Marina Project Information

Project: Harbor Point Marina - Sample Project

Address: 125 Harbor Point Drive, Coastal City, FL 33767

Panel: Main Dock Panel

Voltage: 120/240V

Ambient Temperature: 26-30 C

Distance To Source: 100 ft

Slips Have Individual kWh Sub-Meters: Yes

Total Demand Load: 86448.00 VA

Demand Current: 368.00 A

Main Breaker Size: 400 A

Service Wire Material: Copper

Service Raceway: PVC Schedule 80; one complete set per raceway

Service Entrance Conductor Size: 500 kcmil

Service Entrance Conductors Per Phase: 1

Service Entrance Conductor Conduit Size: 3"

Service VD: 0.80%

Phase Balance (Max - Min VA): 1872.00 VA

Grounding Electrode Conductor Size (Copper): 1/0 AWG

Pedestal Receptacle Layouts

Ckt ID	Side 1 Layout	Side 2 Layout
Ckt 1-3	30A + 20A GFCI	30A + 20A GFCI
Ckt 3-5	50A + 20A GFCI	50A + 20A GFCI
Ckt 5-7	50A + 30A	50A + 30A
Ckt 7-9	100A + 50A	50A + 30A + 20A GFCI

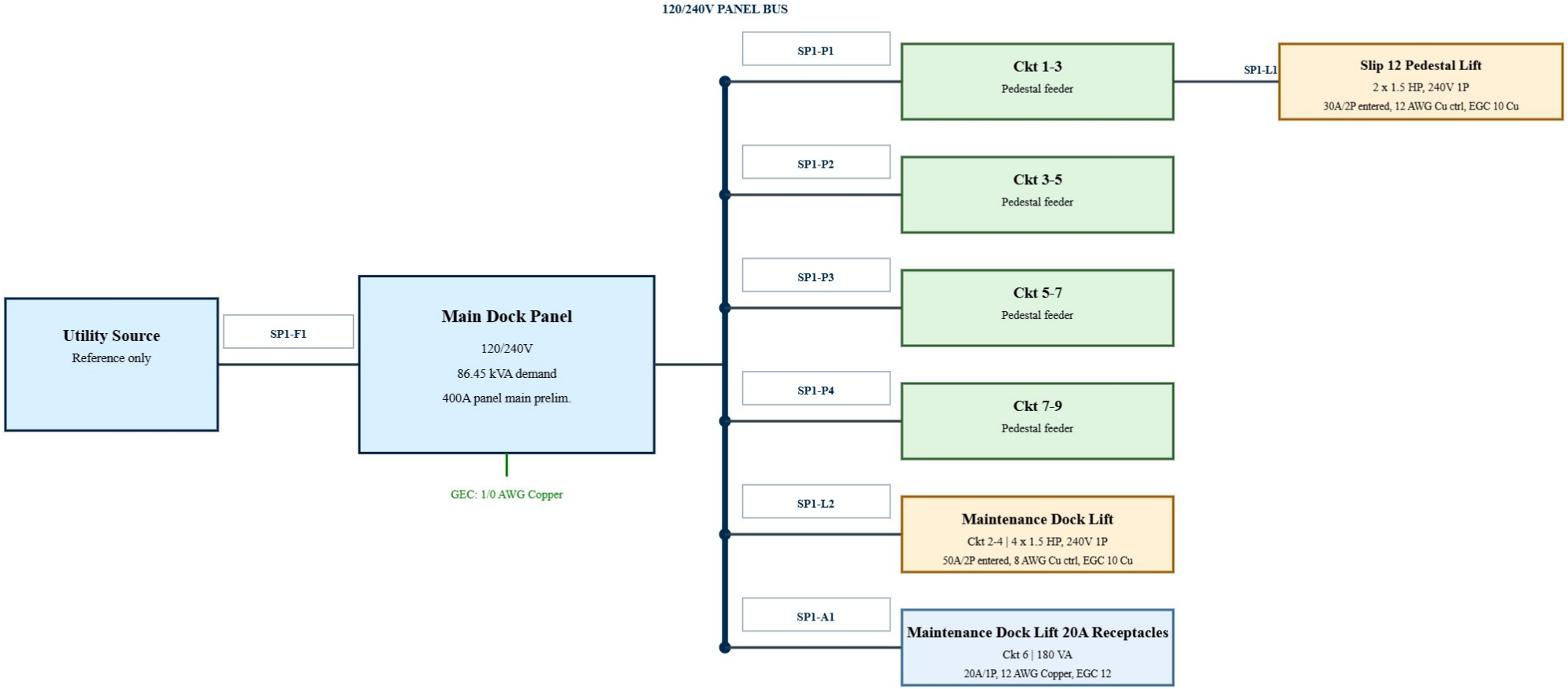
Panel Schedule

Circuit ID	VA A	VA B	Breaker	VD %	Distance	Wire Size	Wire Type	EGC Size	Conduit Size
Ckt 1-3	2304.00	4536.00	60/2P prelim.	1.47%	60 ft	6 AWG	Copper	10	3/4"
Ckt 3-5	8820.00	8820.00	110/2P	1.46%	90 ft	2 AWG	Copper	6	1 1/4"
Ckt 5-7	8640.00	8640.00	100/2P	2.55%	125 ft	3 AWG	Copper	8	N/A (G-Cable)
Ckt 7-9	17460.00	17280.00	225/2P	2.40%	170 ft	250 kcmil	Aluminum	4	2 1/2"
Ckt 2-4	5100.00	5100.00	50/2P	1.93%	70 ft	8 AWG	Copper	10	Verify
Ckt 6	180.00	0.00	20/1P	0.35%	70 ft	12 AWG	Copper	12	1/2"

Tagged Feeder Schedule

Tag	Destination	Breaker	Phase	Conductors	EGC	Conduit	Distance	VD
SP1-F1	Main Dock Panel	400A/2P prelim.	A-B	500 kcmil Copper	3	3"	100 ft	0.80%
SP1-P1	Ckt 1-3	60A/2P prelim.	A-B	6 AWG Copper	10	3/4"	60 ft	1.47%
SP1-P2	Ckt 3-5	110A/2P	B-A	2 AWG Copper	6	1 1/4"	90 ft	1.46%
SP1-P3	Ckt 5-7	100A/2P	A-B	3 AWG Copper	8	N/A (G-Cable)	125 ft	2.55%
SP1-P4	Ckt 7-9	225A/2P	B-A	250 kcmil Aluminum	4	2 1/2"	170 ft	2.40%
SP1-L1	Ckt 1-3 - Slip 12 Pedestal Lift	30A/2P entered	A-B	Controller supply: 12 AWG Copper	10 AWG Copper	Verify	40 ft	1.49%
SP1-L2	Ckt 2-4 - Maintenance Dock Lift	50A/2P entered	A-B	Controller supply: 8 AWG Copper	10 AWG Copper	Verify	70 ft	1.93%
SP1-A1	Ckt 6 - Maintenance Dock Lift 20A Receptacles	20A/1P	A	12 AWG Copper	12 AWG Copper	1/2"	70 ft	0.35%

Electrical One-Line Diagram



Feeder tags link to the tagged feeder schedule.

Main Dock Panel Boat Lift Load Schedule

Location	Source / Circuit	Circuit Source	Motor	Phase	FLC	Shore kVA	Branch VA	Branch Circuit	Result
Slip 12 Pedestal Lift	Ckt 1-3 - Side 1	Pedestal Circuit	2 x 1.5 HP, 240V 1P	A-B	10.00A NEC 430.248	3.60	5400	Ckt 1-3; Controller supply: 12 AWG Copper; Each motor: 12 AWG Copper minimum; OCPD 30A/2P entered; EGC 10 AWG Copper; 40 ft; VD 1.49%	Boat Lift controls same-slip comparison
Maintenance Dock Lift	Ckt 2-4 - Serving Panel	Serving Panel Circuit	4 x 1.5 HP, 240V 1P	A-B	10.00A NEC 430.248	-	10200	Ckt 2-4; Controller supply: 8 AWG Copper; Each motor: 12 AWG Copper minimum; OCPD 50A/2P entered; EGC 10 AWG Copper; 70 ft; VD 1.93%; 20A recs Ckt 6	Serving-panel branch included in simultaneous feeder set

Lift motor demand outside the automatic same-slip comparison 10.20 kVA; simultaneous operation 1 of 1 applicable lifts. Basis: Operating controls limit the two complete lifts to one at a time.

Panel Main Motor Feeder OCPD Check: NEC 430.24 minimum feeder ampacity is 373.60 A. All 2 downstream lift-controller OCPDs were entered. The governing NEC 430.62 motor-only calculation is 70.00 A, with a 70A standard feeder OCPD ceiling. The governing entered branch OCPD is 30A for Slip 12 Pedestal Lift plus the other selected motor currents. With 311.10 A nonmotor load on governing Phase B, the NEC 430.63 preliminary breaker basis is 400A. Reported preliminary selection: 400A. The entered controller OCPDs were applied; equipment markings, conductor protection, and coordination must still be verified. NEC 430.24 feeder ampacity, 430.62 motor-only ceiling, and 430.63 mixed-load rating. Actual listed controller/equipment OCPDs, manufacturer instructions, conductor protection, selective coordination, and AHJ review govern.

Ckt 1-3 Motor Feeder OCPD Check: NEC 430.24 minimum feeder ampacity is 44.10 A. All 1 downstream lift-controller OCPDs were entered. The governing NEC 430.62 motor-only calculation is 30.00 A, with a 30A standard feeder OCPD ceiling. The governing entered branch OCPD is 30A for Slip 12 Pedestal Lift plus the other selected motor currents. With 21.60 A nonmotor load on governing Phase B, the NEC 430.63 preliminary breaker basis is 60A. Reported preliminary selection: 60A. The entered controller OCPDs were applied; equipment markings, conductor protection, and coordination must still be verified. NEC 430.24 feeder ampacity, 430.62 motor-only ceiling, and 430.63 mixed-load rating. Actual listed controller/equipment OCPDs, manufacturer instructions, conductor protection, selective coordination, and AHJ review govern.

Pedestal Circuit lifts automatically use the larger lift or shore-power load for the same slip under NEC Table 220.58 Note 3. A Serving Panel Circuit lift receives an assigned panel circuit and does not require a pedestal. Extra 20A Recs are additional loads that must not duplicate a receptacle already entered in the pedestal layout; a serving-panel lift receives a separate 20A accessory circuit. Single-phase FLC uses NEC Table 430.248; three-phase FLC uses Table 430.250. Controller-supply and controller-to-motor results default to wet-location-rated copper THWN-2 local branch wiring, use the 75 C ampacity column based on assumed 75 C controller and motor terminals, and do not inherit feeder material or wiring method. Each local lift branch is assumed to occupy its own raceway or cable with no more than three current-carrying conductors; grouped branch circuits require the NEC 310.15(C)(1) adjustment. Controller-supply conductors use 125% of the highest-rated motor plus the other motor FLC under NEC 430.24. Each controller-to-motor conductor result uses 125% of one motor FLC under NEC 430.22. Voltage drop applies to the entered source-to-controller run only. The Actual OCPD input assumes an inverse-time circuit breaker; fuses, instantaneous-trip devices, and other protection types require separate engineering review. A valid entered actual controller/equipment OCPD replaces the calculated maximum in the branch and feeder review. When the actual OCPD is unknown, the reported maximum inverse-time breaker remains a planning value based on NEC 430.52 and, for multiple motors, 430.53(C)(4), assuming a listed group motor controller. Equipment markings and manufacturer instructions always govern, including any terminal temperature rating below 75 C. The copper EGC is sized from the valid entered OCPD, or from the reported maximum when the actual value is unknown, using NEC Table 250.122.

Assumptions and Notes

ShorePowerCalc is provided 'as is' as an informational calculation aid only. It is not a licensed electrical engineer, does not exercise engineering judgment, and does not create sealed, permit-ready, or construction-ready documents. Calculations are based on user-entered information, selected assumptions, embedded tables, and selected NEC code-basis labels, and may contain errors, omissions, or inaccuracies. Outputs are estimates only and are not guaranteed to comply with the adopted NEC edition, local amendments, utility requirements, manufacturer instructions, project specifications, or site-specific conditions. A licensed electrical engineer, qualified professional, utility, manufacturer, and AHJ, as applicable, must independently review and approve all inputs, calculations, assumptions, equipment selections, grounding and bonding, GFCI/GFPE settings, construction documents, and installations before permitting, procurement, construction, or energizing. Use of this tool is at your own risk, and Southern Electrical Solutions assumes no liability for damages, injuries, losses, rejected permits, rework, non-compliance, or unsafe installations arising from use of or reliance on the tool.

General Assumptions:

- Outputs are only as accurate as the information entered by the user. Verify all receptacle quantities, voltages, distances, conductor materials, raceways, equipment ratings, environmental conditions, and field routing before relying on any result.
- Results are calculation aids only and are not a substitute for sealed engineering documents, utility coordination, manufacturer instructions, field verification, plan review, inspection, or AHJ approval.
- 20A and 30A receptacles are assumed to be 120V; 50A, 100A, and 200A receptacles are assumed to be 240V per NEC 220.5(A).
- Voltage-drop sizing uses a 3% branch/feeder design target in this tool. This is a planning criterion, not a guarantee of NEC compliance; verify project specifications, total feeder-plus-branch drop, actual conductor characteristics, and AHJ requirements. For mixed 120V and 240V loads, voltage drop is evaluated per leg using the applicable voltage.
- Neutral sizing: Ensure neutral conductor is sized per NEC 220.61, typically matching phase conductors for non-linear loads.
- Equipment grounding conductor: The base copper EGC is selected from NEC Table 250.122 using the feeder or branch-circuit OCPD. Where phase conductors are increased beyond the corrected/adjusted ampacity minimum, the EGC is increased proportionately under the selected edition's NEC 250.122 provisions, without exceeding the largest ungrounded conductor in that raceway.
- Raceway sizing uses NEC Chapter 9 Table 4 PVC Schedule 40 or 80 areas, Chapter 9 conductor areas, a full-size neutral where applicable, one insulated copper EGC in each raceway, and the normal 40% fill limit. Every parallel set is modeled in its own identical raceway; '2 x 2 1/2 inch' means two raceways of that trade size with one complete set in each. For service-segment calculations, verify whether an EGC is required in the specific segment.
- Service entrance conductors sized per NEC 230.42, ampacity not less than calculated demand load, using 75°C column, with voltage drop calculation if distance provided (2% max recommended).
- For service entrance conductors, sizes over 500 kcmil copper or 750 kcmil aluminum are installed in parallel configurations.
- Ambient temperature correction uses the 75 C factors in NEC Table 310.15(B)(1)(1) based on the selected range and caps the effective multiplier at 1.0 so corrected ampacity never exceeds the applicable termination-temperature column. The grouped 20 C-or-less option therefore does not increase base ampacity.
- General feeder, service, pedestal distribution, and local boat-lift controller and motor branch ampacity calculations use the 75 C column from NEC Table 310.16 (formerly 310.15(B)(16)). The tool assumes the associated equipment terminals are listed and identified for 75 C conductors. If any terminal is limited to a lower temperature, recalculate that circuit using the lower column. Never use 90 C conductor ampacity as the final termination ampacity.
- For 4-wire, 3-phase wye distribution raceways, the neutral is conservatively counted as a current-carrying conductor because marina loads are treated as predominantly nonlinear. Four current-carrying conductors therefore receive the 80% adjustment factor from NEC Table 310.15(C)(1). A single-phase neutral carrying only imbalance is not counted. Verify the actual load characteristics and conductor grouping for the project.
- For nonmotor general circuits, the small-conductor overcurrent limits in NEC 240.4(D) are enforced in addition to 75 C ampacity: 12 AWG aluminum is limited to 15A, 12 AWG copper to 20A, 10 AWG aluminum to 25A, and 10 AWG copper to 30A. Article 430 motor-circuit exceptions are evaluated separately.
- For an OCPD rated over 800A, the corrected and adjusted conductor ampacity is never selected below the OCPD rating. The next-size allowance for devices rated 800A or less is not applied above 800A.
- Installation type does not change the base ampacity table, but it does set supported/minimum conductor sizes and whether the tool calculates raceway fill. Verify the actual cable or raceway listing and installation conditions.
- For G-Cable, wire sizes are limited to 8 AWG through 500 kcmil; paralleling uses the smallest conductor size that meets the ampacity with the minimal number of conductors.
- For PVC Schedule 40 and Schedule 80 raceways with wet-location-rated THWN-2 conductors, wire sizes are limited to 12 AWG through 500 kcmil; paralleling uses the smallest conductor size that meets the ampacity with the minimal number of conductors when exceeding 500 kcmil.
- For high loads exceeding single wire ampacity, paralleled conductors are recommended using the smallest size that allows the least number of conductors.
- Parallel conductors must comply with NEC 310.10(G), including the general 1/0 AWG minimum and identical length, material, circular-mil area, insulation, and termination method. Each raceway is assumed to contain the same number of conductors and the same electrical characteristics, with all circuit conductors and one EGC grouped as a complete set.
- For PVC Schedule 40 and Schedule 80 THWN-2 installations, the smallest wire size used is 12 AWG.
- For G-Cable installations, the smallest wire size used is 8 AWG.
- 20A GFCI receptacles are treated as accessory/convenience receptacles and are not included in the shore power receptacle count for demand factors; their load is calculated at 180 VA (1.5 A x 120 V) per NEC 220 and added at 100% demand.
- Pedestal feeder calculations use the selected-edition NEC marina demand calculation in Table 220.58, not the sum of all receptacle ratings.
- Each side of a pedestal is considered an individual slip for applying NEC Table 220.58 demand factors.
- Where qualifying individual sub-meters are present, selecting 'Yes' applies the permitted 10% reduction to qualifying shore-power demand per NEC Table 220.58 Note 2.
- Under NEC Table 220.58 Note 1, a slip with exactly two shore-power receptacles of different voltages includes only the receptacle with the higher kVA rating.
- Boat lift motor FLC values use NEC Table 430.248 for single-phase motors and Table 430.250 for three-phase motors unless a manual override is entered. Every motor on each selected complete lift is included at 100%, with one 25% largest-motor adder at each calculated feeder level.
- Boat lift controller-supply conductors are sized for 125% of the highest-rated motor plus the full-load current of the other motors under NEC 430.24. These local branch results default to wet-location-rated copper THWN-2, use the 75 C ampacity column based on assumed 75 C controller and motor terminals, and do not inherit feeder material or wiring method. Each local lift branch is assumed to occupy its own raceway or cable with no more than three current-carrying conductors; grouped branch circuits require the NEC 310.15(C)(1) adjustment. Separate controller-to-motor conductor results are sized at 125% of one motor FLC under NEC 430.22 and are shown independently from the controller supply. Voltage drop applies only to the entered source-to-controller run. The Actual OCPD input assumes an inverse-time circuit breaker; other protection types require separate engineering review. A valid entered actual controller/equipment OCPD replaces the calculated maximum and becomes the EGC sizing basis. Equipment markings and manufacturer instructions always govern OCPD, conductor, controller, overload, and termination requirements, including any terminal temperature rating below 75 C.
- Feeders supplying boat-lift motors are not reduced below the Article 430.24 motor-feeder ampacity calculation. Breakers marked 'preliminary' are planning values. The NEC 430.62/430.63 review appears only for feeders with valid downstream motor branches and applies each valid entered actual lift-controller OCPD. Missing or invalid entries retain a calculated lower-to-maximum range. Equipment markings, conductor protection, selective coordination, manufacturer instructions, and AHJ review govern the final feeder breaker.
- Pedestal Circuit lifts automatically use the larger calculated lift or shore-power load for the same slip per NEC Table 220.58 Note 3.
- A Pedestal Circuit lift with no qualifying shore-power receptacle is included at its complete motor load on the selected pedestal feeder. Extra 20A Recs are additional loads and must not duplicate accessory receptacles already entered in the pedestal layout.
- A Serving Panel Circuit lift receives its own serving-panel circuit and does not require a pedestal selection; Extra 20A Recs receive a separate 20A branch.
- Lift motor loads outside the automatic same-slip comparison do not receive the shore-power receptacle demand factor. All motors on one lift are treated as operating together. Maximum Simultaneous Lifts applies only between separate complete lifts, with one governing

25% largest-motor adder at each calculated feeder level. A limit below the connected lift count requires supporting documentation and AHJ acceptance under NEC 430.26.
- For balancing, 120V loads (accessory and non-accessory) on side 1 are assigned starting with phase A and on side 2 starting with phase B when identical layouts are used.

Multi Panel Mode Assumptions:
- Multi Panel mode starts the calculation boundary at the low-voltage landside MDP/switchboard and models downstream dock panels and pedestal loads. It does not model utility transformers or 480V marine substations.
- Multi Panel outputs are planning-level calculation aids only. They do not replace engineered service studies, fault-current studies, coordination studies, utility service requirements, manufacturer submittals, stamped construction drawings, or AHJ review.
- MDP demand is calculated from all downstream shore power receptacles served by the MDP, not by simply adding individual dock-panel demands.
- Dock-panel feeders are sized from each dock panel's calculated demand and reported as calculation aids. Final feeder, panelboard, overcurrent, neutral, grounding, bonding, and voltage-drop decisions must be reviewed by the engineer of record and AHJ.
- For 120/208V three-phase MDPs, single-phase dock-panel feeders are automatically assigned across A-B, B-C, and C-A to reduce phase imbalance. Three-phase dock panels retain their calculated A/B/C load split.
- The Multi Panel feeder schedule reports equipment grounding conductors (EGC) for feeders. The one-line and summary also show grounding electrode conductor (GEC) values for the MDP and dock panels as calculation aids.
- When 2026 NEC is selected, the report applies the demand percentages in Table 120.120. Verify the locally adopted edition, effective date, local amendments, and project-specific requirements.

Large Marina Mode Assumptions:
- Large Marina mode starts the calculation boundary at the landside MDP/switchboard and models downstream marine substations and pedestal panel loads. Utility transformer sizing is reference-only and is not included.
- Large Marina outputs are planning-level calculation aids only. They do not replace engineered service studies, fault-current studies, coordination studies, utility service requirements, manufacturer submittals, stamped construction drawings, or AHJ review.
- MDP demand is calculated from all downstream shore power receptacles served by the MDP, not by simply adding selected substation kVA ratings.
- MDP-fed large pedestal loads are modeled as direct 480V or 277/480V three-phase shore power receptacles served from the MDP. They are included in the MDP receptacle count, demand factor, phase loading, and feeder schedule, but are not included in marine substation sizing.
- Marine substations are modeled as 480V single-phase primary to 120/240V single-phase secondary equipment. Transformer losses, inrush, impedance, bonding details, and manufacturer-specific requirements must be reviewed separately.
- Automatic phase balancing assigns single-phase 480V substation feeders across A-B, B-C, and C-A using calculated demand to reduce phase imbalance.
- The Large Marina feeder schedule reports equipment grounding conductors (EGC) for feeders. The one-line and summary also show grounding electrode conductor (GEC) values for the MDP and substation secondary panels as calculation aids.
- Grounding, bonding, separately derived system requirements, marina equipotential bonding, and local corrosion/environmental requirements must be verified by the engineer of record and AHJ.
- When 2026 NEC is selected, the report applies the demand percentages in Table 120.120. Verify the locally adopted edition, effective date, local amendments, and project-specific requirements.

Ground-Fault Protection (NEC Article 555.35):
- Ground-fault protection, leakage-current coordination, bonding, grounding, and corrosion-related requirements are life-safety items and must be reviewed by the engineer of record, equipment manufacturer, and AHJ.
- Article 555 ground-fault requirements vary by adopted NEC edition, receptacle type, feeder or branch-circuit location, equipment rating, marina configuration, device coordination, and local amendments. Verify exact GFPE/GFCI thresholds, testing, location, and coordination requirements with the adopted NEC edition and AHJ.
- Do not rely on this app to select, set, locate, or coordinate GFPE/GFCI devices. Manufacturer data, engineered coordination review, field testing requirements, and AHJ direction must control.
- Ground-fault protection devices should be installed in locations to minimize nuisance tripping and must be accessible for testing and maintenance.
- Consult the local AHJ to confirm specific ground-fault protection requirements, as they may impose additional or more stringent rules.

Legal and Liability Disclaimer:
- By using this tool, you agree to indemnify and hold harmless Southern Electrical Solutions from any claims, liabilities, or expenses related to its use.
- This tool does not constitute professional engineering, legal, consulting, utility, manufacturer, or AHJ advice, and no attorney-client, engineer-client, or other professional relationship is formed.
- All outputs are estimates and calculation aids; actual installations must be designed, reviewed, approved, inspected, and accepted by qualified professionals and authorities with jurisdiction.
- Do not use any output for permitting, procurement, construction, installation, or energizing until it has been independently verified and approved for the specific project and jurisdiction.
- In the event of any conflict between this tool and official NEC or local codes, the official sources prevail.