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Humboldt Marine Terminal - Electrical Loads

To:	Shane Phillips, P.E.
From:	Tyler Sparks, P.E.
Date:	September 1, 2022
Subject:	Humboldt Marine Terminal Electrical Loads – Technical Memo
CC:	Maged El-Mestkawy, P.E.

PURPOSE

The proposed development of the Humboldt Offshore Wind and Heavy Lift Marine Terminal will require electrical power to operate. For planning and development of the facility, a summary of the expected electrical loads is necessary. This technical memorandum accompanies the electrical load summary (attached) to describe and explain the information it contains.

PROJECT PHASES

The phasing of the project has not been finalized, but there is a phasing concept which the load summary is based on. It includes four phases. While the number and scope of each of the phases may change, the information regarding the individual loads within each phase should remain the same, and remain relevant.

ELECTRICAL LOADS – PHASE 1

Highmast Lighting Towers: Lighting for the facility will be achieved with highmast light towers (above 60 ft, height to be determined) using LED light fixtures. Each light fixture is estimate at 900 watts and each light tower will have approximately 12 light fixtures. The total load for each light tower is estimated at 9.6 KW (kilowatts), and 28.8KW for three towers.

Fabrication/Assembly Building: The facility will include a fabrication and assembly building, with an estimated size of 50,000 square feet. Expected electrical loads within the building are lighting, ventilation, machinery power, small tool power outlets, heating, with some general office loads. The estimated load per square foot of the building is 15 watts. At 50,000 square feet the total estimated load of the Fabrication/Assembly Building is 750 KVA.

Entry Gate and Miscellaneous: A vehicle entry gate with possible manned guard kiosk will be required, and along with smaller miscellaneous loads, has been estimated at 100 KVA

ELECTRICAL LOADS – PHASE 2

Highmast Lighting Towers: Electrical loads are similar to the Phase 1 light towers, 9.6KW per tower. Seven light tower in this phase will require 67.2 KVA

Wind Turbine Nacelle Heaters: Nacelles will be stored on site and will require heaters to prevent condensation and moisture buildup. The expect load for each nacelle is 10KVA, with the total nacelle heating load being 100KVA.

Wharf Crane: The wharf crane will have multiple motors for its operational movements, with the hoist motor being the largest. Depending on the type of crane, multiple motors may be used during lifts. The combined continuous load of the crane is estimated at 600 KVA with an applied demand factor of 80%, for a total continuous load of 480 KVA.

Power Outlets: It is expected that a variety of power tools, including arc-welding equipment will be used at the terminal, and outlets for the equipment will be required. Eight outlets are included in the summary at 15 KVA each, with a 50% demand factor applied. The total power outlet electrical load is estimated at 60 KVA

Turbine Assembly Rack: An assembly rack for turbines is included, expected to include lighting, lifts and trolley movements, with an estimated total load of 200 KVA.

Vessel Shore Power/Tug Charging: Vessels at berth may be required to plug into power, and tugs may plug in to charge batteries. The load summary includes a single shore power connection, with a load of 500 KVA

Battery Charging including SPMTs: Yard transport equipment, including self-propelled modular transports, will be utilized at the facility. Included in the load summary for this phase are six chargers at 100 KVA each, with a 60% demand factor applied. The total load for battery charging is 420 KVa.

ELECTRICAL LOADS – PHASE 3

Highmast Lighting Towers: Electrical loads are similar to the Phase 1 and 2 light towers, 9.6KW per tower. Seven light towers in this phase will require 67.2 KVA

Power Outlets: Similar to Phase 2 at 15 KVA each, seven power outlets have a total estimated load of 52.5 KVA with a 50% demand factor applied.

Blade Manufacturing Facility. This is the largest building on site at 240,000 square feet, mainly due to the physical size of the blades being constructed. Estimated at 8W per square foot, the total building load is 1.9 MVA.

Turbine Assembly Rack: Similar to Phase 2, the assembly rack load is estimated at 200 KVA.

Vessel Shore Power/Tug Charging: Similar to Phase 2, shore power and tug charging is estimated at 500 KVA

Battery Charging including SPMT's: Similar to Phase 2, battery charging is estimated at 100 KVA per charger. Sixteen chargers are included in the summary at a demand factor of 50% for a total load of 800 KVA

Cranes: Four yard cranes, including mobile cranes are included in Phase 3, estimated at 300 KVA per crane. A 60% demand factor has been applied giving a total crane load of 720 KVA.

ELECTRICAL LOADS – PHASE 4

Highmast Lighting Towers: Electrical loads are similar to the Phase 1, 2 and 3 light towers, at 9.6KW per tower. Five light towers in this phase will require 48 KVA.

Wind Turbine Nacelle Heaters: Similar to Phase 2, nacelle heaters are 10 KVA each and will total 100 KVA

Power Outlets: Similar to Phases 2 and 3, at 15 KVA each, five power outlets have a total estimated load of 37.5 KVA with a 50% demand factor applied.

Office Building: The planned office building on site will be approximately 20,000 square feet. At 20 watts per square foot the total office building load is estimated to be 400 KVA

Manufacturing Buildings: Two additional manufacturing buildings are included in the terminal load summary, one is 40,000 square feet and the second is 60,000 square feet. At 10 watts per square foot each, they are estimated at 300 KVA and 450 KVA.

Tower Manufacturing Building: A 180,000 square foot building for the manufacturing of towers is included, and is estimated at 10 watts per square foot, totaling 1.1 MVA

Vessel Shore Power: Shore power, but not tug charging, is included in this phase, with a total load estimated at 300 KVA

End.

Humbolt Marine Terminal

Electrical Load Estimate 2 Sept 2022

Phase	Description	Equipment	Quantity	Load KVA (each)	Connected Load (KVA)	Demand Factor	Total Load (kVA)	Notes
1	Entry and Fabrication/Assembly Building	High Mast Lighting Towers	3	9.60	28.8	1	28.8	
		Fabrication/Assembly Building (50,000 sqft)	50000	0.015	750	1	750	Phase 1
		Entry Gate / Miscellaneous	1	100.00	100	1	100	0.9 MVA
								1.3 MVA (50% Contingency)
2	Wind Turbine Laydown Area and Wharf	High Mast Lighting Towers	7	9.60	67.2	1	67.2	
		Wind Turbine Nacelle Heaters	10	10.00	100	1	100	
		Wharf Crane	1	600.00	600	0.8	480	
		Power Outlets (welding, tools, equipment)	8	15.00	120	0.5	60	
		Turbine Assembly Rack	1	200.00	200	1	200	
		Vessel Shore Power/Tug Charging	1	500.00	500	1	500	
		Battery Charging incl SPMTs	6	100.00	600	0.7	420	Phase 2
								1.8 MVA
								2.7 MVA (50% Contingency)
3	Blade Manufacturing and Blade Laydown Area, Wharf	High Mast Lighting Towers	7	9.60	67.2	1	67.2	
		Power Outlets (welding, tools, equipment)	7	15.00	105	0.5	52.5	
		Blade Manufacturing Facility (240,000 sqft)	240000	0.008	1920	1	1920	
		Turbine Assembly Rack	1	200.00	200	1	200	
		Vessel Shore Power/Tug Charging	1	500.00	500	1	500	
		Battery Charging incl SPMTs	16	100.00	1600	0.5	800	Phase 3
		Cranes	4	300.00	1200	0.6	720	4.3 MVA
								6.4 MVA (50% Contingency)
4	Tower Manufacturing and Tower Laydown Area	High Mast Lighting Towers	5	9.60	48	1	48	
		Wind Turbine Nacelle Heaters	10	10.00	100	1	100	
		Power Outlets (welding, tools, equipment)	5	15.00	75	0.5	37.5	
		Office Building (20,000 sqft)	20000	0.02	400	1	400	
		Manufacturing Building (40,000 sqft)	40000	0.01	400	0.75	300	
		Manufacturing Building (60,000 sqft)	60000	0.01	600	0.75	450	
		Tower Manufacturing Building (180,000 sqft)	180000	0.01	1440	0.75	1080	Phase 4
		Vessel Shore Power	1	300.00	300	1	300	2.7 MVA
								4.1 MVA (50% Contingency)
						Total MVA	9.7	
						Total MVA	**14.5**	50% Contingency

PACIFIC OCEAN

NEW NAVY BASE ROAD

TOWN OF SAMOA

ROAD IMPROVEMENTS

ROAD IMPROVEMENTS

NOT A PART

PHASE 4

PHASE 3

PHASE 2

PHASE 4 WHARF

PHASE 3 WHARF

PHASE 2 WHARF

PHASE 4

PHASE 3

PHASE 1

VANCE AVENUE

EXISTING SAMOA FEDERAL CHANNEL (38')

HUMBOLDT BAY

EXISTING SAMOA FEDERAL TURNING BASIN (38')

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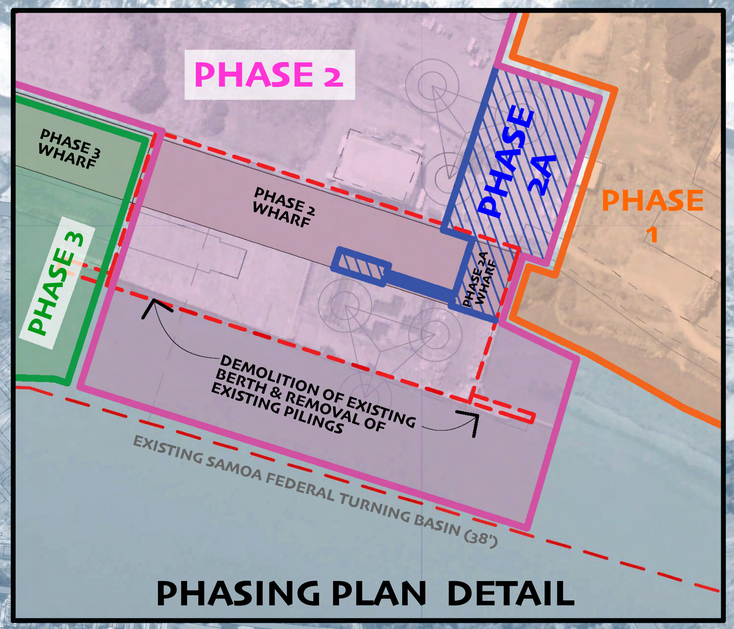
NOTE: THIS MASTER PLAN AND THE IDEAS HEREIN ARE CONCEPTUAL IN NATURE AND ARE NOT INTENDED FOR PROJECT APPROVAL OR CONSTRUCTION. MORE DEVELOPED PLANS ARE TO BE BASED ON ACCURATE SURVEY AND BASE DATA INFORMATION.



PHASING PLAN DETAIL

HUMBOLDT BAY HARBOR RECREATION & CONSERVATION DISTRICT

moffatt & nichol

0' 200' 500 1,000'

HUMBOLDT BAY OFFSHORE WIND & HEAVY LIFT MULTIPURPOSE MARINE TERMINAL

CONCEPTUAL PHASING PLAN

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5.7.22