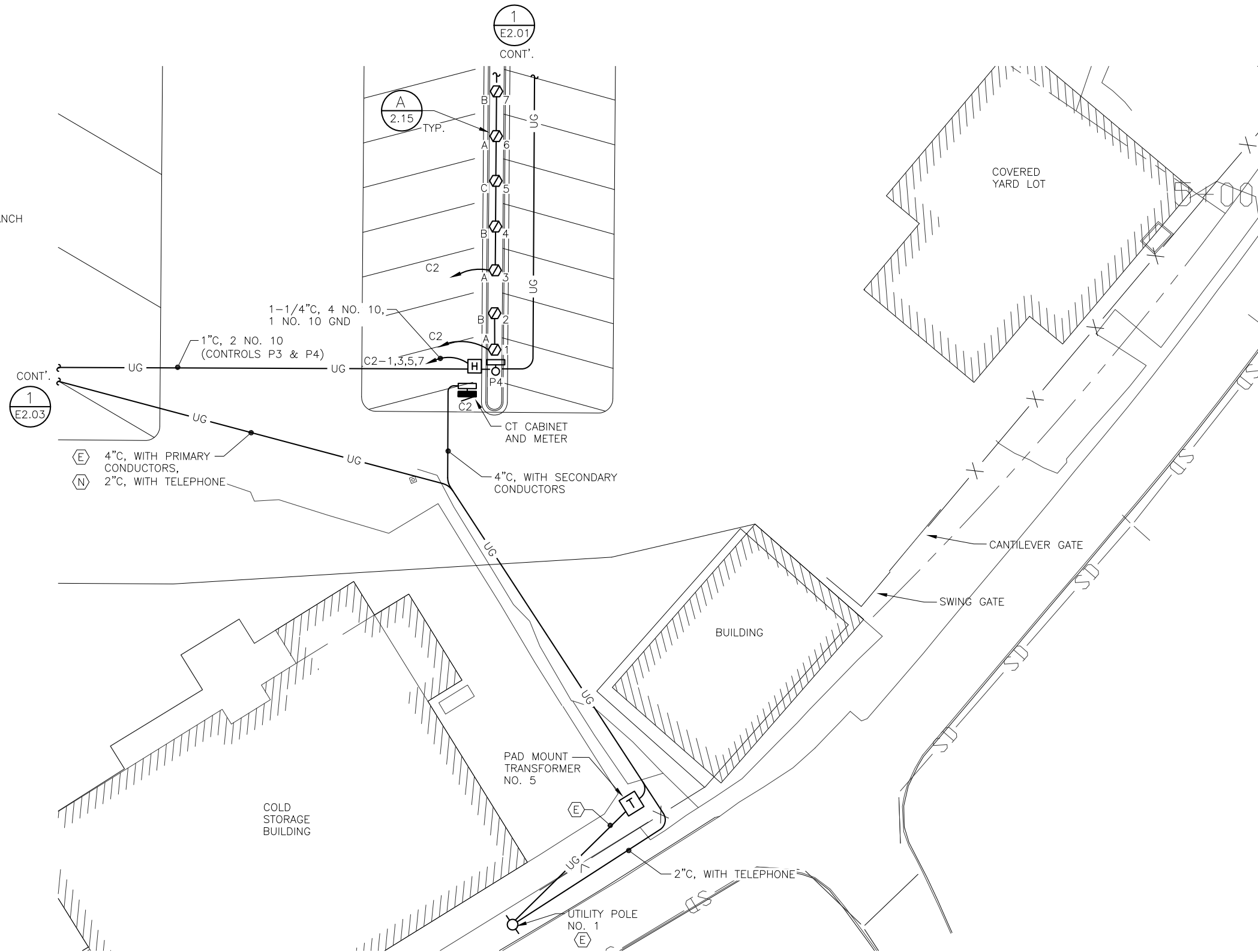
SHEET TITLE: **SITE PLAN**

PN&D PROJECT NO. 052023.04 DWG. FILE: E2.01.DWG

E2.01
 SHEET 6 OF 16



NOTES:
 1. SEE SINGLE LINE DIAGRAMS FOR FEEDER AND BRANCH CIRCUIT SIZES NOT INDICATED IN PLAN.



1 PARTIAL SITE PLAN

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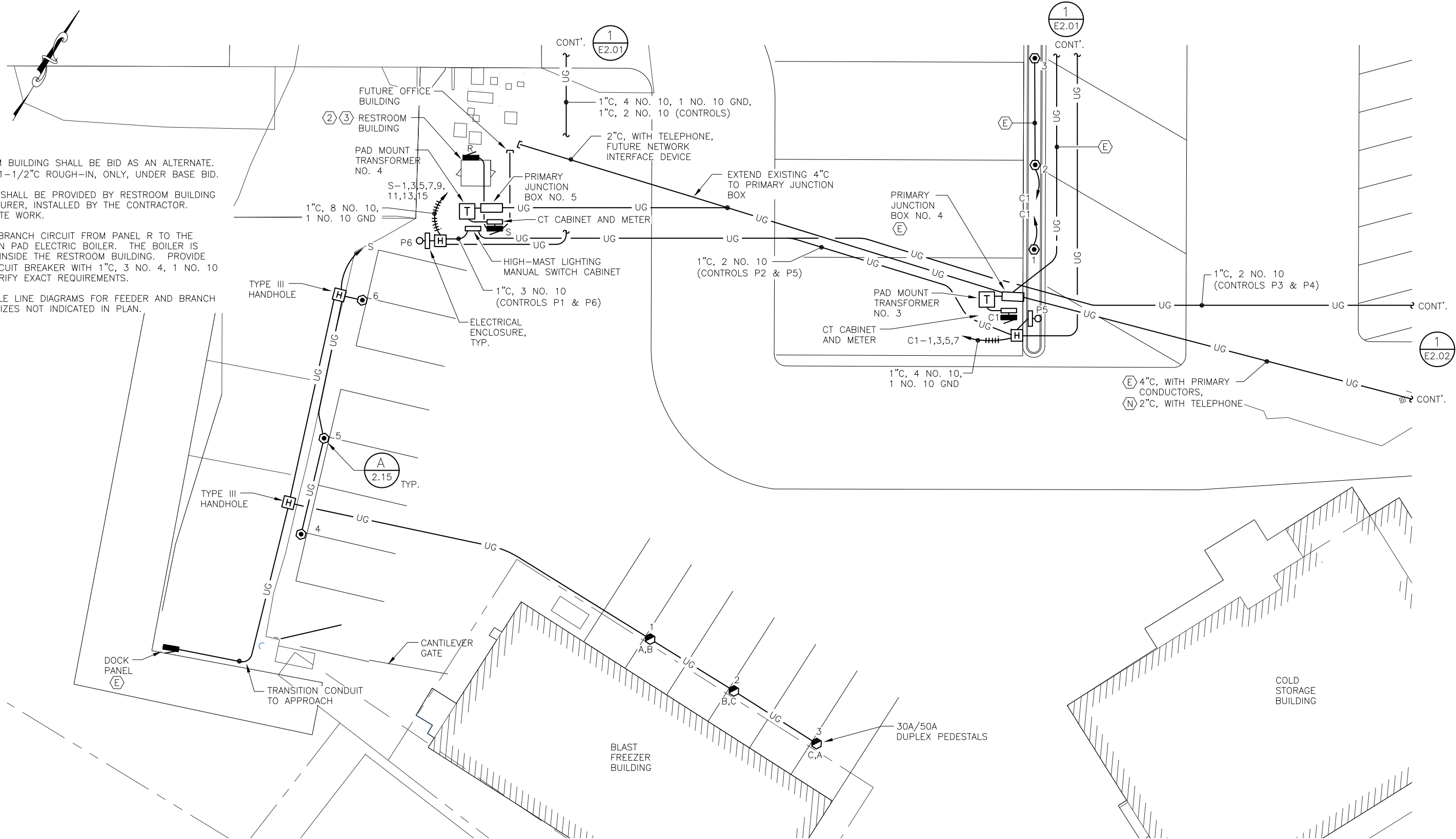
STATE OF ALASKA
 49th
 Barry J. Begenyi
 EE 10453
 REGISTERED PROFESSIONAL ENGINEER
 DATE: 2/11/11

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SHEET TITLE: **SITE PLAN**
 SHEET: **E2.02**
 PND PROJECT NO.: 052023.04 DWG. FILE: E2.02.DWG
 SHEET 7 OF 16

- NOTES:
- RESTROOM BUILDING SHALL BE BID AS AN ALTERNATE. PROVIDE 1-1/2" C ROUGH-IN, ONLY, UNDER BASE BID.
 - PANEL R SHALL BE PROVIDED BY RESTROOM BUILDING MANUFACTURER, INSTALLED BY THE CONTRACTOR. COORDINATE WORK.
 - PROVIDE BRANCH CIRCUIT FROM PANEL R TO THE WASHDOWN PAD ELECTRIC BOILER. THE BOILER IS LOCATED INSIDE THE RESTROOM BUILDING. PROVIDE 60/2 CIRCUIT BREAKER WITH 1" C, 3 NO. 4, 1 NO. 10 GND. VERIFY EXACT REQUIREMENTS.
 - SEE SINGLE LINE DIAGRAMS FOR FEEDER AND BRANCH CIRCUIT SIZES NOT INDICATED IN PLAN.



1 PARTIAL SITE PLAN

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SCALE: SCALE IN FEET
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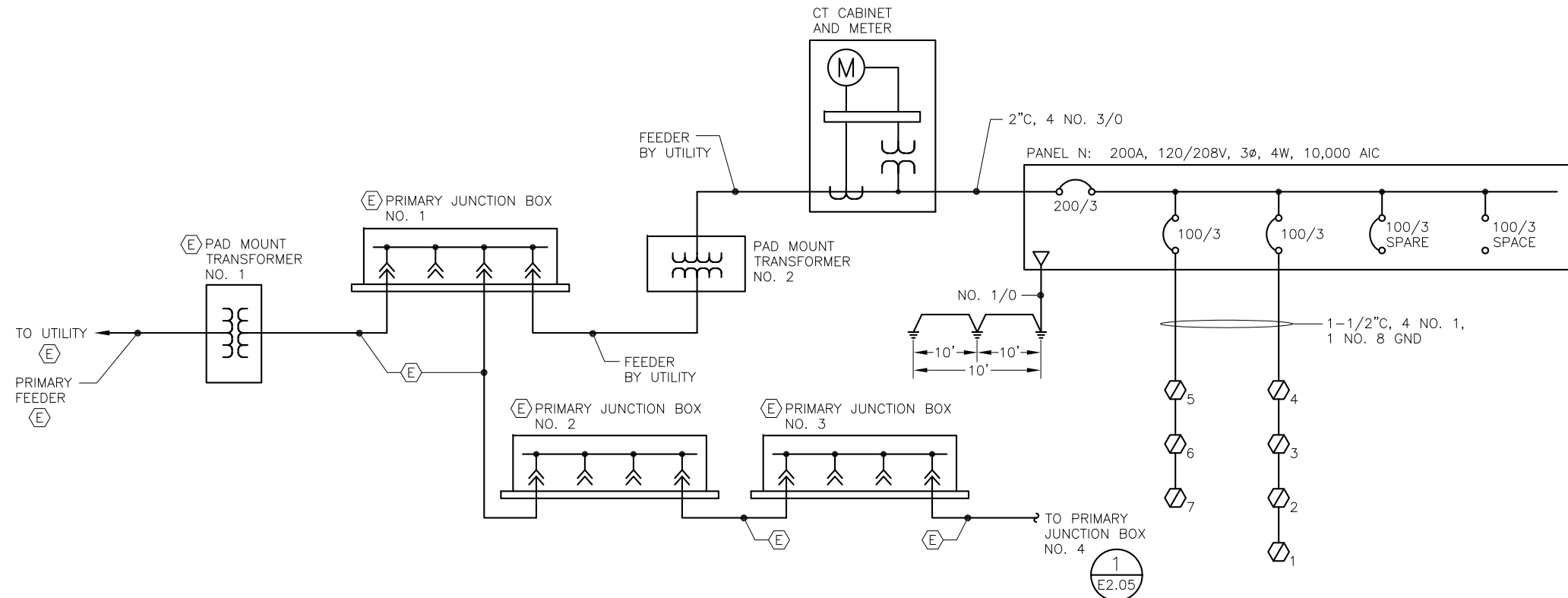
Barry J. Begenyi
EE 10453
DATE: 2/11/11

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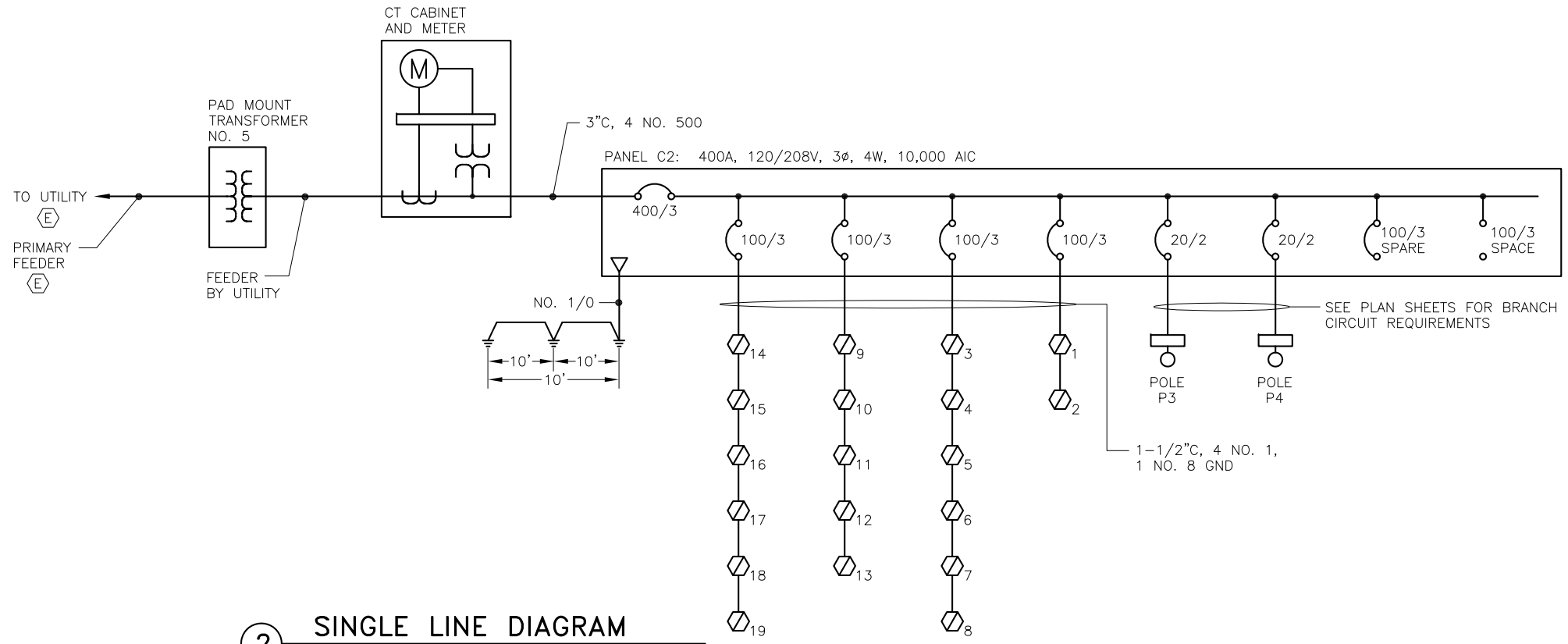
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PN&D PROJECT NO. 052023.04 DWG. FILE: E2.03.DWG

E2.03
SHEET 8 OF 16



① SINGLE LINE DIAGRAM
NO SCALE



② SINGLE LINE DIAGRAM
NO SCALE

Feb 11, 2011 - 9:46am F:\Projects\137_PND\137 Wrangell Marine Center Ph. 3 Utilities\Drawings\Working\E2.04.dwg (Layout1 tab)

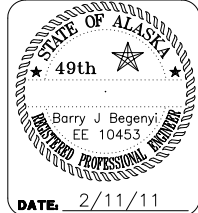
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SCALE: _____



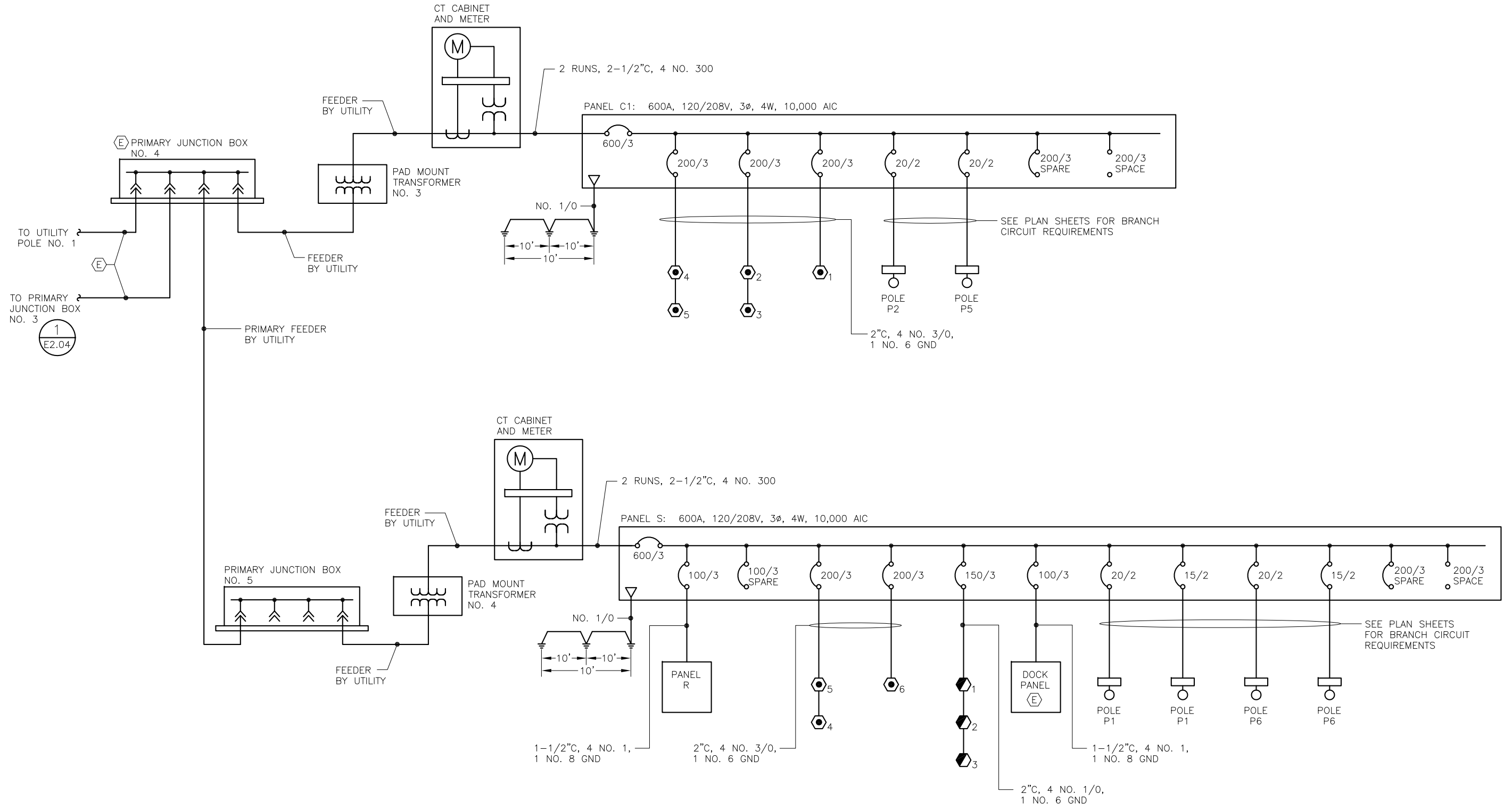
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SHEET TITLE:
SINGLE LINE DIAGRAMS

DATE: 2/11/11

PN&D PROJECT NO. 052023.04 DWG. FILE: E2.04.DWG

E2.04
SHEET 9 OF 16



1 SINGLE LINE DIAGRAM
NO SCALE

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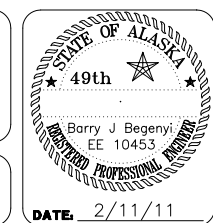
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SHEET TITLE:
SINGLE LINE DIAGRAMS

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E2.05
SHEET 10 OF 16

PANEL C1		SIZE	VOLTS/PHASE			MAIN		LOCATION		MOUNT	
		600 AMPS	208Y/120V, 3 PH			600/3		CENTER SITE		SURFACE	
C K T NO	DESCRIPTION	BREAKER AMP/ POLE	KVA			BREAKER AMP/ POLE	DESCRIPTION	C K T NO			
			CKT	AØ	BØ				CØ		
1	POLE P2	LTG 20/2	1.0	11.4		10.4	200/3	PEDESTAL 1	2		
3	-----	---	1.0		11.4	10.4	---	-----	4		
5	POLE P5	20/2	0.8			11.2	10.4	---	6		
7	-----	---	0.8	21.6			20.8	200/3	PEDESTALS 2 & 3	8	
9	SPARE	20/1	0.0		20.8		20.8	---	-----	10	
11		20/1	0.0			20.8	20.8	---	-----	12	
13		20/1	0.0	20.8			20.8	200/3	PEDESTALS 4 & 5	14	
15		20/1	0.0		20.8		20.8	---	-----	16	
17	SPACE		0.0			20.8	20.8	---	-----	18	
19			0.0	0.0			200/3	SPARE	20		
21			0.0		0.0		---	-----	22		
23			0.0			0.0	0.0	---	-----	24	
25			0.0	0.0			0.0		SPACE	26	
27			0.0		0.0		0.0			28	
29			0.0			0.0	0.0			30	
31			0.0	0.0			0.0			32	
33			0.0		0.0		0.0			34	
35			0.0			0.0	0.0			36	
37			0.0	0.0			0.0			38	
39			0.0		0.0		0.0			40	
41			0.0			0.0	0.0			42	
BALANCED CONNECTED LOAD: 159.6 KVA / 443.3 AMPS				53.8	53.0	52.8					
MAXIMUM CONNECTED LOAD: 159.6 KVA / 448.3 AMPS											

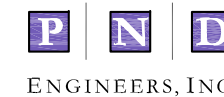
PANEL C2		SIZE	VOLTS/PHASE			MAIN		LOCATION		MOUNT	
		400 AMPS	208Y/120V, 3 PH			400/3		CENTER SITE		SURFACE	
C K T NO	DESCRIPTION	BREAKER AMP/ POLE	KVA			BREAKER AMP/ POLE	DESCRIPTION	C K T NO			
			CKT	AØ	BØ				CØ		
1	POLE P3	LTG 20/2	1.0	6.8		5.8	100/3	PEDESTALS 1 & 2	2		
3	-----	---	1.0		6.8	5.8	---	-----	4		
5	POLE P4	20/2	0.8			0.8	0	---	6		
7	-----	---	0.8	9.1			8.3	100/3	PEDESTALS 3 THRU 8	8	
9	SPARE	20/1	0.0		8.3		8.3	---	-----	10	
11		20/1	0.0			8.3	8.3	---	-----	12	
13		20/1	0.0	10.3			10.3	100/3	PEDESTALS 9 THRU 13	14	
15		20/1	0.0		10.3		10.3	---	-----	16	
17	SPACE		0.0			5.8	5.8	---	-----	18	
19			0.0	8.3			8.3	100/3	PEDESTALS 14 THRU 19	20	
21			0.0		8.3		8.3	---	-----	22	
23			0.0			8.3	8.3	---	-----	24	
25			0.0	0.0			0.0	100/3	SPARE	26	
27			0.0		0.0		0.0	---	-----	28	
29			0.0			0.0	0.0	---	-----	30	
31			0.0	0.0			0.0		SPACE	32	
33			0.0		0.0		0.0			34	
35			0.0			0.0	0.0			36	
37			0.0	0.0			0.0			38	
39			0.0		0.0		0.0			40	
41			0.0			0.0	0.0			42	
BALANCED CONNECTED LOAD: 91.4 KVA / 253.9 AMPS				34.5	33.7	23.2					
MAXIMUM CONNECTED LOAD: 91.4 KVA / 287.5 AMPS											

LUMINAIRE SCHEDULE				
TYPE	DESCRIPTION	MANUFACTURER	LAMPS	REMARKS
P1	HIGH MAST AREA LIGHTS, 70' POLE, (4 EA) LIGHTS THIS POLE	MUSCO	(4) 400W MH	
P2	HIGH MAST AREA LIGHTS, 70' POLE, (3 EA) LIGHTS THIS POLE	MUSCO	(3) 400W MH	
P3	HIGH MAST AREA LIGHTS, 70' POLE, (4 EA) LIGHTS THIS POLE	MUSCO	(4) 400W MH	
P4	HIGH MAST AREA LIGHTS, 70' POLE, (3 EA) LIGHTS THIS POLE	MUSCO	(3) 400W MH	
P5	HIGH MAST AREA LIGHTS, 70' POLE, (3 EA) LIGHTS THIS POLE	MUSCO	(3) 400W MH	
P6	HIGH MAST AREA LIGHTS, 70' POLE, (3 EA) LIGHTS THIS POLE	MUSCO	(3) 400W MH	

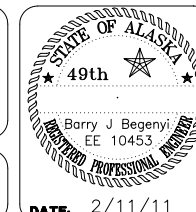
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SHEET **E2.06** OF **16**
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DESIGN: BJB CHECKED: BJB SCALE:
DRAWN: PEL APPROVED:

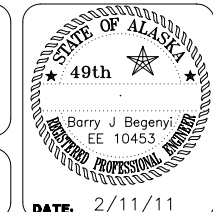
PANEL N		SIZE	VOLTS/PHASE				MAIN	LOCATION	MOUNT		
		400 AMPS	208Y/120V, 3 PH				400/3	NORTH SITE	SURFACE		
C K T NO	DESCRIPTION	BREAKER AMP/ POLE	KVA				BREAKER AMP/ POLE	DESCRIPTION	C K T NO		
			CKT	AØ	BØ	CØ					
1	SPARE	20/1	0.0	10.4			10.4	100/3	PEDESTALS 1 THRU 4	2	
3		20/1	0.0		5.7		5.7	---	----	4	
5		20/1	0.0			5.7	5.7	---	----	6	
7		20/1	0.0	5.7			5.7	100/3	PEDESTALS 5 THRU 7	8	
9	SPACE		0.0		5.7		5.7	---	----	10	
11			0.0			5.7	5.7	---	----	12	
13			0.0	0.0			0.0	100/3	SPARE	14	
15			0.0		0.0		0.0	---	----	16	
17			0.0			0.0	0.0	---	----	18	
19			0.0	0.0			0.0		SPACE	20	
21			0.0		0.0		0.0			22	
23			0.0			0.0	0.0			24	
25			0.0	0.0			0.0			26	
27			0.0		0.0		0.0			28	
29			0.0			0.0	0.0			30	
31			0.0	0.0			0.0			32	
33			0.0		0.0		0.0			34	
35			0.0			0.0	0.0			36	
37			0.0	0.0			0.0			38	
39			0.0		0.0		0.0			40	
41			0.0			0.0	0.0			42	
BALANCED CONNECTED LOAD: 38.9 KVA / 108.1 AMPS				16.1	11.4	11.4					
MAXIMUM CONNECTED LOAD: 38.9 KVA / 134.2 AMPS											

PANEL S		SIZE	VOLTS/PHASE				MAIN	LOCATION	MOUNT		
		600 AMPS	208Y/120V, 3 PH				600/3	SOUTH SITE	SURFACE		
C K T NO	DESCRIPTION	BREAKER AMP/ POLE	KVA				BREAKER AMP/ POLE	DESCRIPTION	C K T NO		
			CKT	AØ	BØ	CØ					
1	POLE P1	20/2	0.8	14.3			13.5	150/3	PEDESTALS 1 THRU 3	2	
3	-----	---	0.8		14.3		13.5	---	----	4	
5	POLE P1 (HAUL OUT)	15/2	0.3			13.8	13.5	---	----	6	
7	-----	---	0.3	21.1			20.8	200/3	PEDESTALS 4 & 5	8	
9	POLE P6	20/2	0.5		21.3		20.8	---	----	10	
11	-----	---	0.5			21.3	20.8	---	----	12	
13	POLE P6 (HAUL OUT)	15/2	0.3	10.7			10.4	200/3	PEDESTAL 6	14	
15	-----	---	0.3		10.7		10.4	---	----	16	
17	LIGHTING CONTROLS	20/1	0.2			10.6	10.4	---	----	18	
19	SPARE	20/1	0.0	0.0			0.0	200/3	SPARE	20	
21		20/1	0.0		0.0		0.0	---	----	22	
23		20/1	0.0			0.0	0.0	---	----	24	
25		20/1	0.0	0.0			0.0		SPACE	26	
27	SPACE		0.0		0.0		0.0			28	
29			0.0			0.0	0.0			30	
31			0.0	0.0			0.0			32	
33			0.0		0.0		0.0			34	
35			0.0			0.0	0.0			36	
37			0.0	0.0			0.0			38	
39			0.0		0.0		0.0			40	
41			0.0			0.0	0.0			42	
BALANCED CONNECTED LOAD: 138.1 KVA / 383.6 AMPS				46.1	46.3	45.7					
MAXIMUM CONNECTED LOAD: 138.1 KVA / 384.2 AMPS											

Feb 11, 2011 - 9:56am F:\Projects\137_PND\137 Wrangell Marine Center Ph. 3 Utilities\Drawings\Working\E2.07.dwg (Layout tab)



REVISIONS					
REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.



CITY OF WRANGELL, ALASKA
WRANGELL MARINE SERVICE CENTER
PHASE 3

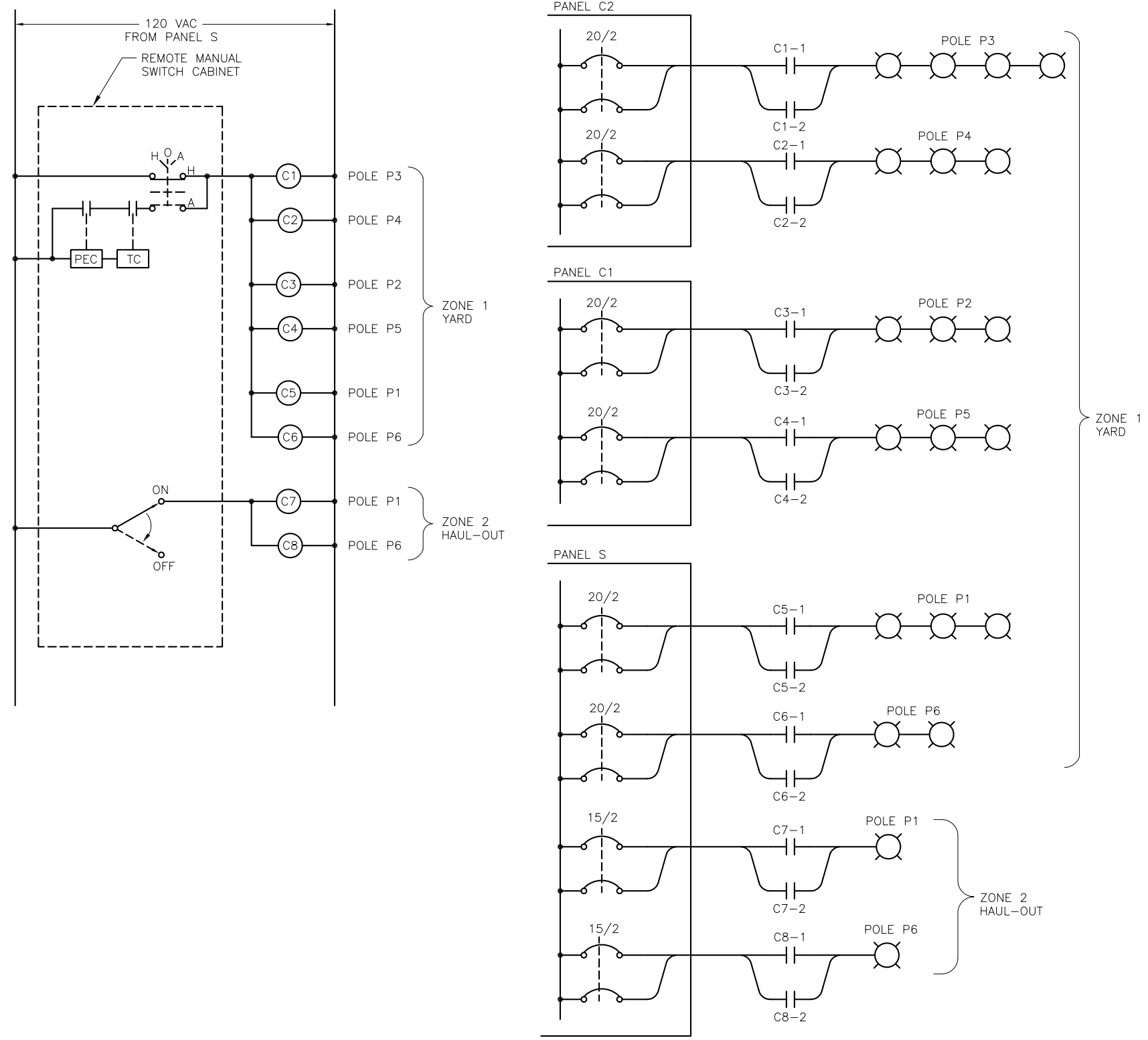
SHEET TITLE: **SCHEDULES**

PN&D PROJECT NO.: 052023.04 DWG. FILE: E2.07.DWG

E2.07
SHEET 12 OF 16

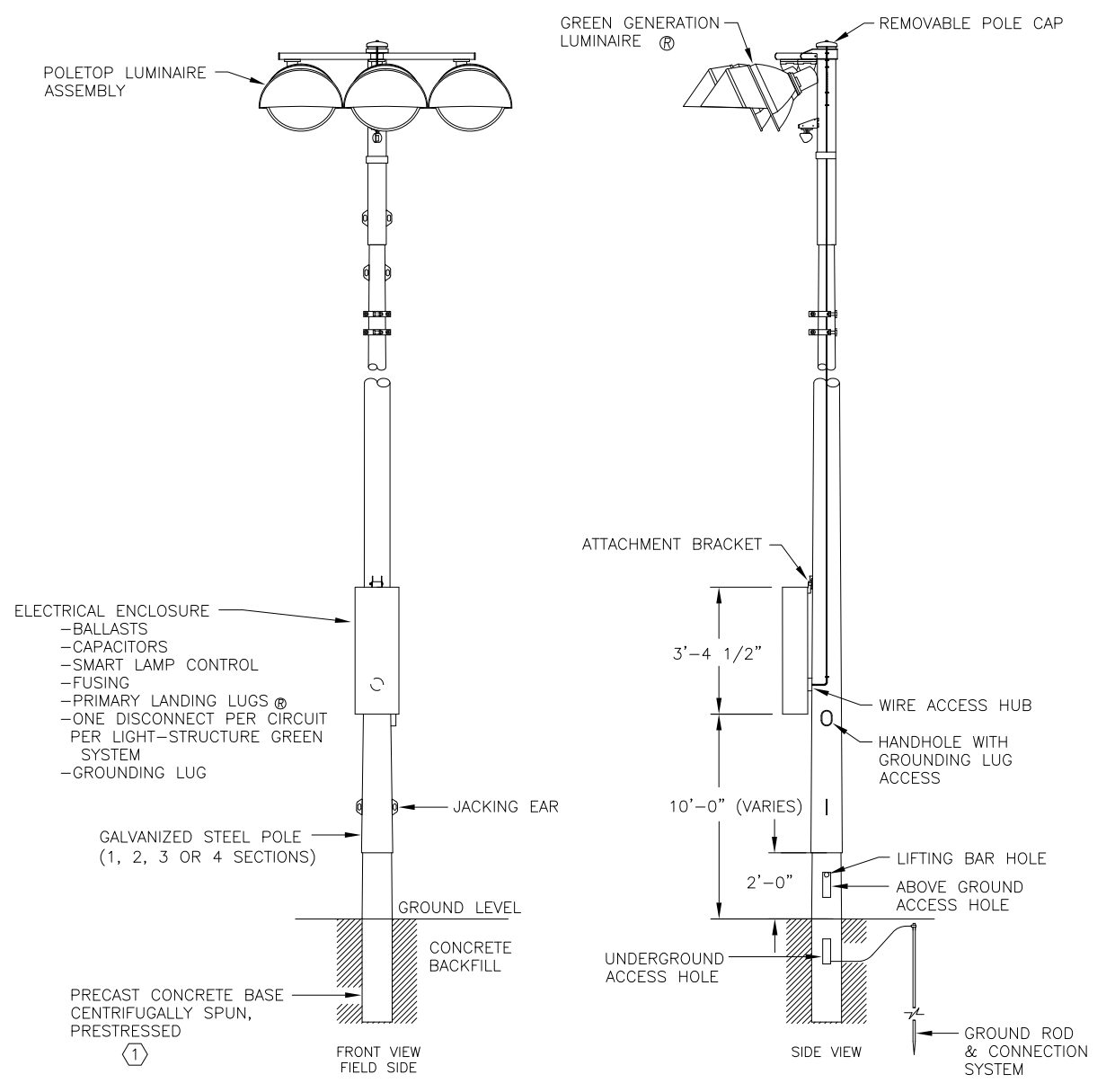
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DRAWN: PEL APPROVED: _____

Feb 11, 2011 - 10:02am
F:\Projects\137_PND\137_PND\Drawings\Working\E2.08.dwg (Layout1 tab)



2 SCHEMATIC - HIGH MAST LIGHTING CONTROLS
NO SCALE

NOTES:
① SEE DRAWING 2.15 FOR SPECIAL FOUNDATION CONDITIONS AT POLES P2 AND P3.



1 DETAIL - HIGH MAST LIGHT POLE
NO SCALE

HAIGHT & ASSOCIATES
CONSULTING ELECTRICAL ENGINEERS
526 Main Street, Juneau, AK 99801
(907) 586-9788

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REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.

PND ENGINEERS, INC.
9360 Glacier Highway, Ste. 100
Juneau, Alaska 99801
Phone: 907-586-2093
Fax: 907-586-2099
www.pndengineers.com

DESIGN: BJB CHECKED: BJB
DRAWN: PEL APPROVED: _____

SCALE: _____

STATE OF ALASKA
49th
Barry J. Begenyi
EE 10453
PROFESSIONAL ENGINEER

DATE: 2/11/11

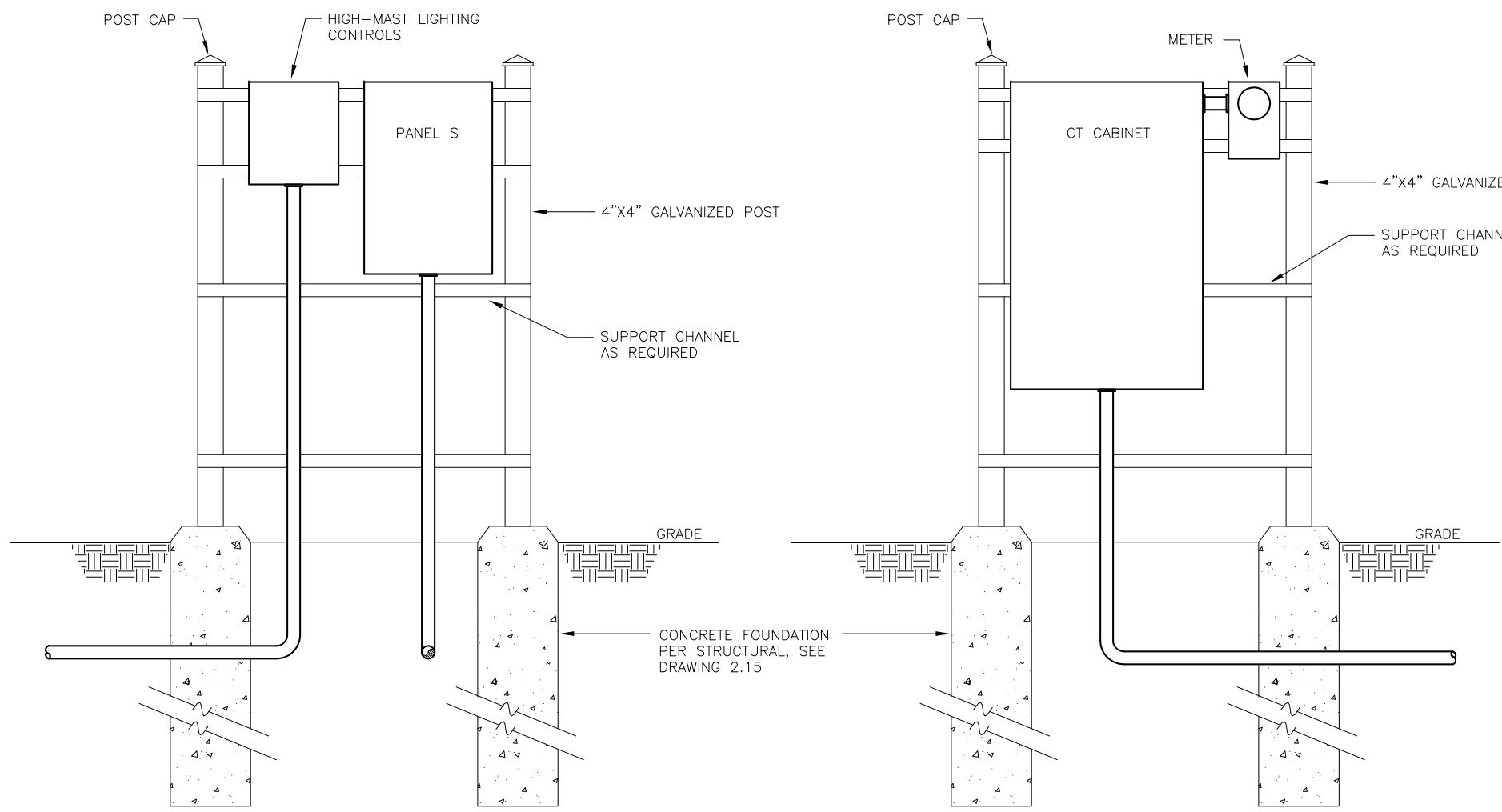
CITY OF WRANGELL, ALASKA
WRANGELL MARINE SERVICE CENTER
PHASE 3

SHEET TITLE: **DETAILS**

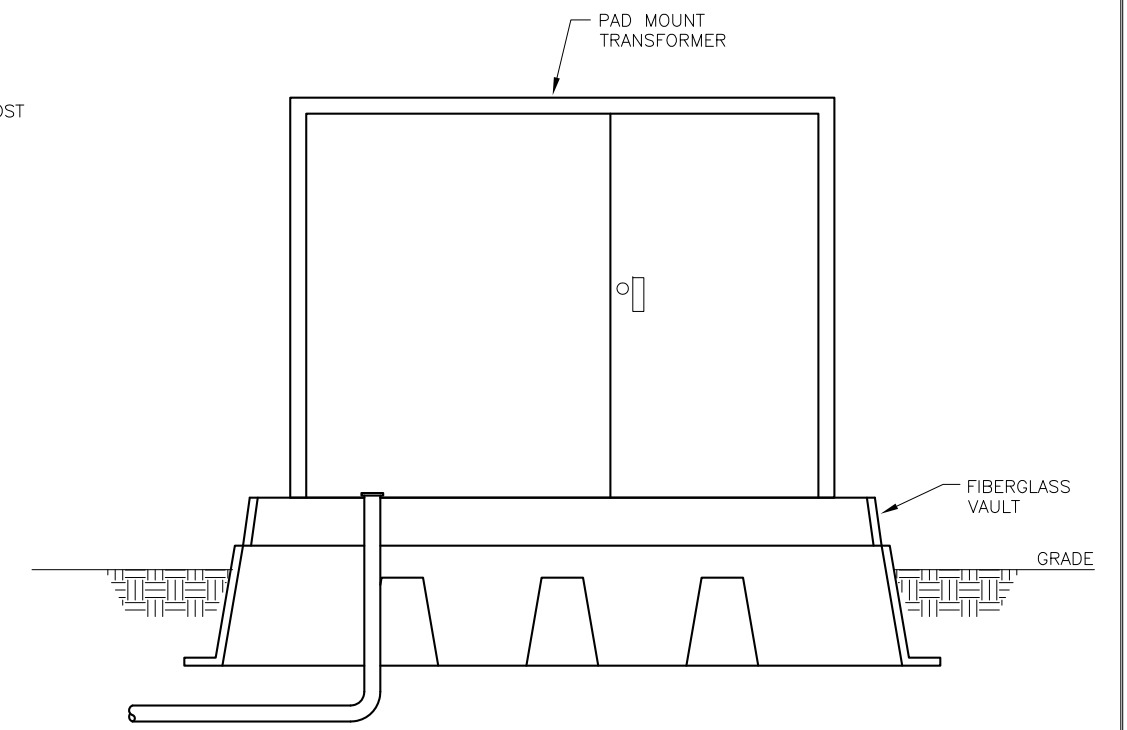
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E2.08
SHEET 13 OF 16

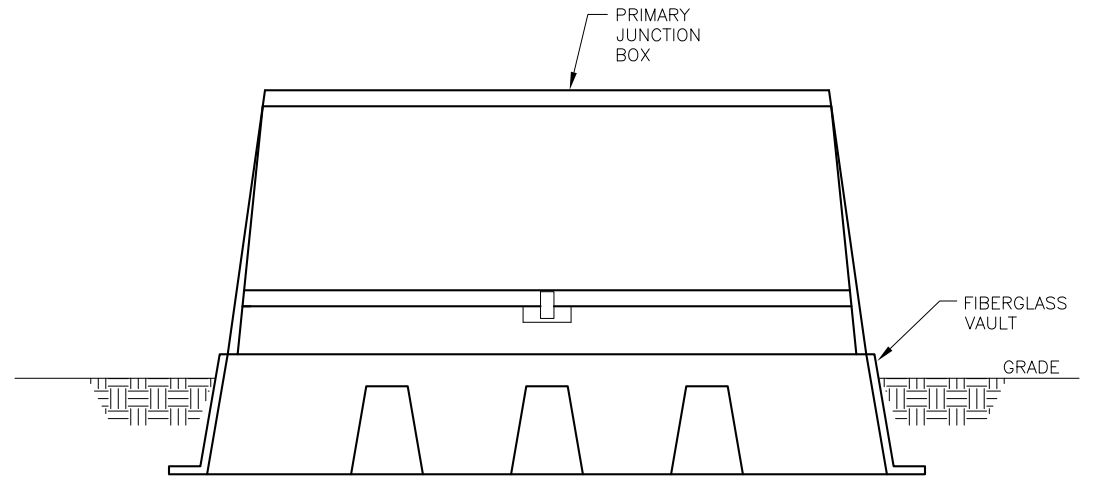
Feb 11, 2011 - 10:04am
F:\Projects\137_PND\2\5 Wrangell Marine Center Ph. 3 Utilities\Drawings\Working\E2.09.dwg (Layout 1 tab)



FRONT
BACK
3 ELEVATION - PANELBOARD S
NO SCALE



1 TYPICAL ELEVATION - PAD MOUNT TRANSFORMER
NO SCALE



2 TYPICAL ELEVATION - PRIMARY JUNCTION BOX
NO SCALE



HAIGHT & ASSOCIATES
CONSULTING ELECTRICAL ENGINEERS
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(907) 586-9788

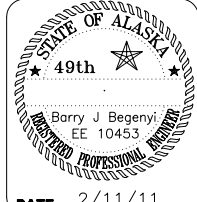
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REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.



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DRAWN: PEL APPROVED: _____

SCALE: _____



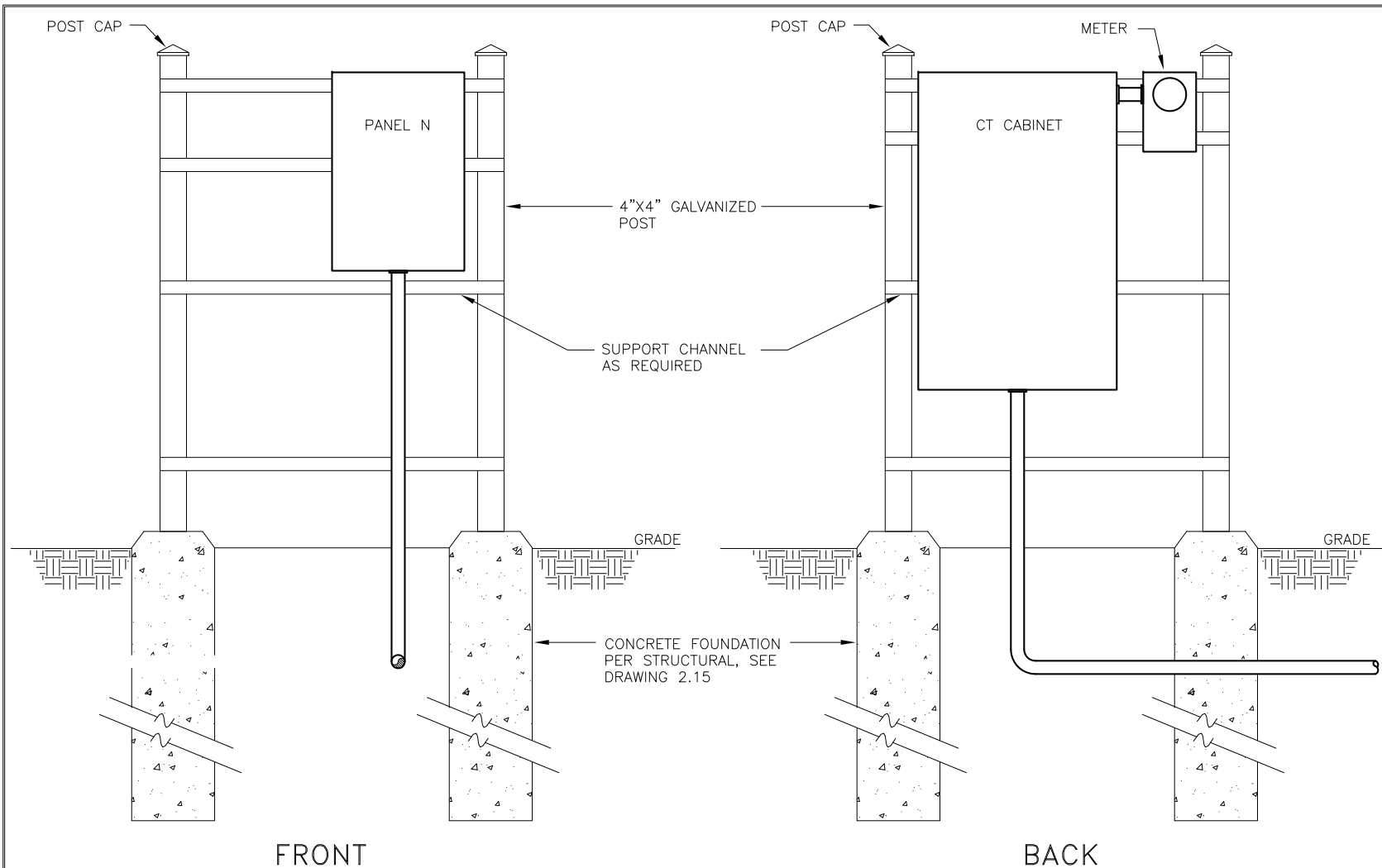
DATE: 2/11/11

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WRANGELL MARINE SERVICE CENTER
PHASE 3

SHEET TITLE: **DETAILS**

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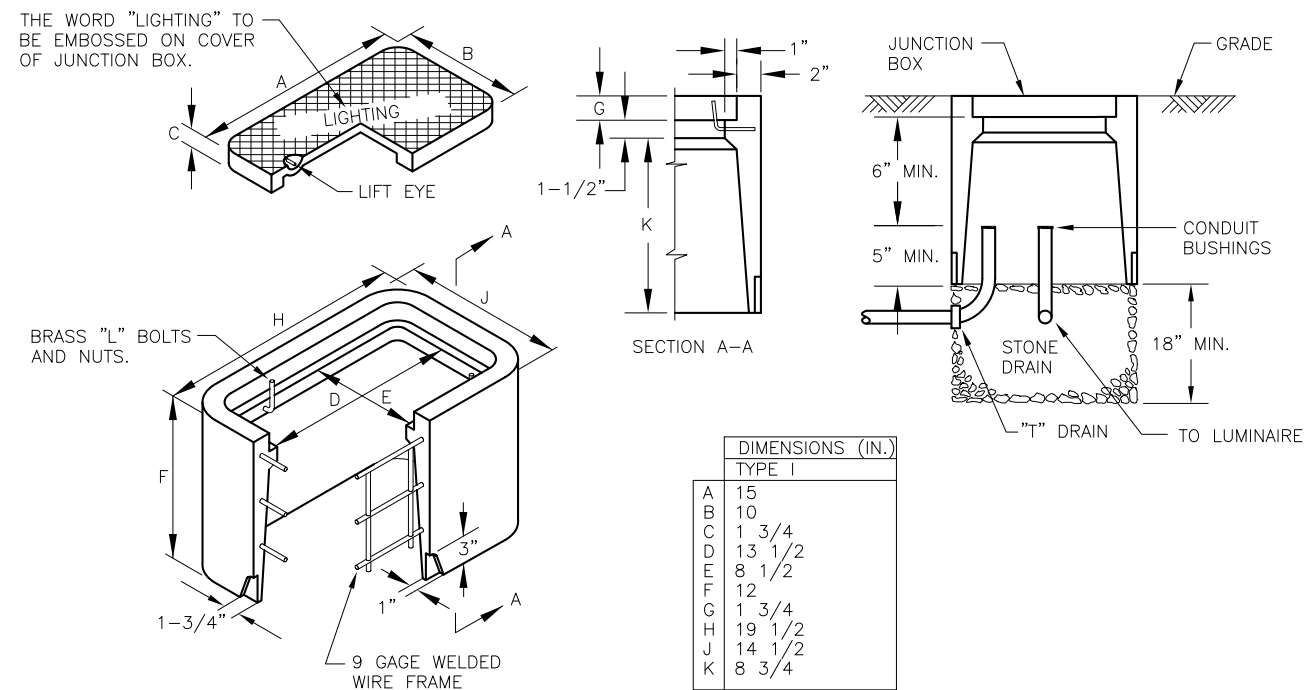
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SHEET 14 OF 16



FRONT

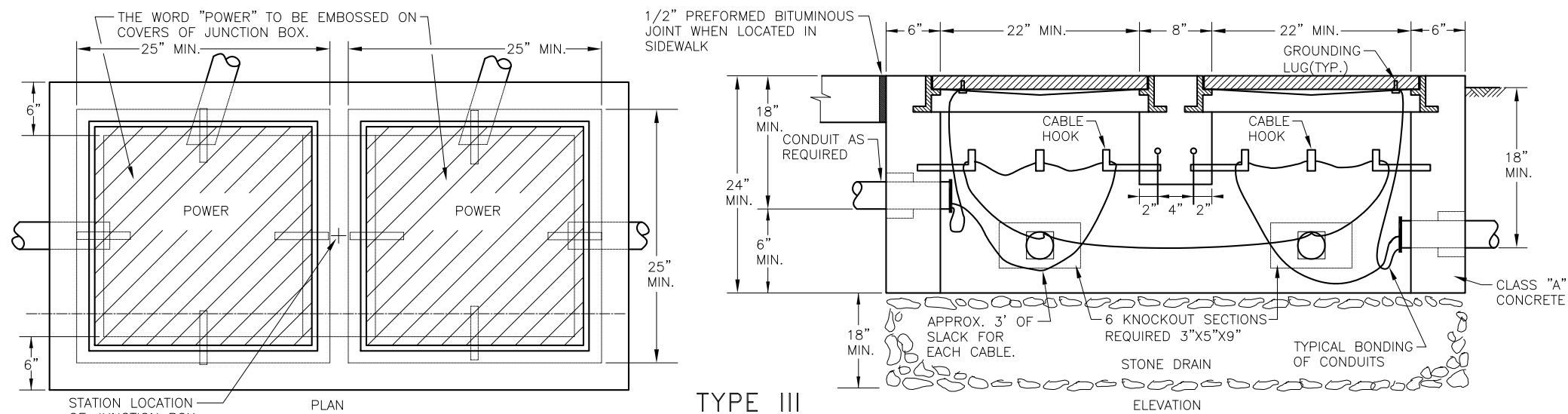
BACK

2 TYPICAL ELEVATION - PANELBOARD N, C1, & C2
NO SCALE



TYPE I

DIMENSIONS (IN.)	
TYPE I	
A	15
B	10
C	1 3/4
D	13 1/2
E	8 1/2
F	12
G	1 3/4
H	19 1/2
J	14 1/2
K	8 3/4



1 DETAIL - HANDHOLES
NO SCALE

Feb 11, 2011 - 11:33am
F:\Projects\137_PND\2\5 Wrangell Marine Center Ph. 3\Utilities\Drawings\Working\E2.10.dwg (Layout1 tab)

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(907) 586-9788

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REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.

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ENGINEERS, INC.
9360 Glacier Highway, Ste. 100
Juneau, Alaska 99801
Phone: 907-586-2093
Fax: 907-586-2099
www.pndengineers.com

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DRAWN: PEL APPROVED: _____
SCALE:

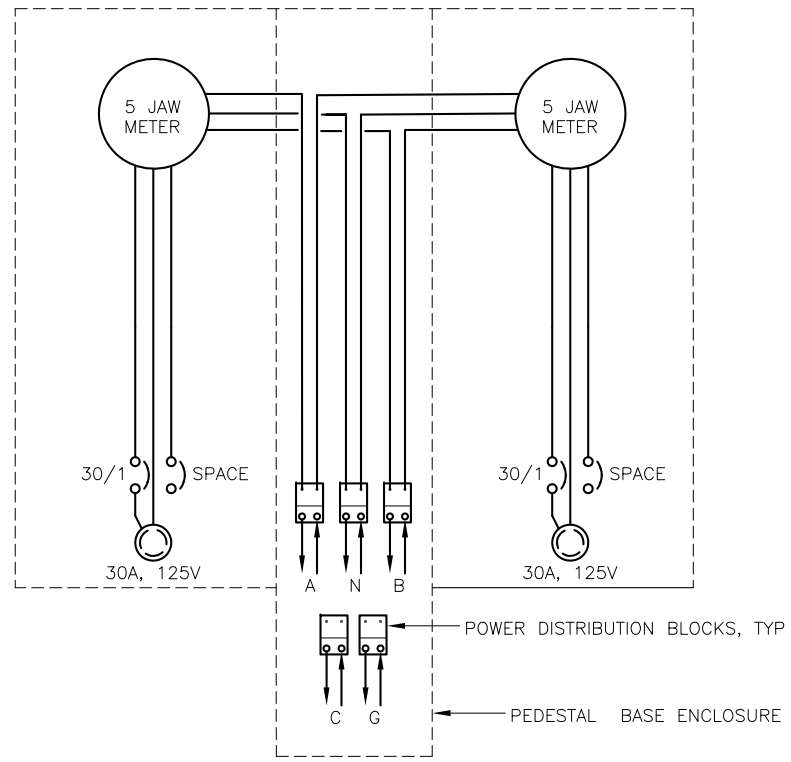
Barry J. Begenyi
EE 10453
DATE: 2/11/11

CITY OF WRANGELL, ALASKA
WRANGELL MARINE SERVICE CENTER
PHASE 3

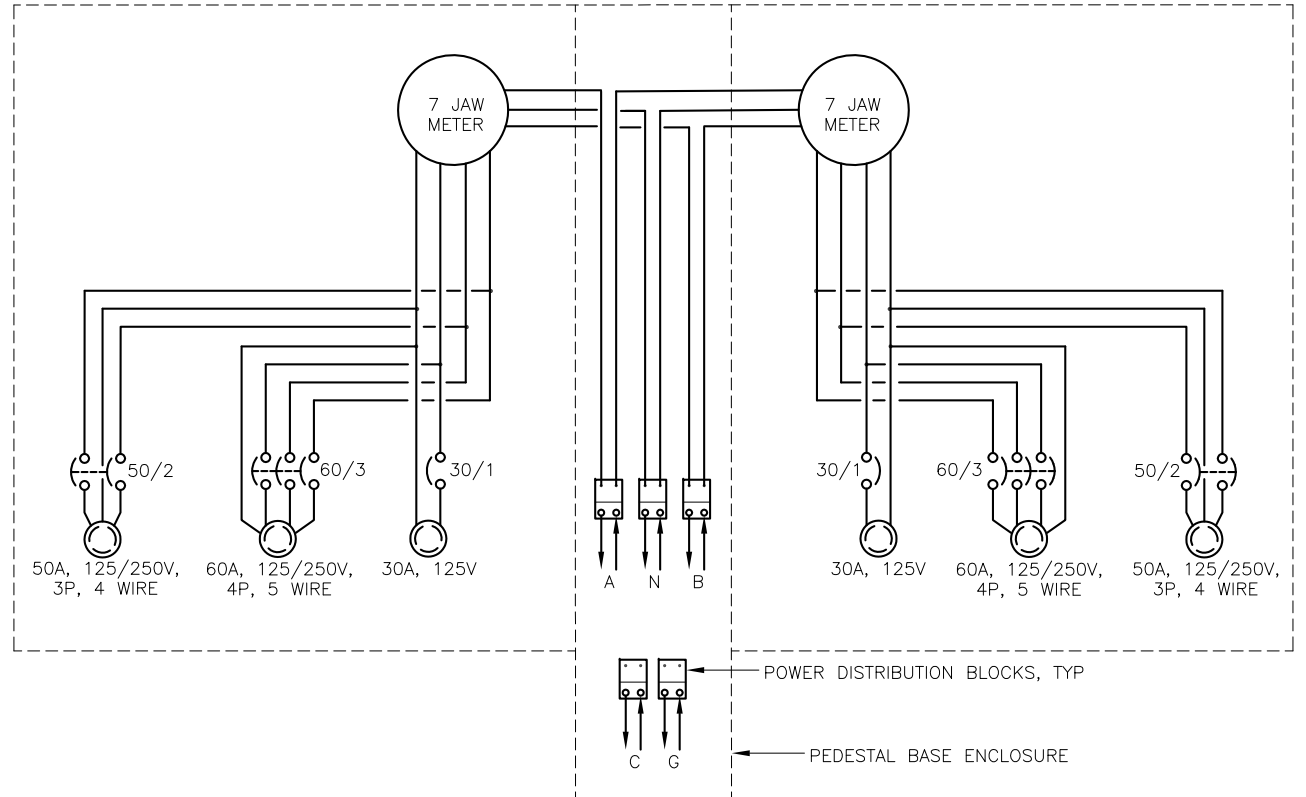
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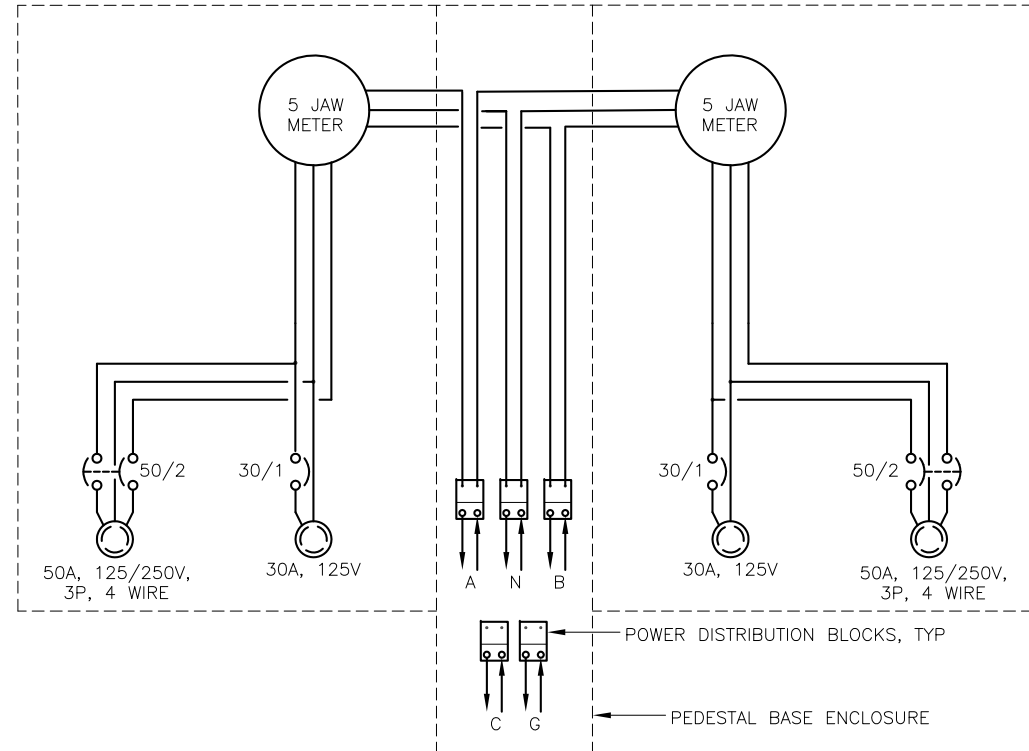
E2.10
SHEET 15 OF 16



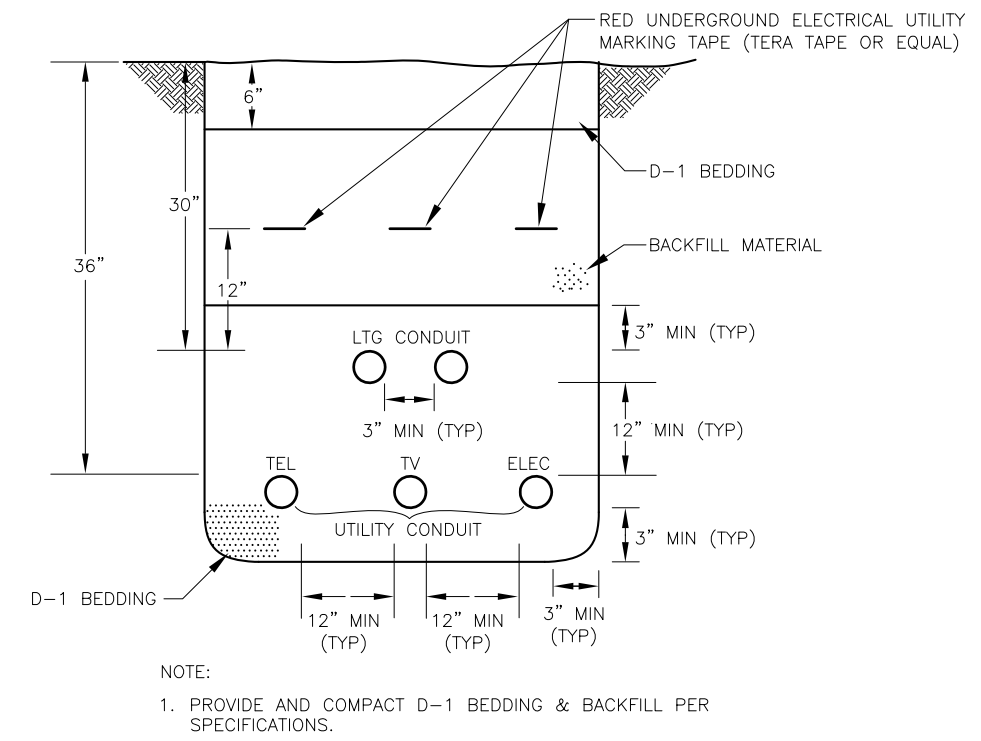
3 WIRING DIAGRAM - DUAL 30A PEDESTAL
NO SCALE



2 WIRING DIAGRAM - DUAL 30A/50A/60A PEDESTAL
NO SCALE



4 WIRING DIARAM - DUAL 50A/30A PEDESTAL
NO SCALE



1 DETAIL - TRENCH
NO SCALE

NOTE:
1. PROVIDE AND COMPACT D-1 BEDDING & BACKFILL PER SPECIFICATIONS.

Feb 11, 2011 - 10:29am
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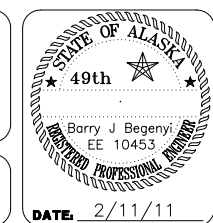
REVISIONS					
REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.

PND ENGINEERS, INC.

9360 Glacier Highway, Ste. 100
Juneau, Alaska 99801
Phone: 907-586-2093
Fax: 907-586-2099
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DESIGN: BJB CHECKED: BJB
DRAWN: PEL APPROVED: _____

SCALE: _____



**CITY OF WRANGELL, ALASKA
WRANGELL MARINE SERVICE CENTER
PHASE 3**

SHEET TITLE: **DETAILS**

PN&D PROJECT NO. 052023.04 DWG. FILE: E2.09.DWG

E2.11
SHEET 16 OF 16



Submittal Approval

June 8, 2011

Mr. Michael Newbill
Channel Electric, Inc.
1155 Copper Ridge Ln
Ketchikan, AK 99901

RE: Wrangell Marine Service Center
Project #149046

Dear Michael:

This letter is to serve as approval for submittals provided by Musco Lighting, LLC for the above referenced project. Please review the following items for accuracy. Upon your approval, we can begin fabrication of the materials for your project. Any changes may result in delay of production, delivery and additional costs. Musco Lighting shall deliver equipment to the job site 4 - 6 weeks after submittal approval or release of order.

- Voltage to pole requirements: 208
- Phase to enclosure: single
- Confirm pole locations as shown on 149046R5

Please indicate your approval of these submittals in their entirety by signing below.

Authorized Signature

Date

Printed Name

Company Name

Please return one copy of this form to:

MUSCO SPORTS LIGHTING, LLC.
Attn: Teri Cirbo
200 First Avenue West
Oskaloosa, Iowa 52577
Phone: 800-825-6020 x2790
Fax: 641-673-4740

Presented to:

Wrangell Marine Service Center
Lighting Project
Wrangell, AK
June 8, 2011

Project #149046



Submitted by:

Musco Sports Lighting, LLC
100 1st Avenue West
Oskaloosa, Iowa 52577
Local Phone: 641-673-0411
Toll Free: 800-825-6020
Fax: 641-673-4740

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Table of Contents

Wrangell Marine Service Center
Lighting Project
Wrangell, AK

A. LIGHTING DESIGN

- Drawing #149046R5, dated 21-Mar-11

B. PRODUCT INFORMATION

- Manufacturer's Model Number
- Light-Structure Green™ Illustration
- Pole Configuration Drawings
- LSG Luminaire Assembly Drawing
- 400W Pulse-Start Luminaire Technical Data Sheet
- 400W Lamp Detail
- LSG Electrical Enclosure Drawing
- LSG Poletop Drawing
- LSG Pole Drawing
- LSG Concrete Base Drawing
- LSG Wire Harness Drawing
- Corrosion Protection
- UL Letter

C. FOUNDATION INFORMATION

- Pole Calculations
- Contractor Information

D. CONTROL INFORMATION

- LSG Electrical Enclosure Subpanel, drawing #149046E1
- Remote Switch Box, drawing 149046E2

E. WARRANTY

- Light-Structure Green™

F. PROJECT REFERENCES

EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	P1, P3	70'	-	70'	400W MH	4	4	0
4	P2, P4-P6	70'	-	70'	400W MH	3	3	0
6	← TOTALS →					20	20	0



GUARANTEED PERFORMANCE

ILLUMINATION SUMMARY

Marine Service Center

Wrangell Marine Service Center
Wrangell, AK

Marine Service Center

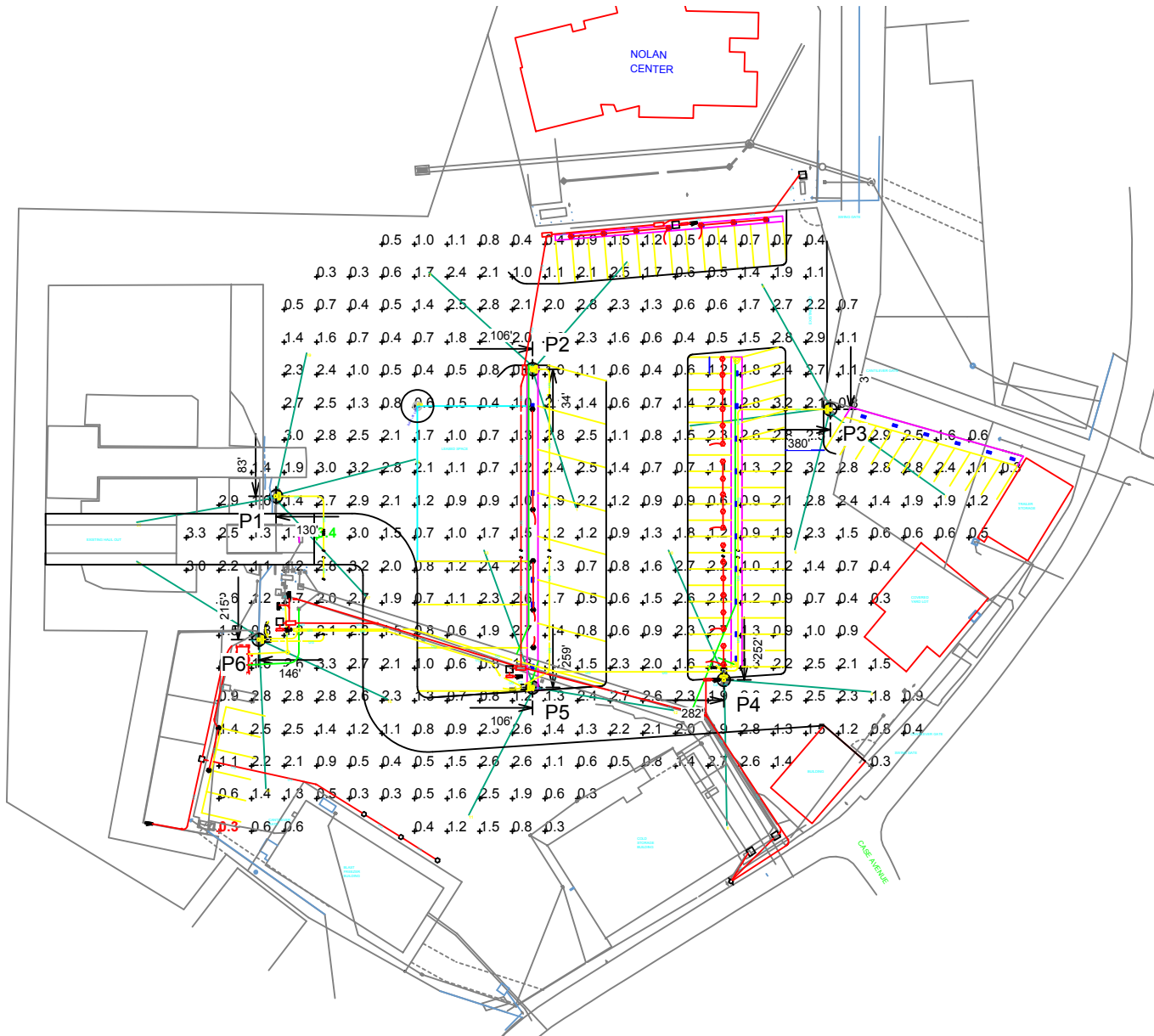
- Size: 1306' x 1302'
- Grid Spacing = 30.0' x 30.0'
- Values given at 3.0' above grade

- Luminaire Type: Green Generation
- Rated Lamp Life: 20,000 hours
- Avg Lumens/Lamp: 36,000

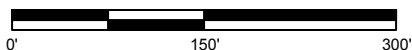
MAINTAINED ILLUMINATION HORIZONTAL FOOTCANDLES

Entire Grid	
No. of Target Points:	364
Average:	1.5
Maximum:	3
Minimum:	0
Avg/Min:	5.92
Max/Min:	13.30
UG (Adjacent Pts):	4.17
CV:	0.54

Average Tilt Factor:	1.000
Additional Non-Recoverable Light Loss Factor:	x1.000
Recoverable Light Loss Factor:	x1.000
Total Light Loss Factor (LLF):	1.000
Number of Luminaires:	20
Avg KW:	9.4
Max KW:	9.4



SCALE IN FEET 1 : 150



Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the **Musco Control System Summary** for electrical sizing.

Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

By: Nathaniel Fox

File #: 149046R5

Date: 22-Nov-10

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EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
2	P1, P3	70'	-	70'	400W MH	4	4	0
4	P2, P4-P6	70'	-	70'	400W MH	3	3	0
6	← TOTALS →					20	20	0



GUARANTEED PERFORMANCE

ILLUMINATION SUMMARY

Haul Out Area

Wrangell Marine Service Center
Wrangell, AK

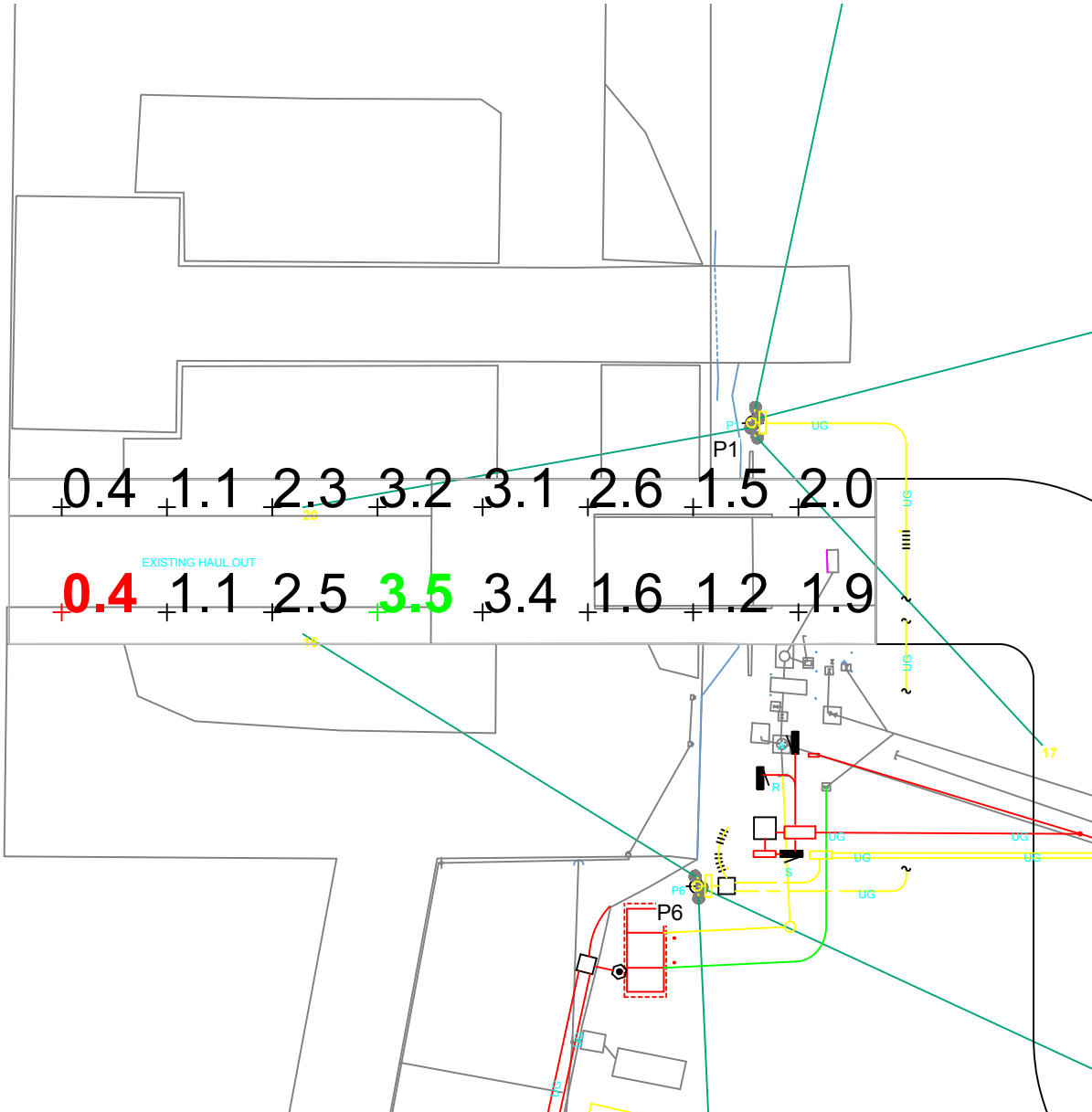
Haul Out Area

- Grid Spacing = 30.0' x 30.0'
- Values given at 3.0' above grade

- Luminaire Type: Green Generation
- Rated Lamp Life: 20,000 hours
- Avg Lumens/Lamp: 36,000

**MAINTAINED ILLUMINATION
HORIZONTAL FOOTCANDLES**

	Entire Grid	
No. of Target Points:	16	
	Average: 2.0	
	Maximum: 3	
	Minimum: 0	
	Avg/Min: 5.65	
	Max/Min: 9.86	
UG (Adjacent Pts):	3.12	
	CV: 0.51	
Average Tilt Factor:		1.000
Additional Non-Recoverable Light Loss Factor:		x1.000
Recoverable Light Loss Factor:		x1.000
Total Light Loss Factor (LLF):		1.000
Number of Luminaires:		20
Avg KW:		9.4
Max KW:		9.4



Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the Musco Control System Summary for electrical sizing.

Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

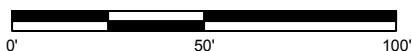
By: Nathaniel Fox

File #: 149046R5

Date: 22-Nov-10

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SCALE IN FEET 1 : 50



Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

GUARANTEED PERFORMANCE

EQUIPMENT LAYOUT

Wrangell Marine Service Center
Wrangell, AK

INCLUDES:

- Marine Service Center

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

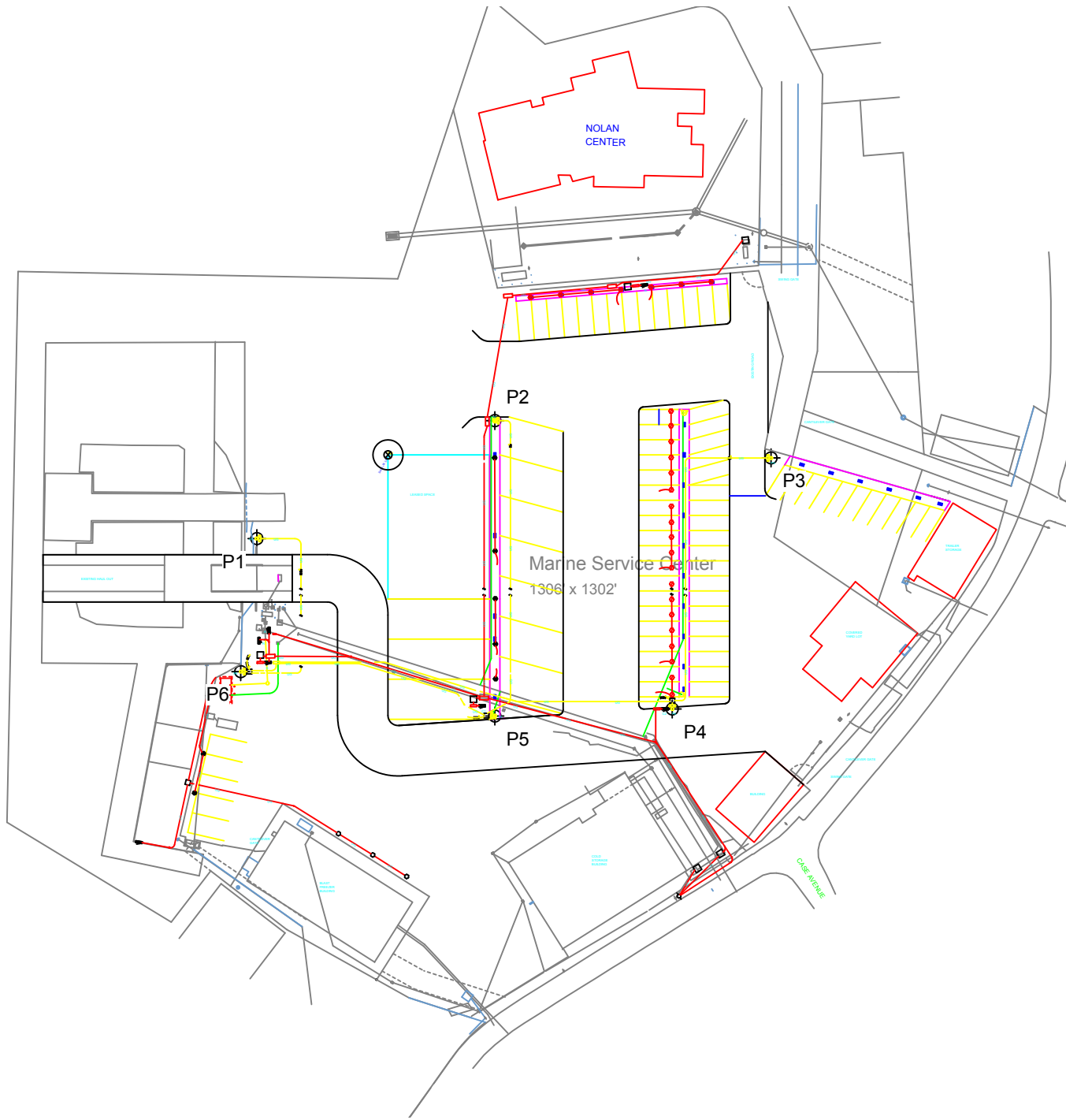
Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN

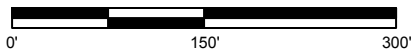
		Pole		Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE
2	P1, P3	70'	-	70'	400W MH	4
4	P2, P4-P6	70'	-	70'	400W MH	3
TOTALS						20

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)								
Single Phase Voltage	120 (60)	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	415 (60)	480 (60)
400 watt MH	4.0	2.5	-	2.0	1.8	-	-	-	1.1



SCALE IN FEET 1 : 150



Pole location(s) ⚡ dimensions are relative to 0,0 reference point(s) ⊗

By: Nathaniel Fox

File #: 149046R5

Date: 22-Nov-10

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Manufacturer's Model Number

Wrangell Marine Service Center
Lighting Project
Wrangell, AK

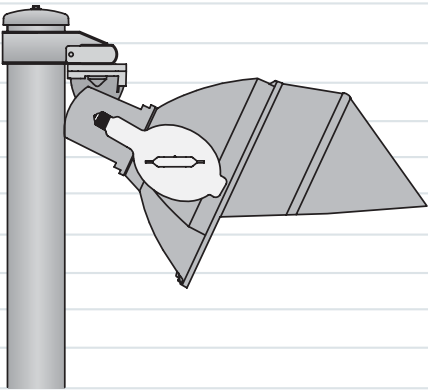
Product

# of Poles	Pole Designation	Catalog #
2	P1, P3	LSG – 70B – 400W – 4
4	P2, P4 – P6	LSG – 70B – 400W – 3

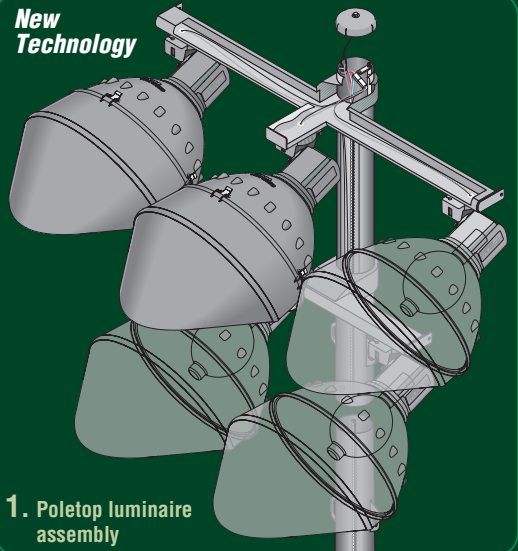


Light·Structure GREEN™

**For your budget,
for the environment.**



New Technology



1. Poletop luminaire assembly

2. Wire Harness

3. Galvanized steel pole

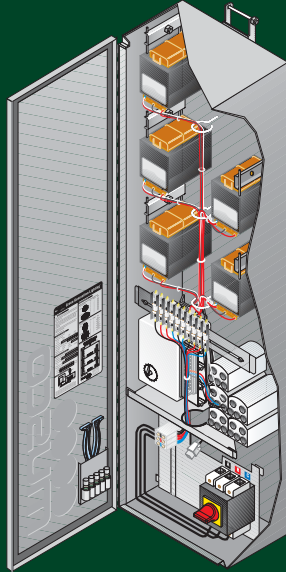
New Technology

- Cuts operating costs by as much as half
- Reduces spill light by 50%
- Provides constant light levels

Same 5 Easy Pieces™

- Complete system from foundation-to-poletop
- Factory wired, aimed and tested
- Fast, trouble free installation
- Comprehensive corrosion package

New Technology



4. Electrical components enclosure

5. Precast concrete base

Ground line

All you add is:

- Grounding rod and connection to system grounding lug
- Concrete backfill
- Underground wiring
- Service entrance



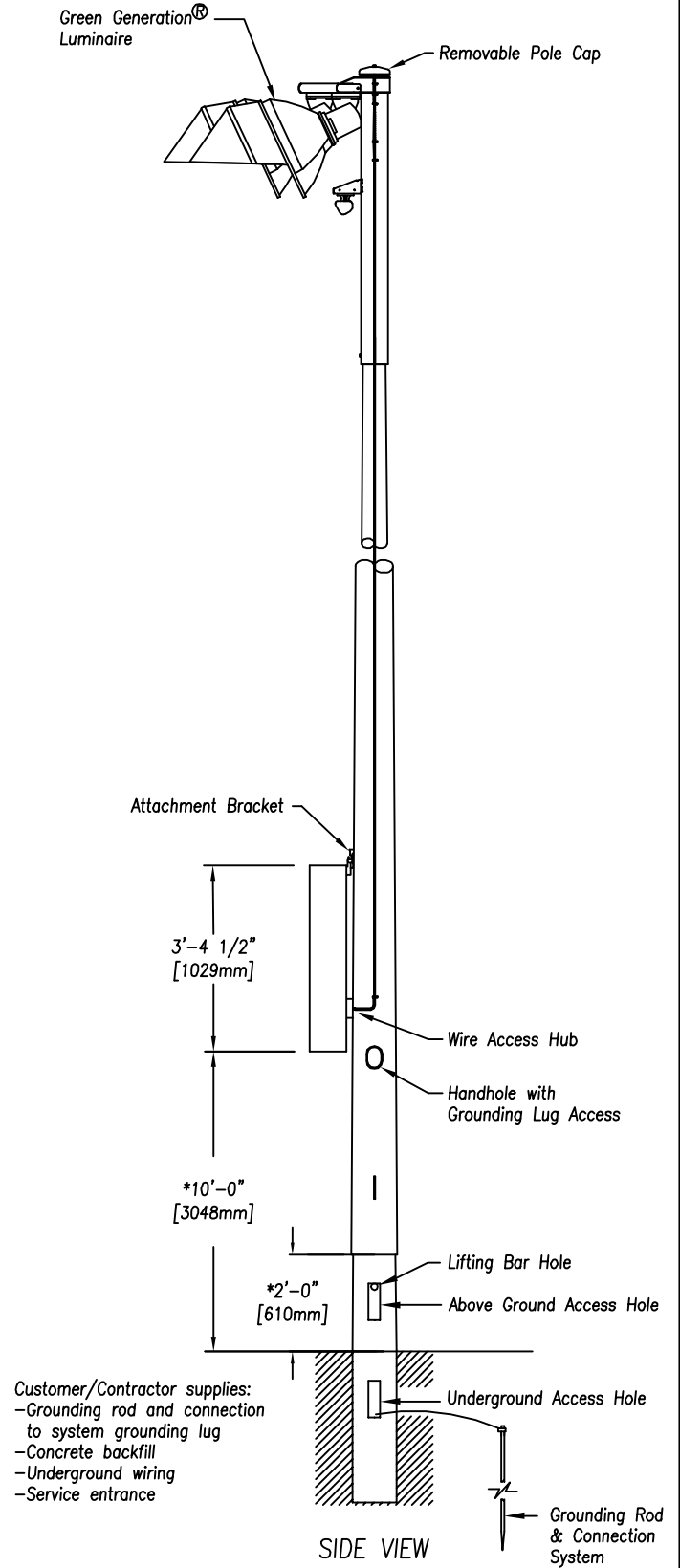
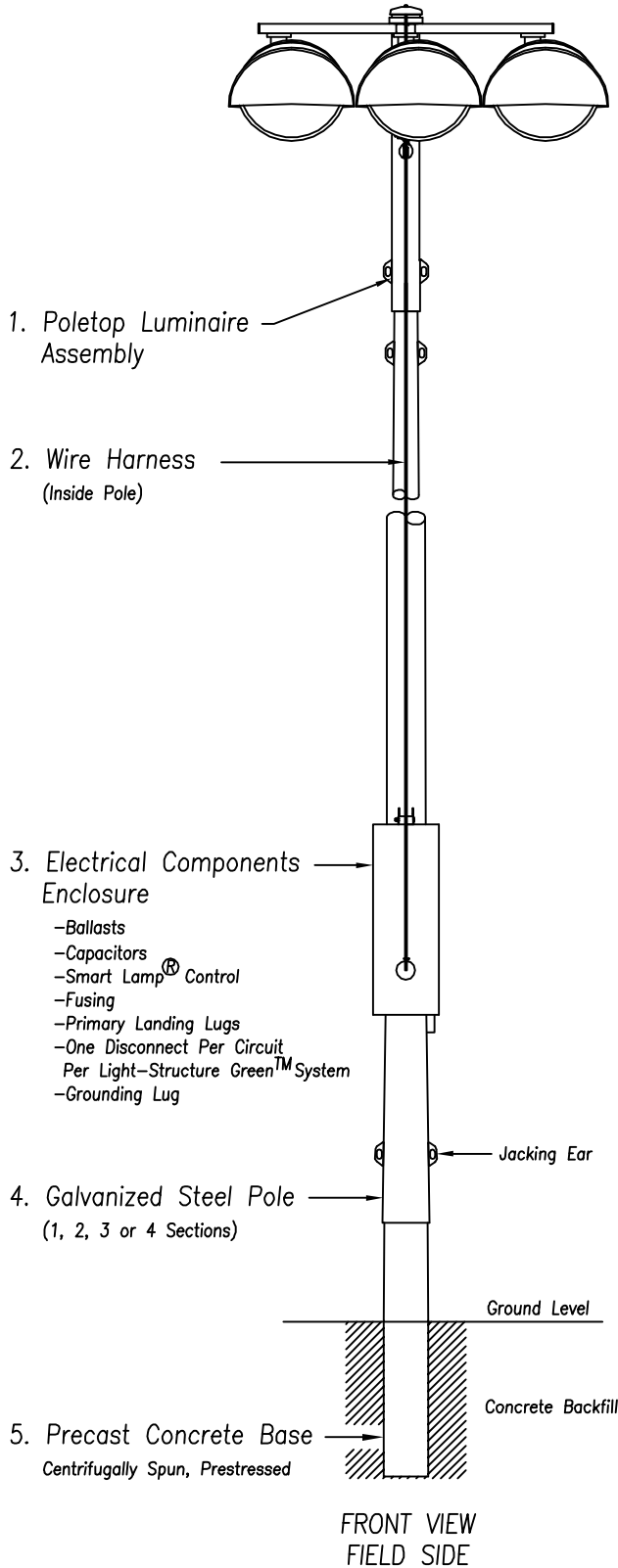
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Typical Light-Structure Green™ System Detail – 3 Luminaires

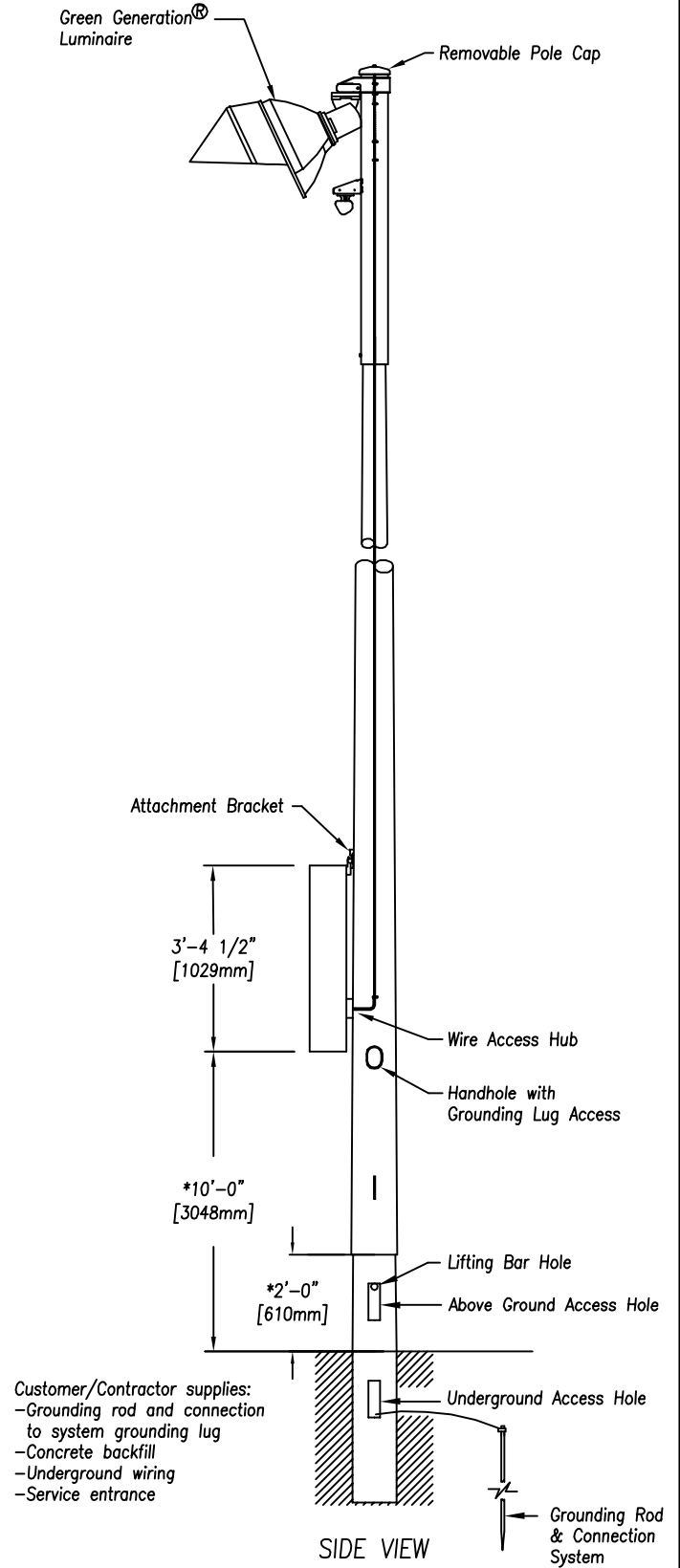
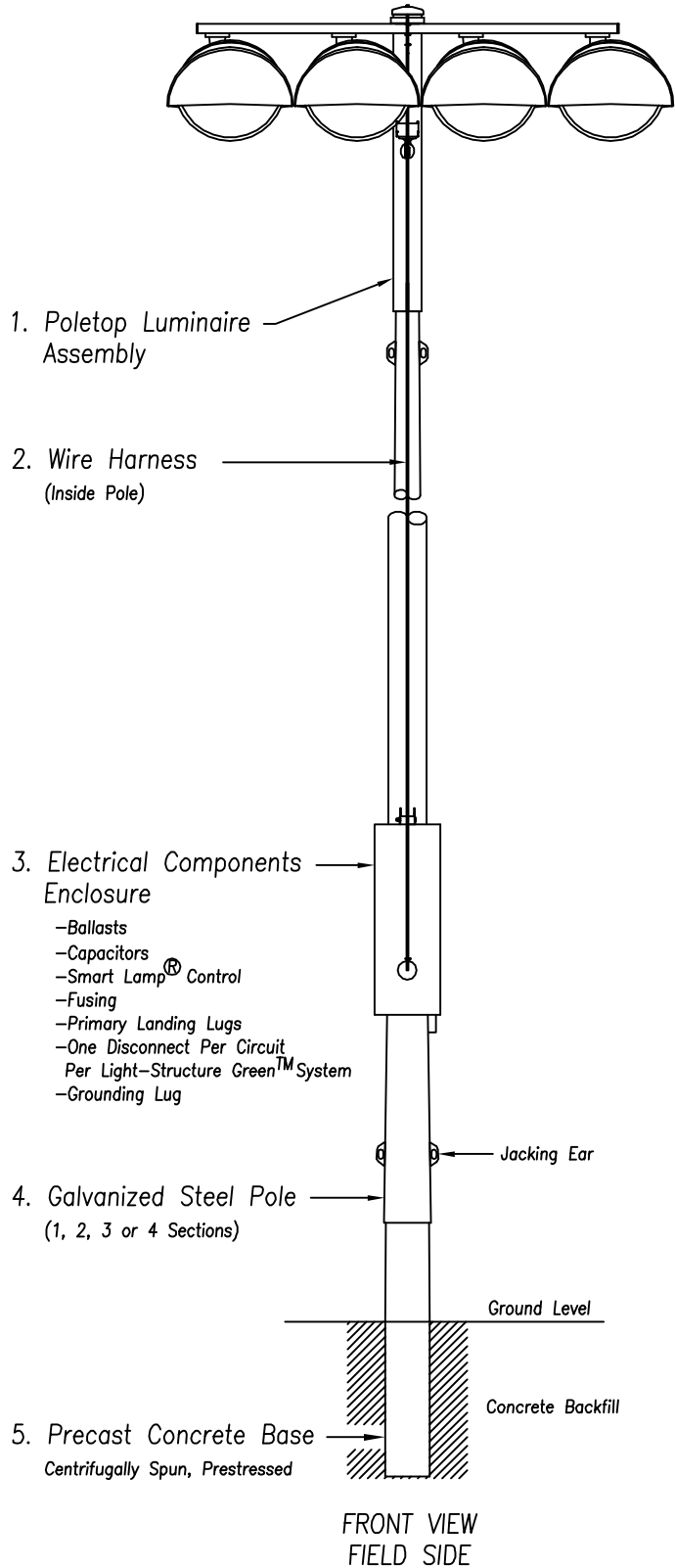


Notes:

1. This drawing is not to scale.
2. * This dimension for reference only. Variances may occur depending on steel pole tolerances, concrete tolerances, galvanizing thickness, hole depth accuracy.
3. Musco provides a base installation bar, an installation level modified for taper, and installation wedges.
4. Provisions for auxiliary equipment such as speaker or security lighting can be incorporated.
5. Copyright 1991, 2007, 2008 Musco Lighting. Patents issued and pending.

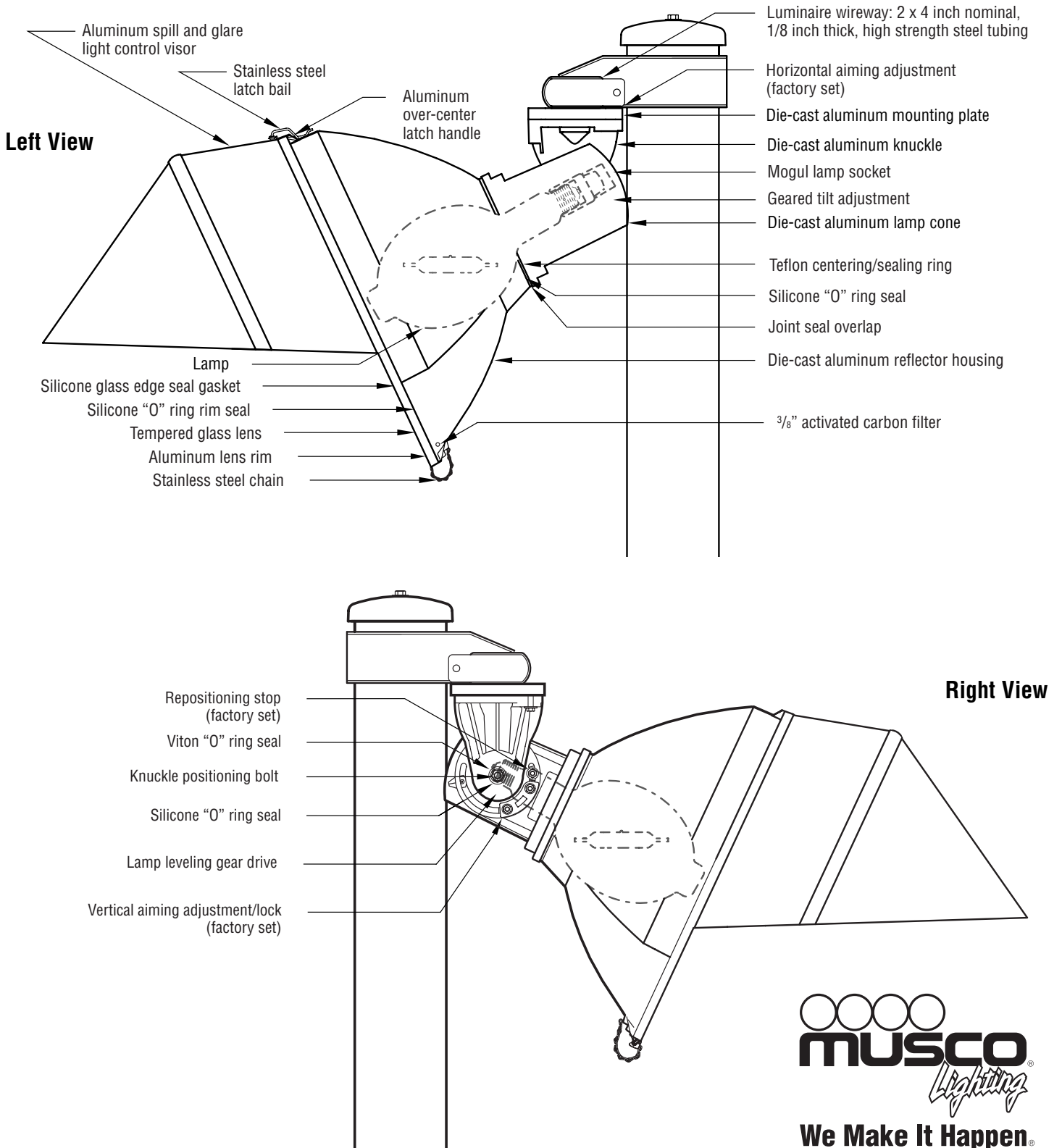


Typical Light-Structure Green™ System Detail – 4 Luminaires



Notes:

1. This drawing is not to scale.
2. * This dimension for reference only. Variances may occur depending on steel pole tolerances, concrete tolerances, galvanizing thickness, hole depth accuracy.
3. Musco provides a base installation bar, an installation level modified for taper, and installation wedges.
4. Provisions for auxiliary equipment such as speaker or security lighting can be incorporated.
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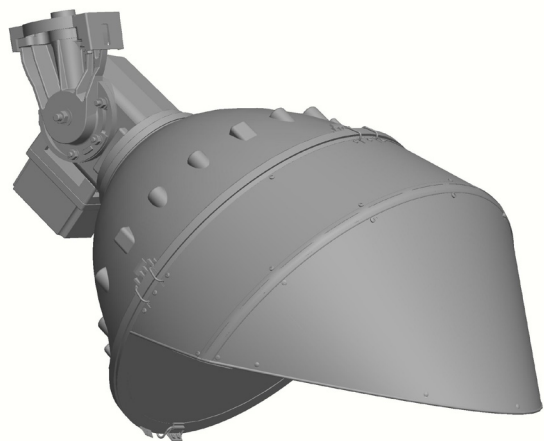
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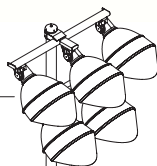
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400W Pulse-Start Luminaire

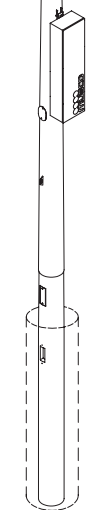
Technical Data Sheet



Poletop Luminaire Assembly



400W Security Fixtures



Luminaire Data

Weight40 lbs
 UL Listing Number..... E33316

Structural Strength

Luminaire assembly will withstand forces of 150 MPH wind without damage or misalignment to assembly

Finishes

Powder-coat painted die-cast aluminum knuckle cone and reflector with stainless steel fasteners.

Lamp Data — MH 400W Pulse-Start

Physical Characteristics

Burning PositionHorizontal +/- 75 Degrees
 Bulb Designation..... E037
 ANSI Designation..... M133, M135E
 Nominal Bulb Diameter4.6 Inches (120 mm)
 Nominal Light Center Length (LCL)7.0 Inches (178 mm)
 Maximum Overall Length (MOL)11.5 Inches (292 mm)
 Nominal Arc Length4.29 Inches (109 mm)
 Maximum Bulb Temperature 400° C (1742 F)
 Maximum Base Temperature 210° C (842 F)

Electrical Characteristics

Nominal Lamp Watts 400
 Nominal Lamp Volts 135
 Lamp Current..... 3.2 Amps
 Min. Open Circuit Voltage (RMS)254 volts
 Min/Max Starting Pulse (Peak V)..... 3000-4000
 Min. Pulse Width at 2700V (u sec)..... 1
 Min. Pulse Rate per ½ cycle 1
 Pulse Position (min % OCV Peak) 90

Photometric Characteristics

Initial Lumens 40,000
 Mean Lumens 32,000
 Average Rated Life..... 20,000+
 CIE Correlated Color Temperature4000 Degrees Kelvin
 Color Rendering Index (CRI) 68
 Typical Warm Up Time 2 – 3 Minutes
 CIE Chromacity X - 0.385
 Coordinates Y - 0.390
 Typical Hot Restrike Time 4 – 6 Minutes



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400W Pulse-Start Luminaire

Technical Data Sheet

400 Watt Metal Halide Lamp – 60Hz

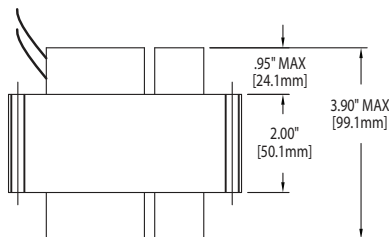
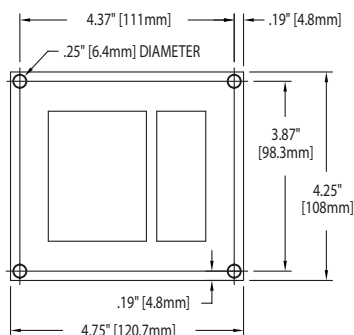
ANSI Code M135, M155/E

Constant Wattage Autotransformer (CWA)
208 – 480 volts, 60 Hz

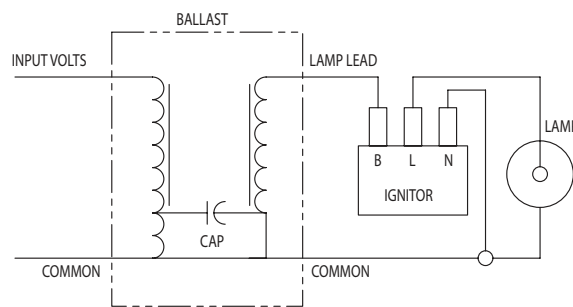
Input Volts	208	240	277	347	480
Power Factor (minimum)	90%				
Regulation					
Line Volts	±10%				±10%
Lamp Watts	±10%				±9%
Line Current (Amperes)					
Operating (min/max)	2.25	2.00	1.70	1.40	1.00
Open Circuit	–	–	–	–	–
Starting (max)	2.05	1.85	1.55	1.20	0.80
UL Temperature Ratings					
Insulation Class	H (180 deg. C)				
Coil Temperature Code 1029	C	D	D	D	D
Min. Ambient Starting Temperature	-20°F or -30°C	-20°F or -30°C	-20°F or -30°C	-20°F or -30°C	-20°F or -30°C
Nominal Open Circuit Voltage	250			280	250
Input Voltage at Lamp Dropout	130	145	170	173	290
Input Watts (nominal)	450			453	
Fuse Rating (amperes)	6	5	5	4	3
Testing Procedures					
High Potential Test (volts)					
1 minute	1600	1600	1600	2000	2000
1 second	1900	1900	1900	2500	2400
Open Circuit Voltage Test (volts)	225 – 270			250 – 310	225 – 275
Short-Circuit Current Test (Amps)					
Secondary Current	3.50 – 4.30				3.45 – 4.25
Input Current	1.60 – 2.40	1.45 – 2.15	1.25 – 1.85	0.90 – 1.40	0.65 – 0.95
Catalog Number	SC-841	SC-841	SC-841	SC-842	SC-840

Ballast Dimensions

Weight = 11 lbs.
[5kg]



Typical Wiring

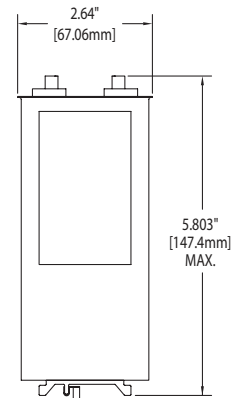
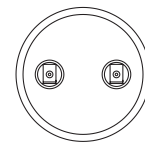


Notes:

1. CSA not applicable for 480 volt ballast.
2. Complies with the Energy Independence and Security Act of 2007 and California Title 20 Appliance Efficiency Regulations.

Capacitor Rating:

Minimum Withstand Voltage 525





Switch Start MH Std 400W/540 Mog ED37 CL

Product family description
Range of Switch Start quartz metal halide lamps for long life and high efficiency.

Features/Benefits

- Long life - up to 20,000 hours.
- Up to 100 lumens per watt.

Applications

- Ideal for industrial and retail high/low bays, and parking lots.

Notes

- Color characteristics may vary somewhat from one lamp type to another. Time should be allowed for the lamp to stabilize in color when it is turned on for the first time or if for any reason its operating position is changed. This may require several hours' operation, with more than one start. Lamp color and output may change temporarily if the lamp is subjected to excess vibration or shock. Lamp color characteristics may change after long accumulate operating time. (372)
- Rated average life is the life obtained, on the average, from large representative groups of lamps in laboratory tests under controlled conditions at 10 or more operating hours per start. It is based on survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary considerably from the average. For lamps with a rated average life of 24,000 hours, life is based on survival of 67% of the lamps. (351)
- Rated average life hours for universal lamps is based on vertical operating position. Operating these lamps in other position will reduce the life by approximately 25% of the rated average life hours.
- Approximate lumen values listed are for vertical operation of the lamp. (352)
- Means Lumens is the approximate lumen output at 40% of lamp rated average life. (353)
- Heat resisting glass bulb.

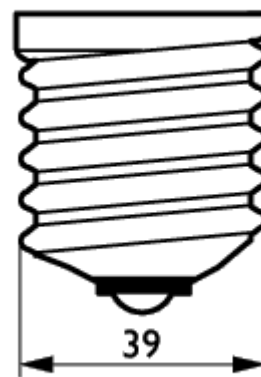
Product data

Product Number	344150
Full product name	Switch Start MH Std 400W/540 Mog ED37 CL
Ordering Code	MH400/U
Pack type	1 Sleeve Open End
Pieces per Sku	1
Skus/Case	6
Pack UPC	046677344153

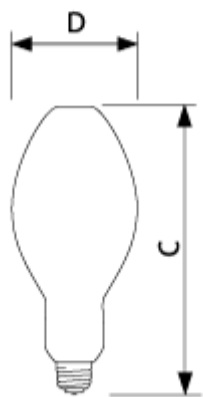
Product data	
EAN2US	
Case Bar Code	50046677344158
Successor Product number	
Base	Mogul [Single Contact Mogul Screw]
Base Information	Brass [Brass Base]
Bulb	ED37
Bulb Material	Hard Glass
Bulb Finish	Clear
Operating Position	Universal [Any or Universal (U)]
Packing Type	1SL [1 Sleeve Open End]
Packing Configuration	6
RatedAvgLife(See Family Notes)	20000 hr
Ordering Code	MH400/U
Pack UPC	046677344153
Case Bar Code	50046677344158
Energy Saving	Not Applicable
ANSI Code HID	M59/S
Watts	400W
Lamp Voltage	135 V
Mercury (Hg) Content	52 mg
Color Code	540 [CCT of 4000K]
Color Rendering Index	65 Ra8
Color Designation	Cool White
Color Temperature	4000 K
Initial Lumens	37000 Lm
Design Mean Lumens	24000 Lm
Light Center Length L	7 in
Max Overall Length (MOL) - C	11.5 in
Diameter D	4.625 in
Product Number	344150



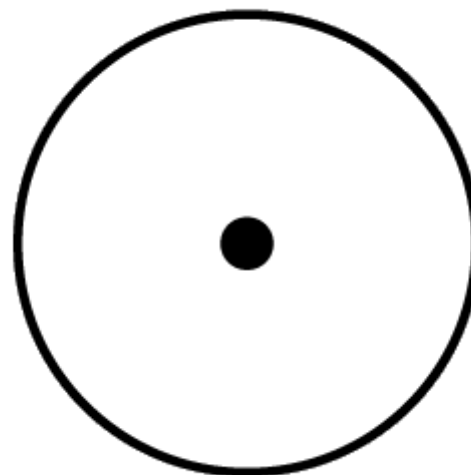
SS MH Std ED37 CL



Cap- Base E39

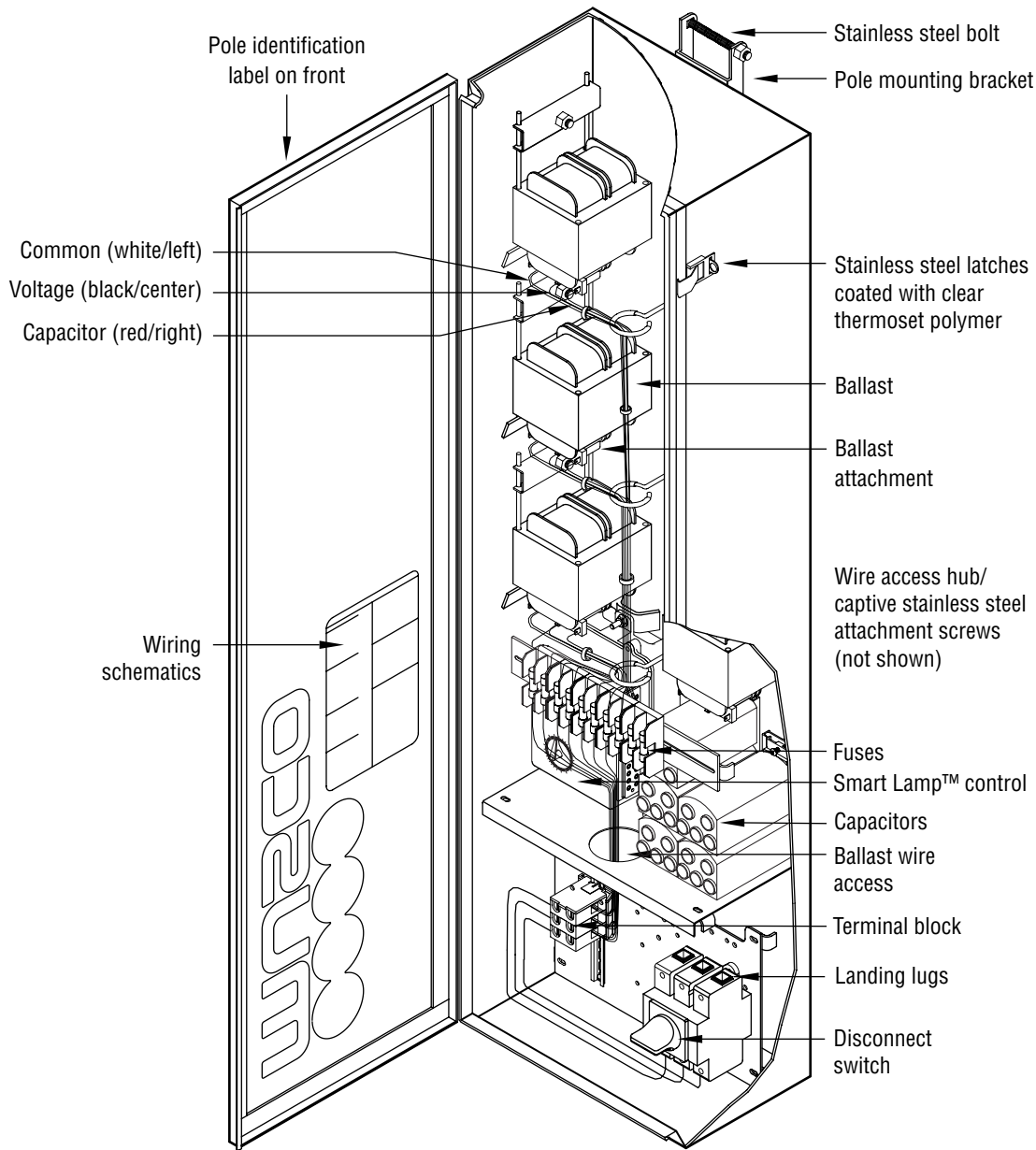


SS MH Std ED37



Operating Position any





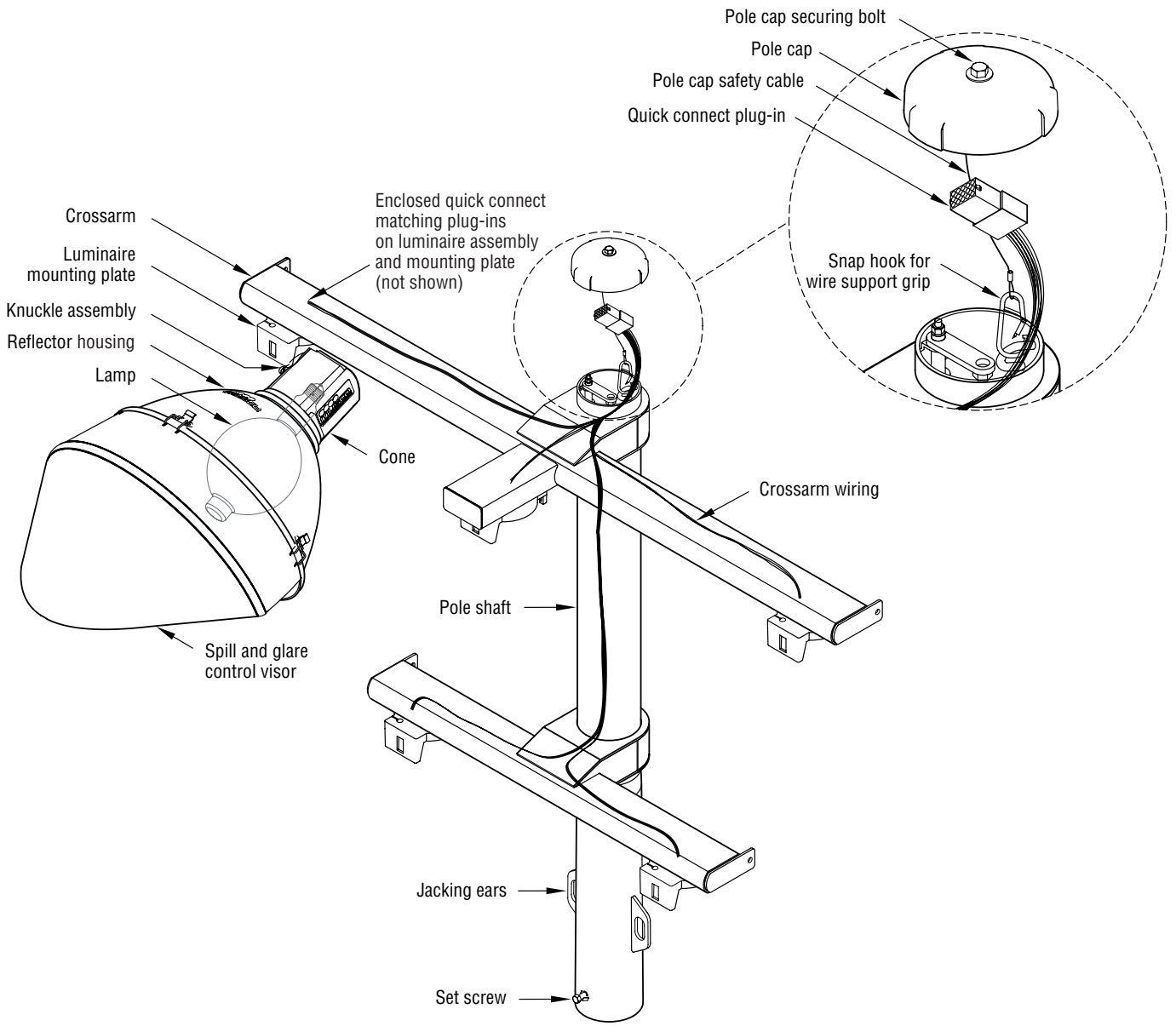
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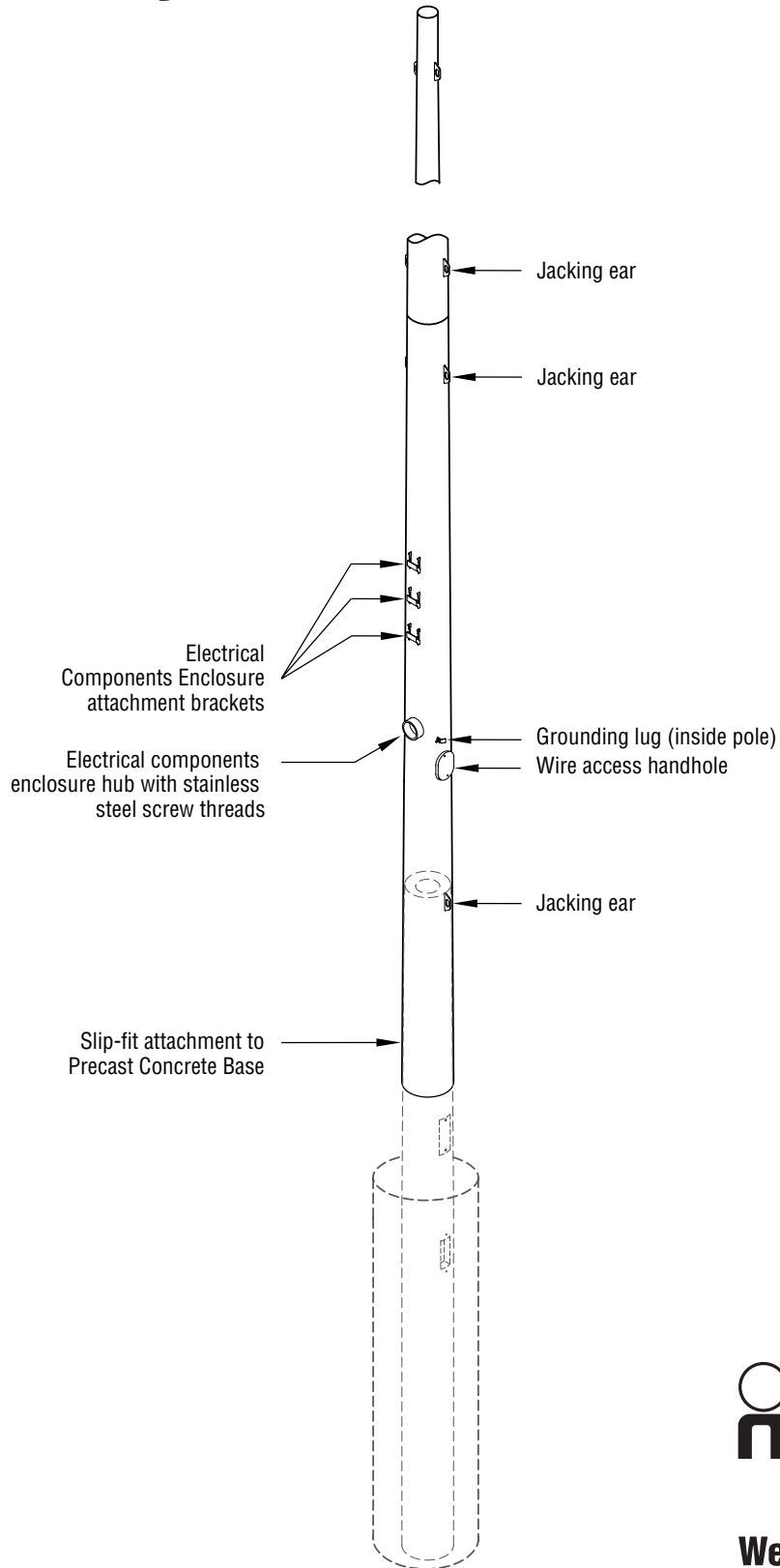
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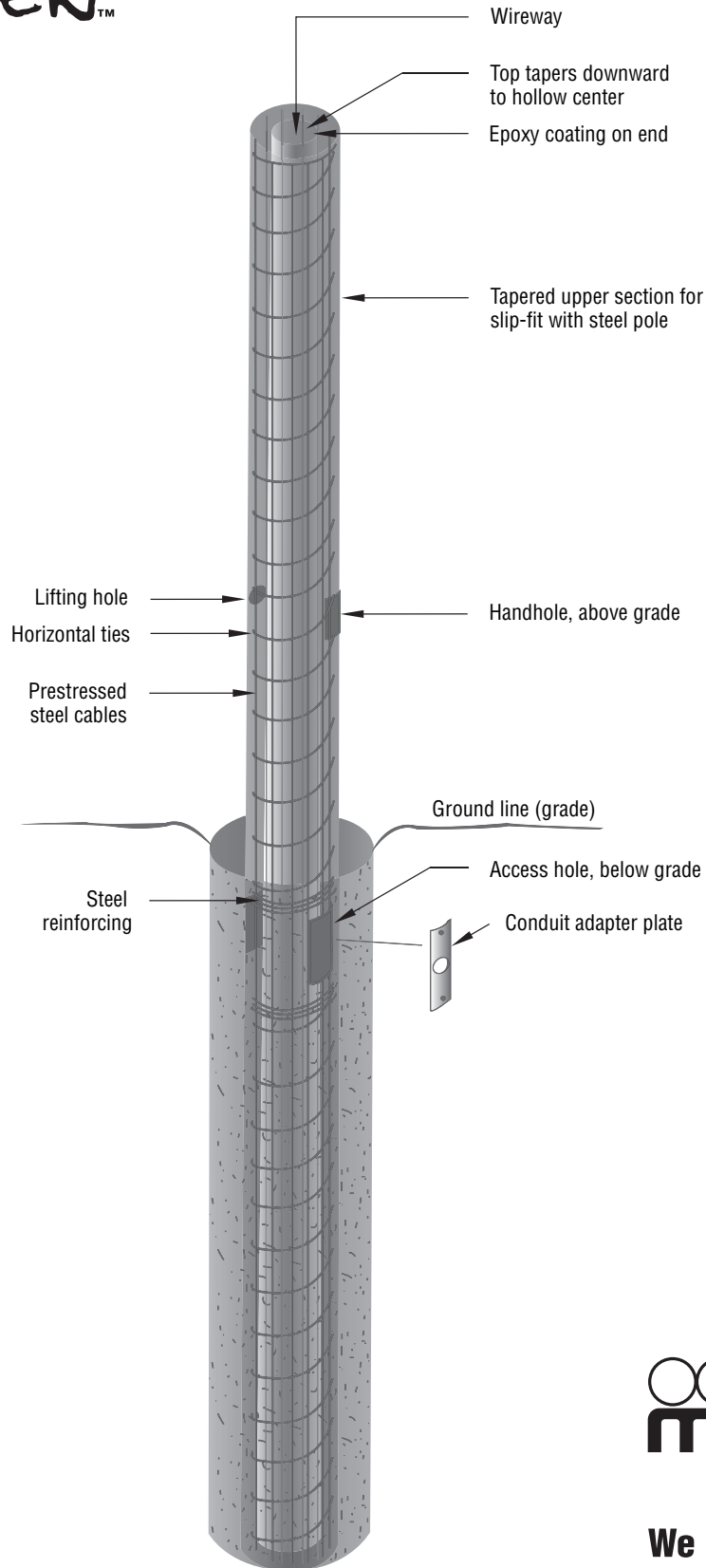
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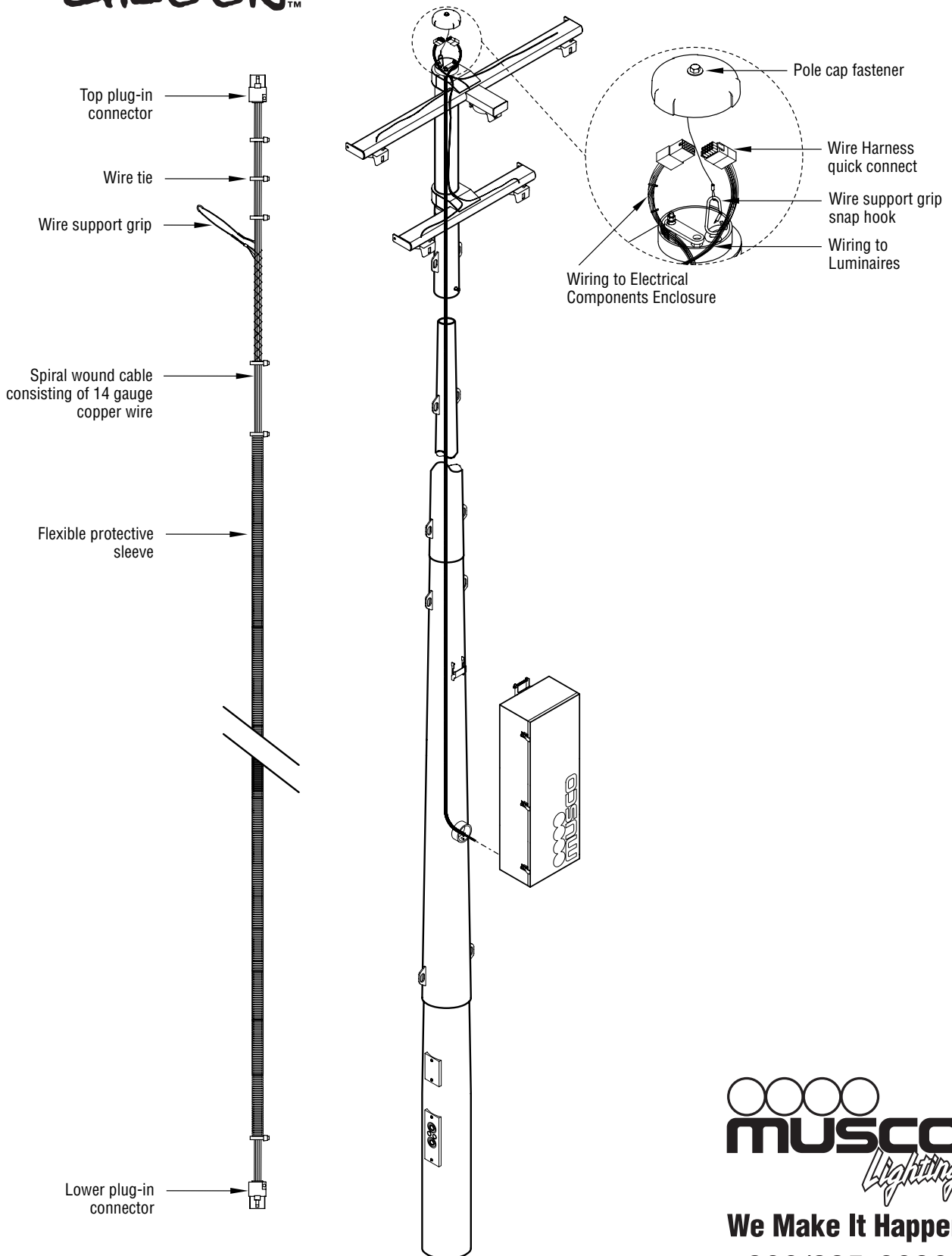
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Corrosion Protection

Manufacturers Certification Of Corrosion Protection

All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion.

All exposed steel shall be hot dip galvanized per ASTM A123. All exposed hardware and fasteners shall be stainless steel of at least 18-8 grade, passivated and polymer coated to prevent possible galvanic corrosion to adjoining metals.

All exposed aluminum shall be powder coated with high performance polyester. All exterior reflective inserts shall be anodized, coated with a clear, high gloss, durable fluorocarbon, and protected from direct environmental exposure to prevent reflective degradation or corrosion.

All wiring shall be enclosed within the crossarms, pole, or electrical components enclosure.

Musco Sports Lighting, LLC

A handwritten signature in cursive script that reads "Carol Ebeling".

Carol Ebeling
Manufacturing Engineer

NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

2005-01-04

Mr. Gary Bentrim
Musco Sports-Lighting Inc
2107 Stewart Rd Po Box 14
Muscatine IA 52761
United States

E-mail: lighting@musco.com

Reference: File E33316 Project 04NK28715 P.O. Number 4065-6050

Product(s): USL/CNL- Model SC2 Luminaire and Smart Lamp Fitting

Dear Mr. Bentrim,

UL's investigation of your product has been completed under the above project number and the subject product was determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Listing Mark only at the factory under UL's Follow-Up Service Program to the subject product(s), which is (are) constructed as described below:

According to your letter dated 8/31/2004.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent to the indicated manufacturing locations in the near future. Please note that Follow-Up Services Procedures are sent to the manufacturers only unless the Applicant specifically requests this document.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL's requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL's requirements and continued use of the UL Mark may be withdrawn.

Sincerely,



Maria N. Molina-Marrero
Senior Project Engineer
Department: 3018CNBK
Tel: 847-664-2482
Fax: 847-313-2482
E-mail: Maria.N.Molina-Marrero@us.ul.com

Reviewed by:



Walter G. Daus
Staff Engineer
Department: 3018CNBK
E-mail: walter.g.daus@us.ul.com



**MUSCO SPORTS LIGHTING, LLC
Light Structure Pole Standard**

This confidential report is provided exclusively for the use of engineering approval. The technical information provided herein is the confidential property of Musco Sports Lighting, LLC and reproduction of this report or use of this information for anything other than its limited, intended purpose as to this project, without the written permission of Musco Sports Lighting, LLC is prohibited.

ITEM:
**Structural Calculations
Pole Standard**

PROJECT:
**Wrangell Marine Service Center
Field Lighting
Wrangell, Alaska**

PROJECT #:
149046

DATE:
March 21, 2011

ENGINEER:
**Structural Engineers, P.C.
114 Nicholas Drive
Marshalltown, IA 50158**



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Kyle G. Lacina 3-21-2011

Kyle G. Lacina, P.E. – No. 14458 Date
License Renewal Date: December 31, 2011

MUSCO SPORTS LIGHTING, LLC
Light Structure Pole Standard, LS Series

Calculation Index

Material	Page Reference
Wind Design Criteria (LSS70B)	1
Pole Analysis (LSS70B w/ 4 Fixtures)	2-9
Precast Pier (By Others)	10

CODE REFERENCE:

AASHTO 2009

Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 2009 Edition,
American Association of State Highway and Transportation Officials (AASHTO), Washington D.C.

ASCE 7-05

Minimum Design Loads for Buildings and Other Structures
American Society of Civil Engineers (ASCE), New York, New York

IBC 2009

International Building Code 2009
International Code Council, Inc., Washington, DC

MUSCO SPORTS LIGHTING, LLC
Wind Design Criteria

Pole: LSS70B

Code: IBC 2009 (ASCE 7-05)

Wind Category: V = 110 mph
Exposure Category C

Wind Design Pressures:

Elev. (ft)	K _z	q _z (psf)	G _f	C _f	F / A _f (psf)
0-15	0.849	24.98	1.24	0.70	21.73
20	0.902	26.54	1.24	0.70	23.08
25	0.945	27.82	1.24	0.70	24.19
30	0.982	28.90	1.24	0.70	25.14
40	1.044	30.71	1.24	0.70	26.71
50	1.094	32.19	1.24	0.70	27.99
60	1.137	33.45	1.24	0.70	29.09
70	1.174	34.55	1.24	1.20	51.51
80	1.208	35.53			
90	1.238	36.43			
100	1.266	37.24			
120	1.315	38.70			
140	1.359	39.98			
160	1.397	41.12			
180	1.432	42.15			
200	1.464	43.09			

Wind Design Parameters:

$q_z = 0.00256 * K_z * K_{zt} * K_d * V^2 * I$ (Eq. 6-15)

$K_z =$ As listed above. (Sec. 6.5.6.6 & Table 6-3)

$K_{zt} =$ 1.00 (Sec. 6.5.7.2 & Fig. 6-4)

$K_d =$ 0.95 (pole) (Sec. 6.5.4.4 & Table 6-4)
0.85 (attachments)

$I =$ 1.00 (Table 1-1 & Table 6-1)

$F = q_z * G_f * C_f * A_f$ (Eq. 6-28)

$G_f =$ 1.24 (Sec. 6.5.8)

$C_f =$ As listed above for pole. (For Pole, Fig. 6-21)
1.00 (For Fixtures - included in EPA)

MUSCO SPORTS LIGHTING, LLC

Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

Wind loading in accordance with: IBC 2009 (ASCE 7-05)

Light Structure Catalog No.	=	LSS70B	
Number of Fixtures	=	4	
Fixture Arrangement	=	(4)	
Platforms	=	NA	
EPA of Fixtures & Accessories	=	8.0	sq ft
Weight of Dressed Pole	=	1584	lb
Pole Natural Frequency	=	0.529	Hz
Pole Damping Ratio	=	0.025	
Allowable Stress Increase, ASI	=	1.00	
Wind Speed	=	110	mph
Exposure Category	=	C	
Importance Factor	=	1.00	
Topographic Factor	=	1.00	

Light Structure Data:

Mounting Section Yield Stress	=	38	ksi
Extension No. 2 Yield Stress	=	NA	
Extension No. 1 Yield Stress	=	NA	
Top Section Yield Stress	=	55	ksi
Bottom Section Yield Stress	=	55	ksi

MUSCO SPORTS LIGHTING, LLC

Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

Element Forces* (D + W)				
Elev. (ft)	M (ft-k)	V (kips)	P (kips)	T (ft-k)
70.947	0.000	0.000	0.000	0.000
70	0.236	0.474	0.241	0.485
69	0.777	0.504	0.250	0.485
68	1.349	0.535	0.259	0.485
67	1.953	0.565	0.270	0.485
66	2.592	0.596	0.293	0.485
65	3.264	0.627	0.310	0.485
64	3.970	0.658	0.324	0.485
63	4.705	0.683	0.338	0.485
62	5.465	0.701	0.353	0.485
61	6.245	0.720	0.369	0.485
60	7.047	0.740	0.385	0.485
59	7.870	0.760	0.401	0.485
58	8.716	0.781	0.417	0.485
57	9.584	0.801	0.435	0.485
56	10.47	0.823	0.452	0.485
55	11.39	0.844	0.470	0.485
54	12.33	0.866	0.488	0.485
53	13.29	0.889	0.507	0.485
52	14.27	0.912	0.526	0.485
51	15.28	0.935	0.545	0.485
50	16.32	0.959	0.565	0.485
49	17.38	0.983	0.586	0.485
48	18.46	1.007	0.606	0.485
47	19.57	1.032	0.628	0.485
46	20.71	1.057	0.649	0.485
45	21.87	1.082	0.671	0.485
44	23.06	1.108	0.693	0.485
43	24.28	1.134	0.716	0.485
42	25.52	1.161	0.742	0.485
41	26.79	1.187	0.789	0.485
40	28.09	1.214	0.835	0.485
39	29.42	1.241	0.859	0.485
38	30.78	1.268	0.883	0.485
37	32.16	1.295	0.907	0.485
36	33.57	1.322	0.931	0.485
35	35.01	1.349	0.956	0.485
34	36.47	1.377	0.981	0.485
33	37.96	1.405	1.007	0.485
32	39.48	1.433	1.033	0.485
31	41.02	1.461	1.060	0.485
30	42.60	1.490	1.087	0.485
29	44.20	1.519	1.114	0.485
28	45.82	1.548	1.142	0.485
27	47.48	1.577	1.170	0.485
26	49.16	1.607	1.198	0.485
25	50.87	1.637	1.227	0.485
24	52.60	1.666	1.257	0.485
23	54.37	1.696	1.287	0.485
22	56.16	1.726	1.317	0.485

* Includes second order effects factor 1.45 - AASHTO 2009, Sect. 4.8.2

MUSCO SPORTS LIGHTING, LLC

Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

Element Forces* (continued) (D + W)				
Elev. (ft)	M (ft-k)	V (kips)	P (kips)	T (ft-k)
21	57.98	1.757	1.347	0.485
20	59.83	1.787	1.379	0.485
19	61.70	1.817	1.410	0.485
18	63.61	1.848	1.442	0.485
17	65.54	1.878	1.474	0.485
16	67.50	1.909	1.507	0.485
15	69.48	1.939	1.540	0.485
14	71.49	1.970	1.573	0.485
13	73.53	2.001	1.607	0.485
12	75.60	2.032	1.641	0.485
11	77.69	2.064	1.676	0.485
10	79.82	2.096	2.001	0.485
9	81.97	2.128	2.037	0.485
8	84.16	2.161	2.073	0.485
7	86.37	2.194	2.109	0.485
6	88.60	2.228	2.146	0.485
5	90.87	2.261	2.183	0.485
4	93.16	2.296	2.220	0.485
3	95.49	2.330	2.258	0.485
2	97.84	2.365	2.297	0.485

* Includes second order effects factor 1.45 - AASHTO 2009, Sect. 4.8.2

MUSCO SPORTS LIGHTING, LLC

Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

Actual & Allowable Stresses									(D+W)
Elev. (ft)	f _a (ksi)	F _a (ksi)	F _{a-csr} (ksi)	f _b (ksi)	F _b (ksi)	f _v (ksi)	F _v (ksi)	CSR	CSR/ ASI
70.947	0.000	0.493	22.80	0.000	25.08	0.000	12.54	0.000	0.000
70	0.094	0.493	22.80	0.967	25.08	1.291	12.54	0.053	0.053
69	0.096	0.493	22.80	3.093	25.08	1.285	12.54	0.138	0.138
68	0.098	0.493	22.80	5.231	25.08	1.281	12.54	0.223	0.223
67	0.101	0.493	22.80	7.378	25.08	1.276	12.54	0.309	0.309
66	0.108	0.493	22.80	9.539	25.08	1.273	12.54	0.395	0.395
65	0.080	0.493	33.00	8.776	36.30	0.907	18.15	0.247	0.247
64	0.081	0.493	33.00	10.06	36.30	0.881	18.15	0.282	0.282
63	0.082	0.493	33.00	11.26	36.30	0.855	18.15	0.315	0.315
62	0.084	0.493	33.00	12.37	36.30	0.828	18.15	0.345	0.345
61	0.085	0.493	33.00	13.39	36.30	0.803	18.15	0.373	0.373
60	0.086	0.493	33.00	14.34	36.30	0.780	18.15	0.399	0.399
59	0.088	0.493	33.00	15.21	36.30	0.759	18.15	0.423	0.423
58	0.089	0.493	33.00	16.02	36.30	0.740	18.15	0.446	0.446
57	0.090	0.493	33.00	16.78	36.30	0.722	18.15	0.466	0.466
56	0.092	0.493	33.00	17.48	36.30	0.706	18.15	0.486	0.486
55	0.093	0.493	33.00	18.14	36.30	0.690	18.15	0.504	0.504
54	0.095	0.493	33.00	18.76	36.30	0.676	18.15	0.521	0.521
53	0.096	0.493	33.00	19.34	36.30	0.663	18.15	0.537	0.537
52	0.098	0.493	33.00	19.89	36.30	0.651	18.15	0.552	0.552
51	0.099	0.493	33.00	20.41	36.30	0.640	18.15	0.566	0.566
50	0.101	0.493	33.00	20.90	36.30	0.630	18.15	0.580	0.580
49	0.102	0.493	33.00	21.36	36.30	0.620	18.15	0.593	0.593
48	0.104	0.493	33.00	21.81	36.30	0.612	18.15	0.605	0.605
47	0.106	0.493	33.00	22.23	36.30	0.603	18.15	0.617	0.617
46	0.107	0.493	33.00	22.63	36.30	0.596	18.15	0.628	0.628
45	0.109	0.493	33.00	23.01	36.30	0.589	18.15	0.638	0.638
44	0.110	0.493	33.00	23.38	36.30	0.582	18.15	0.648	0.648
43	0.112	0.493	33.00	23.73	36.30	0.576	18.15	0.658	0.658
42	0.114	0.493	33.00	24.07	36.30	0.570	18.15	0.668	0.668
41	0.119	0.493	33.00	24.40	36.30	0.565	18.15	0.677	0.677
40	0.124	0.493	33.00	24.72	36.30	0.560	18.15	0.686	0.686
39	0.131	0.493	33.00	27.33	36.30	0.589	18.15	0.758	0.758
38	0.132	0.493	33.00	27.61	36.30	0.583	18.15	0.766	0.766
37	0.133	0.493	33.00	27.88	36.30	0.578	18.15	0.773	0.773
36	0.135	0.493	33.00	28.14	36.30	0.573	18.15	0.780	0.780
35	0.136	0.493	33.00	28.38	36.30	0.569	18.15	0.787	0.787
34	0.137	0.493	33.00	28.62	36.30	0.565	18.15	0.794	0.794
33	0.139	0.493	33.00	28.85	36.30	0.561	18.15	0.800	0.800
32	0.140	0.493	33.00	29.07	36.30	0.557	18.15	0.806	0.806
31	0.142	0.493	33.00	29.28	36.30	0.554	18.15	0.812	0.812
30	0.143	0.493	33.00	29.49	36.30	0.551	18.15	0.818	0.818
29	0.144	0.493	33.00	29.68	36.30	0.548	18.15	0.823	0.823
28	0.146	0.493	33.00	29.88	36.30	0.545	18.15	0.828	0.828
27	0.147	0.493	33.00	30.06	36.30	0.543	18.15	0.833	0.833
26	0.149	0.493	33.00	30.24	36.30	0.540	18.15	0.838	0.838
25	0.150	0.493	33.00	30.42	36.30	0.538	18.15	0.843	0.843
24	0.152	0.493	33.00	30.58	36.30	0.536	18.15	0.848	0.848
23	0.153	0.493	33.00	30.75	36.30	0.534	18.15	0.853	0.853
22	0.155	0.493	33.00	30.91	36.30	0.533	18.15	0.857	0.857

MUSCO SPORTS LIGHTING, LLC

Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

Actual & Allowable Stresses (continued)									(D+W)
Elev. (ft)	f _a (ksi)	F _a (ksi)	F _{a-csr} (ksi)	f _b (ksi)	F _b (ksi)	f _v (ksi)	F _v (ksi)	CSR	CSR/ ASI
21	0.156	0.493	33.00	31.06	36.30	0.531	18.15	0.861	0.861
20	0.158	0.493	33.00	31.21	36.30	0.529	18.15	0.865	0.865
19	0.159	0.493	33.00	31.36	36.30	0.528	18.15	0.870	0.870
18	0.161	0.493	33.00	31.50	36.30	0.527	18.15	0.873	0.873
17	0.162	0.493	33.00	31.64	36.30	0.525	18.15	0.877	0.877
16	0.164	0.493	33.00	31.77	36.30	0.524	18.15	0.881	0.881
15	0.165	0.493	33.00	31.90	36.30	0.523	18.15	0.885	0.885
14	0.167	0.493	33.00	32.03	36.30	0.522	18.15	0.888	0.888
13	0.168	0.493	33.00	32.15	36.30	0.521	18.15	0.892	0.892
12	0.170	0.493	33.00	32.27	36.30	0.520	18.15	0.895	0.895
11	0.172	0.493	33.00	32.39	36.30	0.519	18.15	0.898	0.898
10	0.202	0.493	33.00	32.50	36.30	0.519	18.15	0.902	0.902
9	0.204	0.493	33.00	32.62	36.14	0.518	18.15	0.909	0.909
8	0.205	0.493	33.00	32.73	35.98	0.518	18.15	0.917	0.917
7	0.206	0.493	33.00	32.83	35.82	0.517	18.15	0.924	0.924
6	0.208	0.493	33.00	32.94	35.66	0.517	18.15	0.931	0.931
5	0.209	0.493	33.00	33.04	35.51	0.517	18.15	0.938	0.938
4	0.210	0.493	33.00	33.14	35.36	0.517	18.15	0.944	0.944
3	0.211	0.493	33.00	33.24	35.21	0.517	18.15	0.951	0.951
2	0.213	0.493	33.00	33.34	35.07	0.517	18.15	0.958	0.958

MUSCO SPORTS LIGHTING, LLC
 Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports
 for Highway Signs, Luminaires, and Traffic Signals

Ground Forces & Controlling Stress Ratios:

AASHTO Group Load II: (D + W)

		w/ 1.45 Factor		Actual Forces	
Shear at Ground	=	2.365	kips	1.631	kips
Total Moment at Ground	=	102.569	ft-k	70.737	ft-k
Precast Base Design Moment	=	106.031	ft-k	73.125	ft-k
P-delta Moment at Ground	=	5.030	ft-k	3.469	ft-k
Axial at Ground	=	2.297	kips	1.584	kips
Torque at Ground	=	0.485	ft-k	0.335	ft-k
Pole Max. Combined Stress Ratio	=	0.958			
w/ Allowable Stress Increase	=	0.958		OK	
Precast Base Strength Ratio	=	0.967		OK	
Deflection at Pole Top	=	62.26	in		
Allowable Deflection	=	124.10	in	OK	

MUSCO SPORTS LIGHTING, LLC

Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

Deflections (D+W)				
Elev. (ft)	Rel. Θ (deg)	Rel. Δ (in)	Glo. Θ (deg)	Glo. Δ (in)
70.947	0.004	1.615	8.091	62.26
70	0.018	1.703	8.086	60.65
69	0.036	1.697	8.069	58.94
68	0.055	1.687	8.032	57.25
67	0.072	1.674	7.978	55.56
66	0.079	1.658	7.905	53.89
65	0.081	1.641	7.827	52.23
64	0.089	1.622	7.746	50.59
63	0.096	1.603	7.656	48.97
62	0.102	1.581	7.560	47.36
61	0.107	1.559	7.458	45.78
60	0.112	1.536	7.350	44.22
59	0.115	1.512	7.239	42.69
58	0.118	1.487	7.124	41.17
57	0.121	1.461	7.006	39.69
56	0.123	1.436	6.885	38.23
55	0.124	1.409	6.762	36.79
54	0.126	1.383	6.638	35.38
53	0.127	1.356	6.512	34.00
52	0.127	1.329	6.386	32.64
51	0.128	1.302	6.258	31.31
50	0.128	1.275	6.130	30.01
49	0.129	1.248	6.002	28.74
48	0.129	1.220	5.873	27.49
47	0.129	1.193	5.744	26.27
46	0.129	1.166	5.615	25.07
45	0.129	1.139	5.486	23.91
44	0.128	1.112	5.358	22.77
43	0.128	1.085	5.229	21.66
42	0.128	1.058	5.101	20.57
41	0.127	1.031	4.973	19.52
40	0.136	1.003	4.846	18.49
39	0.144	0.973	4.710	17.48
38	0.143	0.943	4.567	16.51
37	0.142	0.913	4.424	15.57
36	0.141	0.883	4.282	14.65
35	0.140	0.854	4.140	13.77
34	0.139	0.824	4.000	12.92
33	0.138	0.795	3.861	12.09
32	0.137	0.766	3.723	11.30
31	0.136	0.738	3.586	10.53
30	0.135	0.709	3.449	9.792
29	0.134	0.681	3.314	9.083
28	0.133	0.653	3.180	8.402
27	0.132	0.625	3.047	7.750
26	0.131	0.597	2.914	7.125
25	0.131	0.569	2.783	6.528
24	0.130	0.542	2.652	5.958
23	0.129	0.515	2.523	5.416
22	0.128	0.488	2.394	4.901

MUSCO SPORTS LIGHTING, LLC

Analysis in accordance with AASHTO 2009 Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

Deflections (continued) (D+W)				
Elev. (ft)	Rel. Θ (deg)	Rel. Δ (in)	Glo. Θ (deg)	Glo. Δ (in)
21	0.127	0.462	2.266	4.413
20	0.126	0.435	2.139	3.951
19	0.125	0.409	2.013	3.516
18	0.124	0.383	1.888	3.108
17	0.123	0.357	1.764	2.725
16	0.122	0.331	1.641	2.368
15	0.122	0.305	1.518	2.038
14	0.121	0.280	1.397	1.732
13	0.120	0.255	1.276	1.452
12	0.119	0.230	1.156	1.198
11	0.118	0.205	1.037	0.968
10	0.118	0.180	0.919	0.763
9	0.117	0.156	0.801	0.583
8	0.116	0.131	0.685	0.427
7	0.115	0.107	0.569	0.296
6	0.114	0.083	0.453	0.189
5	0.114	0.059	0.339	0.106
4	0.113	0.035	0.225	0.047
3	0.112	0.012	0.112	0.012
2	0.000	0.000	0.000	0.000

CRETEX CONCRETE PRODUCTS NORTH, INC.

SCOPE: Analysis of an annular prestressed concrete pole member based on compatible strain procedure per ACI-318-08* with an ultimate concrete strain of 0.003.

PROJECT: Musco Standard Pole Base
 DATE: Feb-11-2009 4:51 PM
 POLE TYPE: 3B
 PROGRAM VERSION 2.0

USER DEFINED INPUTS

CROSS-SECTION OUTER DIAMETER, D_o	D_o	=	13.32 in	[33.82 cm]
HOLLOW CORE INSIDE DIAMETER, D_i	D_i	=	6.13 in	[15.56 cm]
TENDON CIRCLE DIAMETER, D_t	D_t	=	10.63 in	[26.99 cm]
NUMBER OF TENDONS, N (56 or less and even)	N	=	12	
TENDON DIAMETER, d_t	d_t	=	0.5 in	[1.27 cm]
NOMINAL TENDON AREA, A_{ps}	A_{ps}	=	0.153 in ²	[0.988 cm ²]
ULTIMATE TENDON STRENGTH, f_{du}	f_{du}	=	270 ksi	[1860 MPa]
TENDON YIELD STRENGTH, f_{dy}	f_{dy}	=	230 ksi	[1590 MPa]
CONCRETE COMPRESSIVE STRENGTH, f'_c	f'_c	=	9500 psi	[65.5 MPa]
MODULUS OF ELASTICITY (STEEL), E_s	E_s	=	29000 ksi	[200000 MPa]
INITIAL PRESTRESS FACTOR, IPF	IPF	=	0.64	
PRESTRESS LOSS FACTOR, PLF	PLF	=	0.82	
*PHI FACTOR CALCULATED PER ACI-318-99 OR ACI-318-08:	ACI-318-99			

OUTPUT

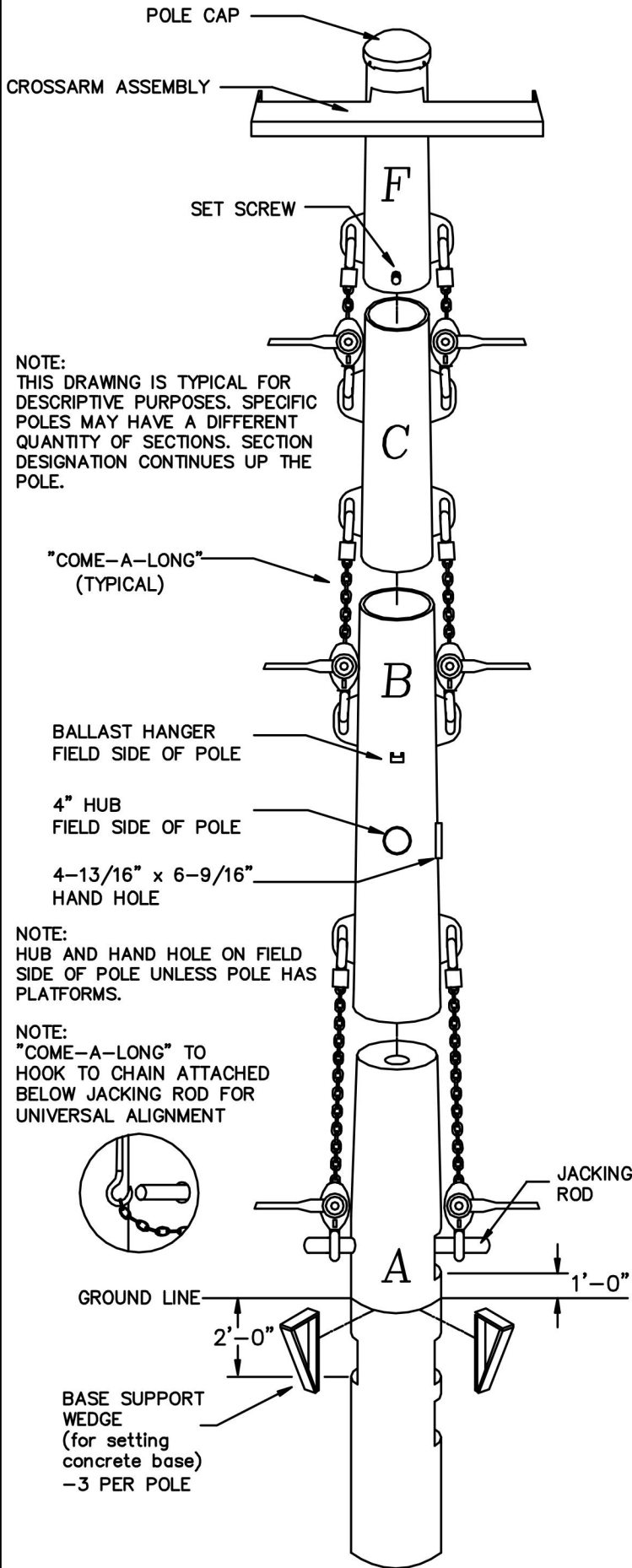
PHI FACTOR, Φ	Φ	=	0.90	
PRESTRESSING STRAIN IN TENDON, ϵ_{ps}	ϵ_{ps}	=	0.005	
CONCRETE SERVICE STRESS DUE TO PRESTRESS		=	2369 psi	[16.33 MPa]
CROSS SECTIONAL AREA		=	110 in ²	[710 cm ²]
GROSS MOMENT OF INERTIA		=	1476 in ⁴	[61440 cm ⁴]
DISTANCE TO NEUTRAL AXIS FROM COMP. SIDE, c	c	=	6.15 in	[15.62 cm]
CONCRETE COMPRESSIVE FORCE, C_c	C_c	=	274 kips	[1219 kN]
AREA OF BONDED REINFORCEMENT		=	1.84 in ²	[11.87 cm ²]
MINIMUM BONDED REINF. AREA (ACI 18.9.2)		=	0.22 in ²	[1.42 cm ²]
SATISFIED				
REINFORCEMENT RATIO, ρ	ρ	=	0.021	
REINFORCEMENT INDEX, ω	ω	=	0.375	
MAXIMUM REINFORCEMENT INDEX (ACI 318-99, 18.8.1)		=	0.234	
EXCEEDED				
STRAND DEVELOPMENT LENGTH, ℓ_d	ℓ_d	=	39 in	[99.1 cm]

RESULTS

NOMINAL MOMENT CAPACITY, M_n	M_n	=	130 ft-k	[176 kN-m]
DESIGN MOMENT CAPACITY, ΦM_n	ΦM_n	=	117 ft-k	[159 kN-m]
CRACKING LOAD MOMENT (ACI 18.8.2), M_{cr}	M_{cr}	=	57 ft-k	[77 kN-m]
SATISFIED				

CONFIDENTIAL: The information contained in this design is proprietary to The Cretex Companies, Inc., and is being furnished for the use of the designer in connection with this particular project. The information contained herein is not to be transmitted to any other organization unless specifically authorized in writing by The Cretex Companies, Inc.

Version : LSG2011.1-A:14FEB2011



NOTE:
THIS DRAWING IS TYPICAL FOR
DESCRIPTIVE PURPOSES. SPECIFIC
POLES MAY HAVE A DIFFERENT
QUANTITY OF SECTIONS. SECTION
DESIGNATION CONTINUES UP THE
POLE.

NOTE:
HUB AND HAND HOLE ON FIELD
SIDE OF POLE UNLESS POLE HAS
PLATFORMS.

NOTE:
"COME-A-LONG" TO
HOOK TO CHAIN ATTACHED
BELOW JACKING ROD FOR
UNIVERSAL ALIGNMENT

POLE	MTG HT. (ft)	NBR FXT	WEIGHT		BURIAL			BACK FILL (yd ³)
			CONC BASE (lbs)	DRESSED POLE (lbs)	HOLE DIA (in)	HOLE DPTH (ft)	BUR DPTH (ft)	
P1	70	4	2770	1636	30	12	12	1.7
P2	70	3	2770	1546	30	12	12	1.7
P3	70	4	2770	1636	30	12	12	1.7
P4	70	3	2770	1546	30	12	12	1.7
P5	70	3	2770	1546	30	12	12	1.7
P6	70	3	2770	1546	30	12	12	1.7

Preliminary Information - Foundation requirements should be confirmed prior to installation.

Note: Design standard IBC wind zone 110 mph.

Backfill - concrete needed for backfill is 3000PSI minimum strength.

Foundation design based on UBC or IBC class 5 strength soils.

Refer to Structural foundation designs or jacking drawings for final installation details.

Steel shaft weight is the dressed pole weight.

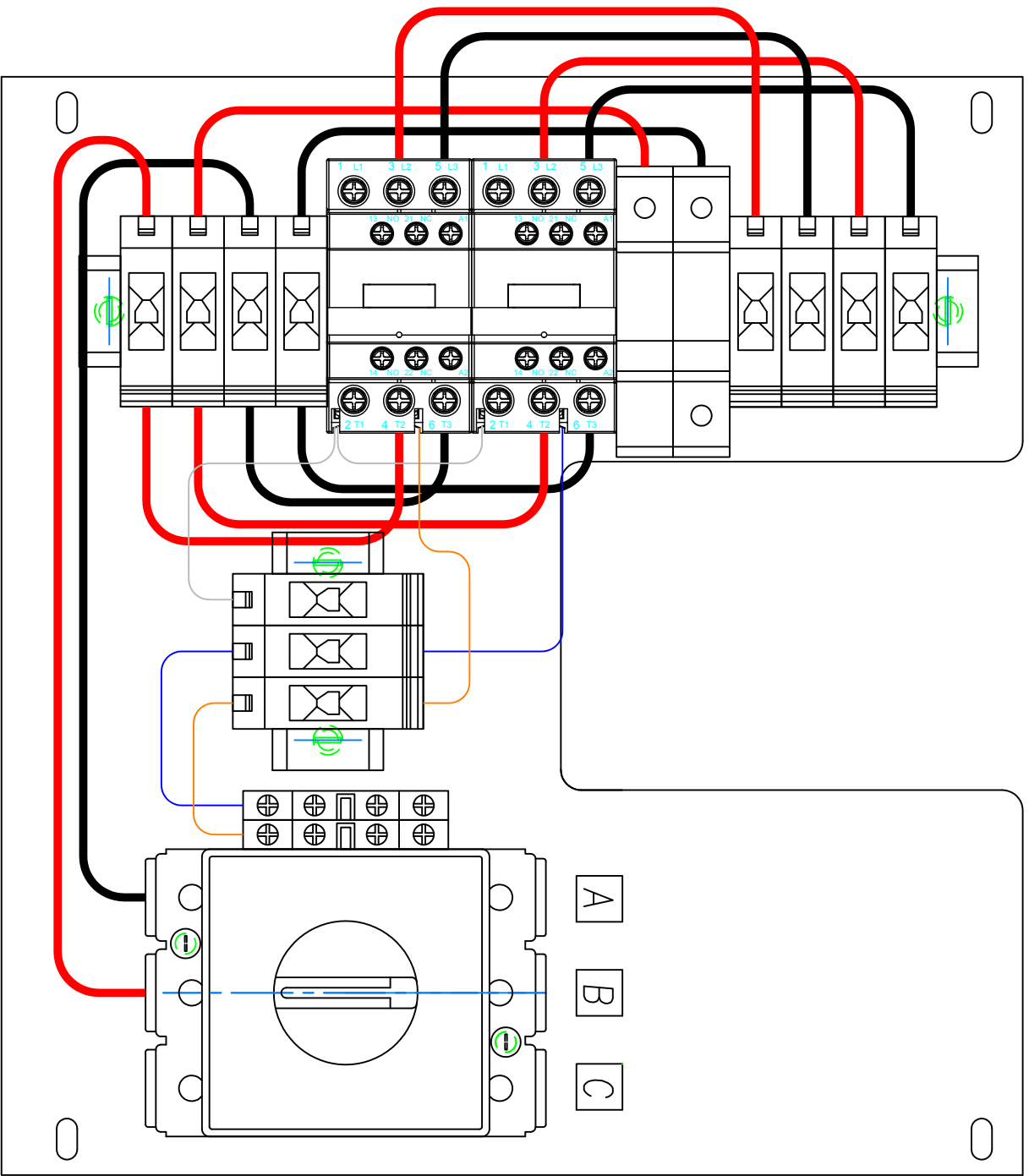
NOTE:

1: "Come-a-longs" not supplied by Musco unless ordered for the Project

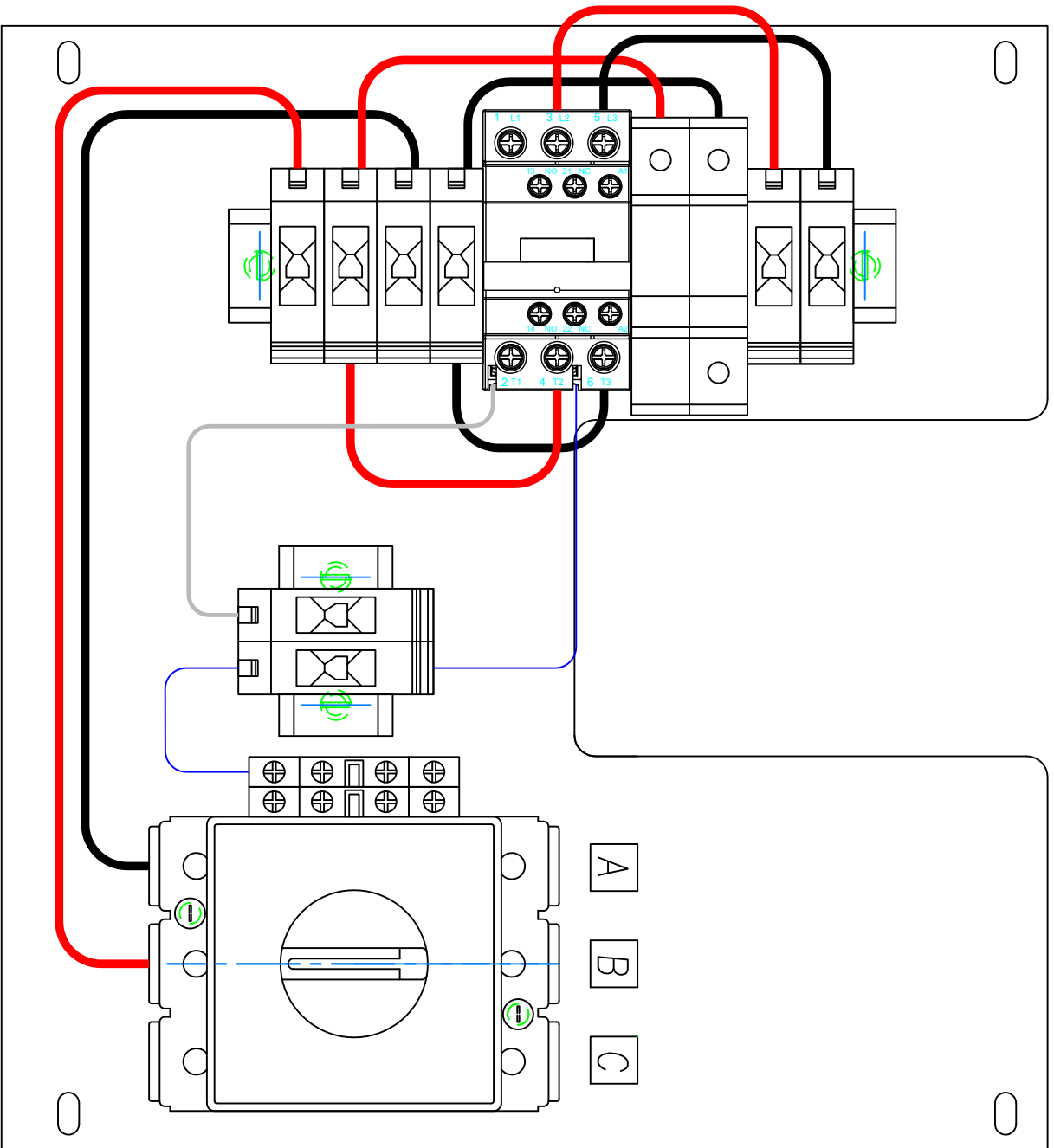
**Wrangell Marine Service Center
Wrangell, AK USA**

By:	Scale:	Date: 06/08/2011
Rep: ADeJong	Nbr: 149046	
Order:	Rev:	





P1, P6



P2, P3, P4, P5

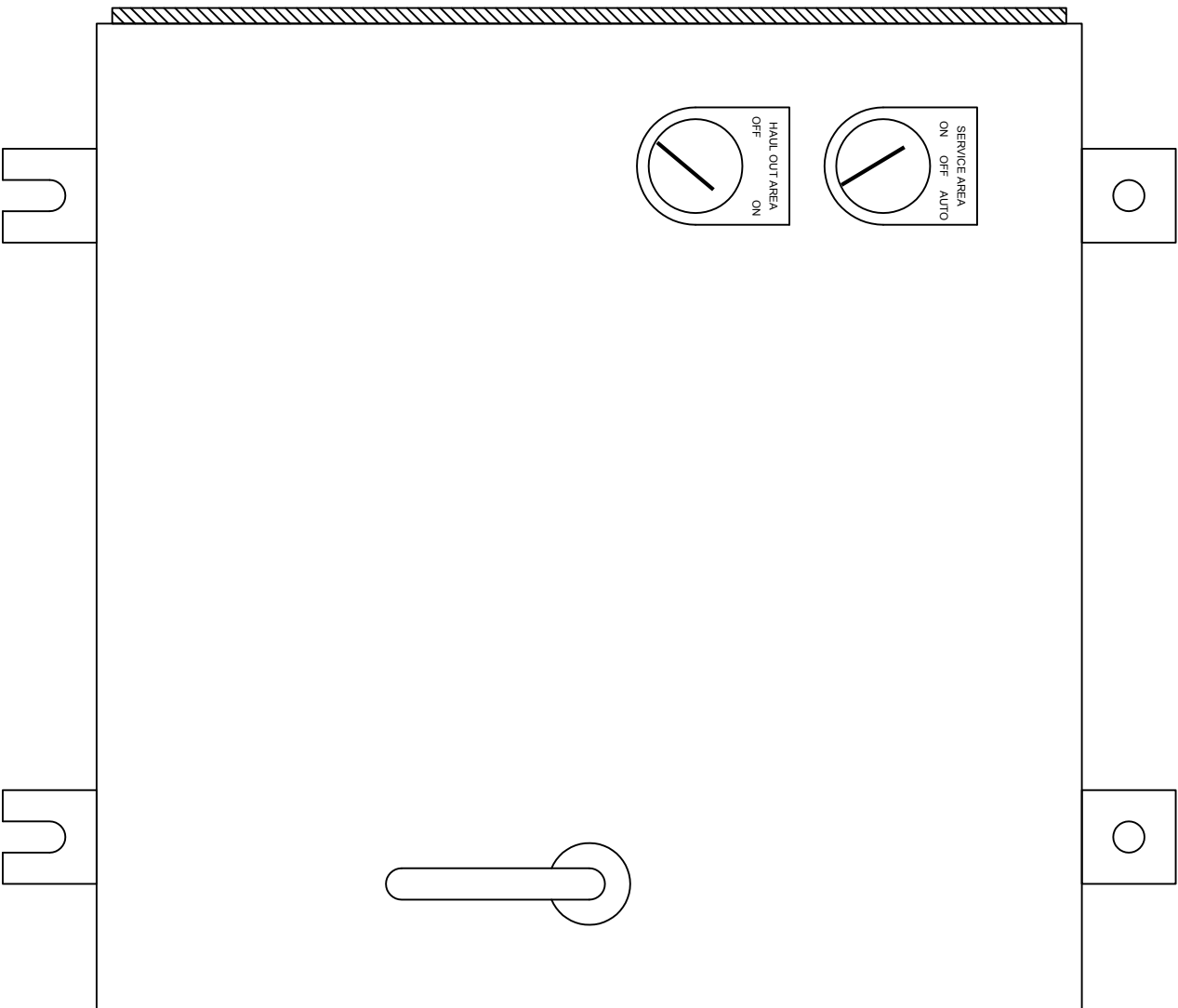
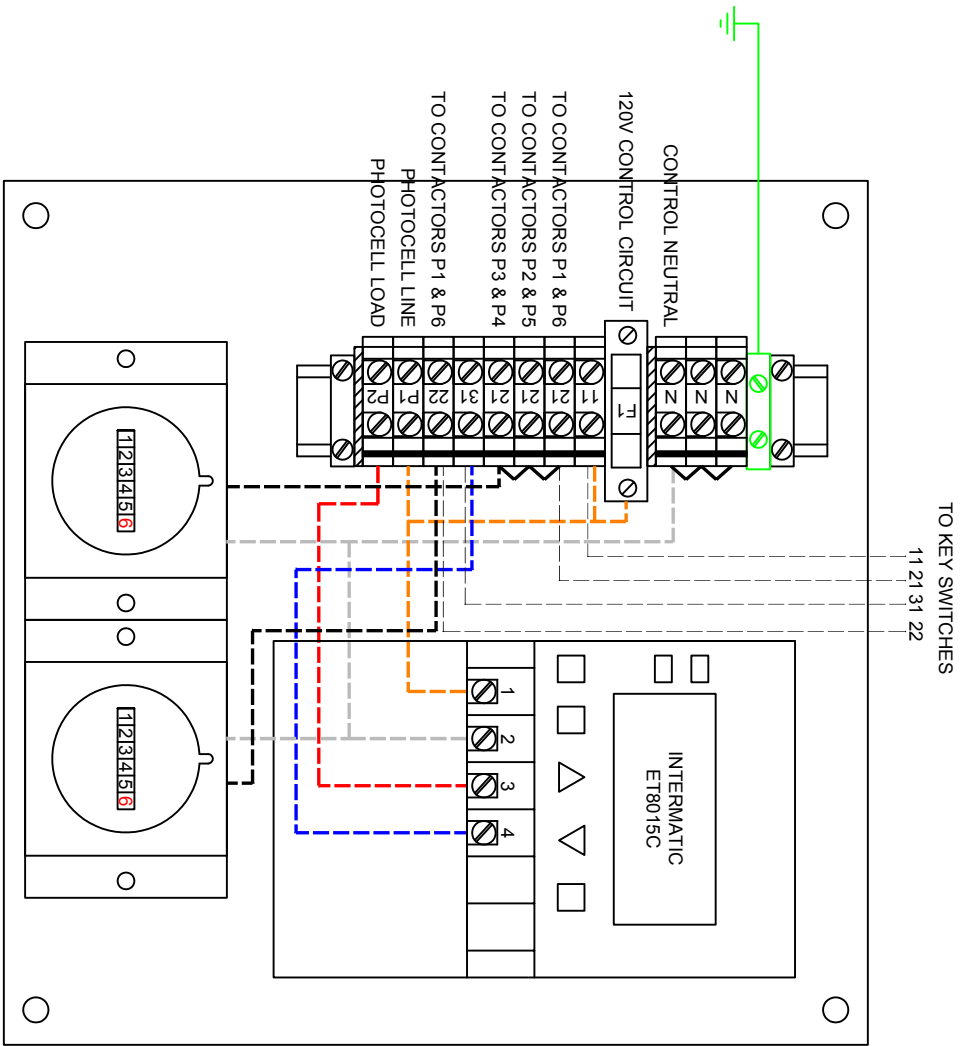
JOB NUMBER:	149046
DRAWN BY:	rp
CHECK BY:	
REPRESENTATIVE:	ADJ
SCALE:	NTS
DATE:	3/31/11
DRAWING NUMBER:	149046E1
	1 OF 1 SHEETS

DATE:	BY:	REVISIONS:


MUSCO
Lighting

CORPORATE OFFICE:
 P.O. Box 808
 100 1st Avenue West
 Oskaloosa, Iowa 52577
 800/825-6020

Wrangell Marine Service
 Wrangell, AK
 Ballast Subpanels



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DATE:	BY:	R.L.	REVISIONS:


MUSCO
Lighting

CORPORATE OFFICE:
 P.O. Box 808
 100 1st Avenue West
 Oskaloosa, Iowa 52577
 800/825-6020

Wrangell Marine Service
 Wrangell, AK
 Remote Switch Box

JOB NUMBER: 149046
 DRAWN BY: rp
 CHECK BY: ADJ
 REPRESENTATIVE: NTS
 SCALE: NTS
 DATE: 3/31/11
 DRAWING NUMBER: 149046E2
 1 OF 1 SHEETS

10 Year Warranty

Equipment

Musco warrants your lighting system (excluding fuses and lamps) to be free from defects in materials and workmanship for a period of ten years starting from the date of shipment.

Two Years Labor — Musco agrees to provide labor and materials for a period of two years to replace defective parts or repair defects in workmanship or, at its election, to pay the reasonable cost of labor for such repairs. For the remainder of the warranty period, replacement materials will be provided at no charge. Labor costs will be the owner's expense.

Lamps

Lamps are warranted not to fail for two years from the date of shipment. Lamps which fail during the first year of the warranty period will be replaced and installed at no cost to the owner.

Lamps which fail during the second year of the warranty period will be replaced by the manufacturer, but installation will be the owner's responsibility. Lamps damaged by physical trauma or electrical surges are not covered by this warranty.

Alignment

Musco warrants accurate alignment of the luminaires on the luminaire assembly for a period of ten years starting from the date of shipment.

Limitations

The following are not covered by this warranty:

- Fuses
- Weather condition events such as lightning or hail damage
- Improper installation, vandalism or abuse
- Unauthorized repairs or alterations

Repair and/or replacement are the complete warranty and constitute the exclusive remedy.

Project References*

Large Area Lighting

Airport Lighting

Anderson Air Force Base
Guam

Des Moines International Airport
Cargo Lighting
Des Moines, Iowa

England Air Park
Airport Tarmac Lighting
Alexandria, Louisiana

Kingsville Naval Air Station
Kingsville, Texas

Michigan Air National Guard
Airport Tarmac Lighting
Battle Creek, Michigan

Minhad Airbase
Dubai, United Arab Emirates

Thumrait Air Base
Muscat, Oman

Large Parking Areas

Daytona International Speedway
Parking Lot
Daytona Beach, Florida

Iowa 80 Truck Stop
Parking Lot
Walcott, Iowa

Las Vegas Speedway
Parking Lot
Las Vegas, Nevada

Richmond International Raceway
Parking Lot
Richmond, Virginia

Speedco Truck Lube
Parking Lot
23 Locations across the U.S.

US Air
Parking Lot
Landover, Maryland

Container Terminals

APM Terminals Virginia
Portsmouth, Virginia

Elizabeth Intermodal Transfer Facility
Elizabeth, New Jersey

Halterm Terminal
Port of Halifax
Halifax, Nova Scotia – Canada

General Area Lighting

ATL Truck Yard
Commerce City, Colorado

Cargill, Inc
Blair, Nebraska
Clavert, Saskatchewan – Canada
Dalhart, Texas
Dayton, Ohio
Eddyville, Iowa
Kansas City, Missouri

Flour Bluff ISD Bus Yard
Corpus Christi, Texas

Koch Nitrogen
Fort Dodge, Iowa

Police Yard Impound/Elm Parking Lot
Rocky Hill, Connecticut

Construction Sites

Chevron Refinery (temporary)
Pascagoula, Mississippi

Hemet Dam
Hemet, California

I-90 Road Construction (temporary)
Albany, New York

Olivenhain Dam (temporary)
Escondido, California

Olmstead Lock & Dam (temporary)
Olmstead, Illinois

Saluda Dam (temporary)
Lexington, South Carolina

San Pedro Construction Site
Wilmington, California

Seven Oaks Dam
San Bernadino, California

Shell Scotford Upgrader Expansion (temporary)
Fort Saskatchewan, Alberta, Canada

Taum Sauk Dam (temporary)
Annapolis, Missouri

Northland Marine Services
Port of Seattle Terminal 115
Seattle, Washington

Maher Terminals
Elizabeth, New Jersey

Shekou Terminal Yard
Shekou, China

Rail Yards

APM Terminals Virginia Intermodal
Portsmouth, Virginia

BNSF Hobart Intermodal¹
Los Angeles, California

BNSF Memphis Intermodal¹
Memphis, Tennessee

Cargill Rail Area
Eddyville, Iowa
Iowa Falls, Iowa

CN Railroad Johnston Yard¹
Memphis, Tennessee

Union Pacific Arlington Auto Distribution
Arlington, Texas

Union Pacific Alton & Southern Yard
East St. Louis, Illinois

Union Pacific Dolton Intermodal
Dolton, Illinois

Union Pacific Global I Intermodal
Chicago, Illinois

Union Pacific Kent Auto Distribution
Kent, Washington

Union Pacific LATC Intermodal Yard¹
Los Angeles, California

Union Pacific Marion Intermodal
Marion, Arkansas

Union Pacific Mesquite Auto Distribution / Intermodal
Mesquite, Texas

Union Pacific Muncie Auto Distribution
Kansas City, Kansas

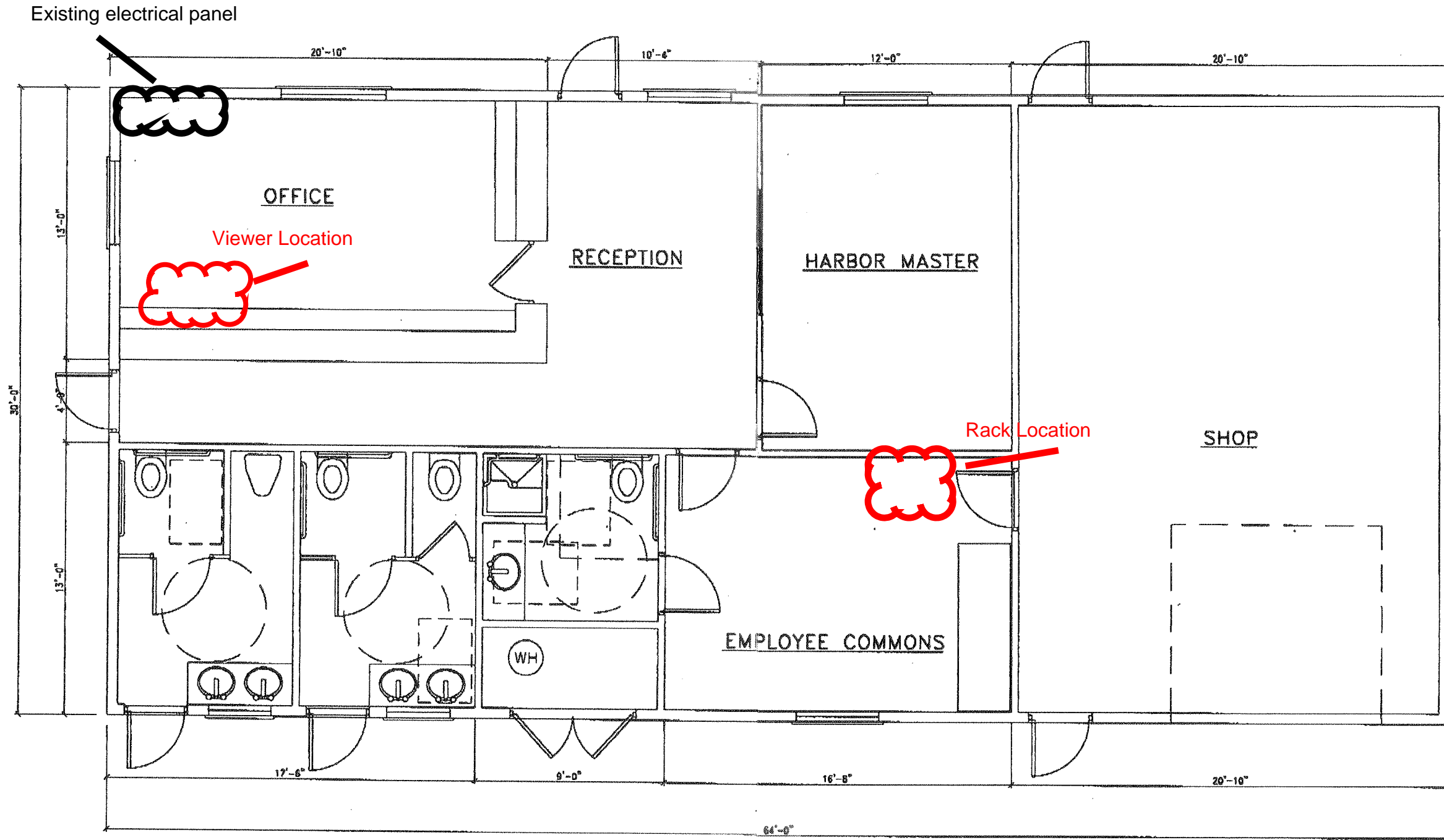
Union Pacific Rolla Auto Distribution¹
Rolla, Colorado

Union Pacific San Antonio Intermodal¹
San Antonio, Texas

Union Pacific West Colton Yard
Bloomington, California

Union Pacific Westfield Auto Distribution
Houston, Texas

Harbor Master Office at Reliance Harbor



D.G. JONES/ASSOCIATES
ENGINEERING INSPECTION CONSTRUCTION MANAGEMENT
Box 2106
Seward, Alaska 99835
907.747.7900
Fax: 907.747.7907
Permit # 01000046-03

DESIGNED: THD
CHECKED: THD
DRAWN: SARAF9
DATE: 8/28/19

WRANGELL HARBOR OFFICE
CITY OF WRANGELL
WRANGELL, AK

FLOOR PLAN

SHEET NO.
1