Washington State Department of Labor & Industries

# Electrical Plan Review Submittal Guide

REVISION DATE: 07-01-2017

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# Introduction

Although electrical plans are checked for compliance with many sections of the National Electrical Code, the main focus of our review is the load on the service and feeders of the electrical system(s), and proper design of emergency and standby systems. Our review starts at the branch circuit level and investigates equipment and conductors in the load path back to the service point.

The pages following this introduction describe the information needed to review your electrical plans and load data. We have included instructions, sample forms, and schedules to demonstrate an acceptable format that can be used to present your supporting documentation. You may use our forms, or you may create your own. These forms are designed to assist you in assembling an accurate presentation that demonstrates your design is in compliance with the appropriate codes.

The ***"Electrical Plan Review Submittal"*** form shown on page 9 **must be completed and enclosed** with all plan submittals. The information in items 1 through 10 on this form is entered into our database and provides us the details needed to identify, track, and record your project. **Plans sent in without a submittal form may be rejected upon receipt.** If you would like this form in an electronic version please contact the Plan Review Supervisor .

The documentation as outlined in *"the Screen In Check List"* **must be** presented in order for the plans examiner to begin a review. **Plans lacking the appropriate screen-in information or "identified" as something other than construction documents, may be disapproved and sent back.**

The Electrical Plan Review staff would like to hear any suggestions or concerns you may have about the review process. We welcome your constructive comments.

# RCW and WAC Requirements for Electrical Plan Review

Revised Code of Washington (RCW) 19.28 states that electrical installations *"shall be in conformity with approved methods of construction."* The standards used for *"approved methods"* are listed in Washington Administrative Code (WAC) 296-46B-010 and include the currently adopted editions of NFPA 70 (National Electrical Code).

WAC 296-46B-900 (1) provides classification or definition of occupancies. WAC 296-46B-900 (3) Table 900-1, and Table 900-2 specify the occupancies for which plan review is required.

WAC 296-46B-900 (2) states "Plan review is a part of the electrical inspection process; its primary purpose is to determine: (a) That service/feeder conductors are calculated and sized according to the proper NEC or WAC article or section; (b) The classification of hazardous locations; and (c) The proper design of emergency and standby systems." The Electrical Plans Examiner's responsibility is to review plans for electrical installations to verify compliance with the National Electrical Code and Washington State Rules and Regulations.

WAC 296-46B-900 (3)(h) requires that plans that are to be reviewed by the department *"… must clearly show the electrical installation or alteration in floor plan view, include all switchboard and/or panelboard schedules and when a service or feeder is to be installed or altered, must include a riser diagram, load calculation, fault current calculation and interrupting rating of equipment. Where existing electrical systems are to supply additional loads, the plans must include documentation that proves adequate capacity and ratings. The plans must be submitted with a plan review submittal form available from the department…"*

Riser diagrams and load calculations must include all of the equipment carrying the additional loads and be complete to the point of connection between the facilities of the serving utility and the premises wiring. NEC 215.5 requires that the details of such diagrams and calculations shall include *"…the total calculated load before applying demand factors, the demand factors used, the calculated load after applying demand factors, and the size and type of conductors to be used."*

For the latest Electrical RCW and WAC rules please visit our web site at: http://www.lni.wa.gov/TradesLicensing/Electrical

# Electrical Plan Review Staff
## Phone Numbers and Mailing Address

Please direct all billing calls and plan status checks to Tony Bierward.
The plan review supervisor will address technical or plan review policy questions.

**Chief Electrical Inspector**:
Steve Thornton
Telephone Number: 360.902.5249
Email: electricalprogram@lni.wa.gov

**Plan Review Supervisor:**
Tony Bierward
Phone number: 360.902.5254
Email: antone.bierward@lni.wa.gov

**Plans Examiner**:
Jim Reynolds
Phone number: 360.902.6483
Email: james.reynolds@lni.wa.gov

**Plans Examiner**:
Joe Evankovich
Phone Number: 360.902.4920
Email: joseph.evankovich@lni.wa.gov

**Plans Examiner**:
Scott Kelly
Phone number: 360.902.5248
Email: scott.kelly@lni.wa.gov

**Plans Examiner**:
Norm Williams
Phone Number: 360.902.5247
Email: norman.william@lni.wa.gov

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| | |
|---|---|
| **Please address all mail to:** | Electrical Plan Review<br>Attn.: Tony Bierward |
| **Street / Delivery Address:** | 7273 Linderson Way SW<br>Tumwater, WA 98502 |
| **Mailing Address:** | PO Box 44460<br>Olympia, WA 98504-4460 |

## Plan Review Fees

The estimated plan review fee is to be calculated and paid at the time the plans are submitted, from the current adopted Washington Administrative Code (WAC 296-46B). Plan review fees are based upon 35% of the electrical inspection permit fee that is verified and calculated during the review process, plus a submittal fee, a shipping and handling fee, and any additional hours that were necessary in the review process. (The initial payment can be calculated using the worksheet located on page 10 of this guide). It is in the best interest of the submitter to fully calculate the estimated permit fee for the project. Any plan review fees that remain unpaid, once the review is completed, will be billed. **Billed fees are due and payable 15 days after billing.**

## Plans Examiner Geographical Areas?

Electrical Plans are not assigned based upon a geographic area.

## Plan Review in Cities Doing Their Own Electrical Inspections?

If the project you are submitting is within the inspection jurisdiction of the one of cities listed at the hyperlink below, Labor & Industries **does not** do the plan review. You will have to submit your plans to the city responsible for the electrical inspection.

http://www.lni.wa.gov/TradesLicensing/Electrical/FeePermInsp/CityInspectors/default.asp

# Labor and Industries Service Locations

## ABERDEEN

415 W Wishkah STE 1B
Aberdeen WA 98520-0013
360.533.8200
Fax: 360.533.8220

Electrical Supervisor
Bob Thomas 360.902.5201

## BELLEVUE

616 120th Ave. NE #C201
Bellevue WA 98005-3037
425.990.1400
Fax: 425.990.1446

Electrical Supervisor
Wendy Karlsen 425.990.1462

## BELLINGHAM

1720 Ellis St. STE 200
Bellingham WA 98225
360.647.7300 or 7320
Fax: 360.647.7310

Electrical Supervisor
Jerry Vance 360.416.3020

## BREMERTON

500 Pacific Ave. STE 400
Bremerton WA 98337
360.415.4000
Fax: 360.415.4048

Electrical Supervisor
Doug Griffith 360.415.4054

## EAST WENATCHEE

519 Grant Rd
E. Wenatchee WA 98802-5459
509.886.6500
Fax: 509.886.6510

Electrical Supervisor
Gary Gooler 509.454.3763

## EVERETT

729 100Th St SE
Everett WA 98208-2620
425.290.1309
Fax: 425.290.1399

Electrical Supervisor
Michael Morgan 425.290.1320

## KENNEWICK

4310 W. 24th Ave
Kennewick WA 99338-1992
509.735.0100
Fax: 509.735.0120

Electrical Supervisor
Dene Koons 509.735.0130

## KELSO

711 Vine St
Kelso WA 98626
360.575.6900
Fax: 360.575.6918

Electrical Supervisor
Trent Harris 360.896.2356

## MOSES LAKE

3001 W Broadway Ave
Moses Lake WA 98837-2907
509.764.6900
Fax: 509.764.6923

Electrical Supervisor
Dene Koons 509.735.0130

## MOUNT VERNON

525 E College Way STE H
Mt. Vernon WA 98273-5500
360.416.3000
Fax: 360.416.3030

Electrical Supervisor
Jerry Vance 360.416.3020

## PORT ANGELES

1605 E Front St. STE C
Port Angeles WA 98362-4628
360.417.2702
Fax: 360.417.2733

Electrical Supervisor
Doug Griffith 360.415.4054

## PULLMAN

1250 Bishop Blvd. STE G
Pullman WA 99163-0847
509.334.5296
Fax: 509.334.3417

Electrical Supervisor
Bob Olson 509.324.2532

## SPOKANE

901 N Monroe STE 100
Spokane WA 99201-2149
509.324.2640
Fax: 509.324.2655

Electrical Supervisor
Bob Olson 509.324.2532

## TACOMA

950 Broadway, Suite 200
Tacoma WA 98402
253.596.3808
Fax: 253.596.3956

Electrical Supervisor
Jeff Ault 253.596.3815

## TUKWILA

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Tukwila WA 98168
206.835.1000
Fax: 206.835.1199

Electrical Supervisor
Wendy Karlsen 206.835.1091

## TUMWATER

7273 Linderson Way SW
Tumwater WA 98501
360.902.6350
Fax: 360.902.6340

Electrical Supervisor
Bob Thomas 360.902.5201

## VANCOUVER

312 SE Stonemill Drive STE 120
Vancouver WA 98684
360.896.2360
Fax: 360.896.2345

Electrical Supervisor
Trent Harris 360.896.2356

## YAKIMA

15 W Yakima Ave. STE 100
Yakima WA 98902-3401
509.454.3760
Fax: 509.454.3710

Electrical Supervisor
Gary Gooler 509.454.3763

# SUBMITTAL FORM INSTRUCTIONS

**1. Facility Name:**

Where project is taking place.

**EXAMPLE:** Grant Elementary School

**2. Project Address: (The official address)**

Facility address as assigned by local building or planning department. Include the city in which the project is located.

**EXAMPLE:** 1101 First Ave - Moses Lake, WA 99555

**3. Submitter Name and Mailing Address:**

The Submitter is the firm or individual who sends the plans to L & I. The Address is for the person or firm submitting the plans for review. Please give the proper address for Federal Express delivery.

**EXAMPLE:** Puget Sound Engineers LLC - 777 First Ave W - Seattle, WA 98000

**4. Project Owner:**

Name of the person, corporation, or agency that is the registered owner of facility.

**EXAMPLE:** Moses Lake School District

**5. Is this project licensed through Department of Health (DOH) or a contracted service with the Department of Social and Health Services (DSHS)?**

What type of facility license is it? Boarding home, Nursing home, etc?

**EXAMPLE:** (If applicable) Boarding Home

**6. Contact Person (including phone and Fax numbers):**

The electrical designer or individual that can answer technical questions on electrical plans, load calculations, panel schedules, etc.

**EXAMPLE:** Bob Salmon 206.555.5555 Fax: 206.555.5555
Email Address: bob@provider.com

**7. General Description:**

Provide a detailed description of the complete scope of electrical work being done; indicate whether project is new construction, addition, remodel, modification of prior EPR project, etc.

**EXAMPLE:** Portable classroom additions to the school electrical system…

**8. Start Date:**

Date electrical work starts.

**9. Completion Date:**

Date project is scheduled for completion.

**10. SPI Funding Information**

Does the project have state matching funds from the Office of the Superintendent of Public Instruction? If so, Bid Date and School District.

**EXAMPLE:** June 30, 2011 Mukilteo School District

# *DEPARTMENT OF LABOR & INDUSTRIES*

## *Electrical Plan Review Submittal*

L&I USE ONLY

| | | |
|---|---|---|
| **1. Facility Name (Where Project is Located):** | **2. Project Address (Street Address, City, and Zip Code):** | |
| **3. Submitter Name and Mailing Address (include street address for FedEx if PO Box):** | | |
| **4. Project Owner:** | **5. Is the facility licensed by DOH or DSHS?** ☐ **YES** ☐ **NO** **If YES, how is it licensed?:** | |
| **6. Electrical Design Contact Person:** | **Telephone Number:** | **Fax Number:** |
| | (_ _ _) _ _ _-_ _ _ _ | (_ _ _) _ _ _-_ _ _ _ |
| *** Email Address :** | **Secondary Email Address :** | **Phone Extension :** _ _ _ __ |

**7. Project Name and Description:**

| | |
|---|---|
| **8. Proposed Construction Start Date:** | **9. Proposed Construction Completion Date:** |
| **10. SPI Funded School Project?** ☐ **YES** ☐ **NO**<br>**If YES, proposed bid date:** | **School District:** |

***** *Email Address is needed to participate in enhanced services. Secondary Email is designed for an optional contact.*

- ❑ **Has the required initial Plan Review payment been made?**
- ❑ **Has the Plan Review Screen-in Check List been reviewed, checked, signed, and included with the submittal package?** (Following this procedure will expedite the review process and plan approval. Missing items may cause the presentation's disapproval and added fees charged)

# EPR - SAMPLE WORKSHEET

Permit Fee's Based on Schedule Adopted 1/1/2017

## SERVICE or FIRST FEEDER to a BUILDING

| ITEM | NO. | AMPS | @ | FEE | TOTAL |
|---|---|---|---|---|---|
| New SERVICE | | 0 to 100 | @ | 101.60 | |
| " " | | 101 to 200 | @ | 123.70 | |
| " " | | 201 to 400 | @ | 238.20 | |
| " " | | 401 to 600 | @ | 277.60 | |
| " " | | 601 to 800 | @ | 359.10 | |
| " " | | 801 to 1000 | @ | 438.40 | |
| " " | | 1001 and Over | @ | 478.30 | |
| Largest New FEEDER or TRANSFORMER Primary/Secondary | | 0 to 100 | @ | 101.60 | |
| | | 101 to 200 | @ | 123.70 | |
| " " | | 201 to 400 | @ | 238.20 | |
| " " | | 401 to 600 | @ | 277.60 | |
| " " | | 601 to 800 | @ | 359.10 | |
| " " | | 801 to 1000 | @ | 438.40 | |
| " " | | 1001 and Over | @ | 478.30 | |
| Service or 1st Feeder FIRST COLUMN SUBTOTAL | | → | | → | |
| ONE ENTRY IN ABOVE BLOCK (unless multiple services are to be installed) | | | | | |

## CIRCUITS ONLY

| | | | | | |
|---|---|---|---|---|---|
| Altered/Added CIRCUITS ONLY First five (5) per panelboard | | Five | @ | 79.00 | |
| Altered/Added CIRCUITS ONLY Each additional circuit per panel. | | Additional | @ | 6.60 | |
| (Per panel fee shall not exceed a new feeder of same rating) | | | | | |
| CIRCUITS SUBTOTAL | | → | | → | |

## ADDITIONAL FEEDERS

| ITEM | NO. | AMPS | @ | FEE | TOTAL |
|---|---|---|---|---|---|
| ALTERED Service or Feeder | | 0 to 200 | @ | 101.60 | |
| " " | | 201 to 600 | @ | 238.20 | |
| " " | | 601 to 1000 | @ | 359.10 | |
| " " | | 1001 and Over | @ | 398.90 | |
| OVER 600 VOLTS Service or Feeder (Surcharge) | | If involved - One | @ | 79.00 | |
| Additional New FEEDER or TRANSFORMER Primary/Secondary | | 0 to 100 | @ | 62.00 | |
| | | 101 to 200 | @ | 79.00 | |
| " " | | 201 to 400 | @ | 94.20 | |
| " " | | 401 to 600 | @ | 110.80 | |
| " " | | 601 to 800 | @ | 151.00 | |
| " " | | 801 to 1000 | @ | 182.70 | |
| " " | | Over 1000 | @ | 255.00 | |
| Feeder 2nd COLUMN SUBTOTAL | | → | | → | |

| | | | | | |
|---|---|---|---|---|---|
| GENERATOR (or PV) FEEDER (If additional feeder) | | 0 to 100 | @ | 62.00 | |
| " " | | 101 to 200 | @ | 79.00 | |
| " " | | 201 to 400 | @ | 94.20 | |
| " " | | 401 to 600 | @ | 110.80 | |
| Generator 2nd COLUMN SUBTOTAL | | → | | → | |

| | | | |
|---|---|---|---|
| **Permit Fees Calculated** (totaled from above) | | **X 35% (.35) =** WAC 296-46B-906 (9) | |
| **Plan Review Submittal Fee** WAC 296-46B-906 (9) | $79.00 | = | **+ $79.00** |
| **Shipping & Handling Fee** WAC 296-46B-906 (9)(b) | $22.10 | = | **+ $22.10** |
| **INITIAL MINIMUM PAYMENT DUE** | → | **Total =** | |

**Upon Plan Review completion, the plans will be returned along with a billing statement indicating any additional fees or remaining balance that may be due. Any remaining balance or fees due must be paid within 15 days.**

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# Electrical Plan Review - Check List Instruction Sheet

## Professional Engineers stamp and signature

Professional Engineers stamp and signature shall be on all plan sheets for the following types of facilities; Educational, Hospitals, Nursing Homes, and other medical facilities that require review by the Department of Health.

## Plan Sheet requirements

Shall include all the following:

- Minimum scale 1/8" (except site plan)
- Minimum font size "9"
- Symbol legends
- Circuit connecting lines with home runs shown for all equipment, lighting, receptacle symbols; or other methods by permission.
- Schedules with electrical specifications for Luminaires, Mechanical/Equipment, Kitchen, Shop, and all other equipment items listed on the switchboard and panel schedules.
- Show the location of all items on the One-Line/Riser diagrams.
- Plan sheets need to reflect current as-built conditions.
- Plan sheets "specifically" identified as something other than the "Construction Set", cannot be approved.

## One-line/Riser Diagrams

Shall be complete and include the following:

- Service point (NEC 100 Definitions)
- Conductor size, type, and number of
- Equipment grounding conductor size, type, and number of, or identify if metallic raceway
- Conduit sizes, type, and number of
- Identifier's for distribution equipment such as switchboards, panelboards, transformers, etc.
- Overcurrent protection devices
- System (Voltage, phase, wire.)
- Bus ratings (the true value)
- AIC ratings
- Transformer primary/secondary voltages, KVA size, and source marking.
- Clearly indicate if system is fully rated or series rated for the available fault current.
- Locations with fault calculation values greater than 10,000 AIC need to be identified
- Additional items that maybe required shall be indicated. Such as; **Ground Fault Protection**, 2nd Level Ground Fault Protection, etc.

## Panel Schedules

Panel schedules for switchboards, distributions, and panels must be provided on the plan sheets and one set of panel schedules on 8½" × 11" sheets for use during the review process. The following information is required to be shown on the panel schedule.

*(Panel Schedules Continued on following page.)*

## Panel Schedules Cont…

- System voltage, phase, wire, bus rating, bus available interrupting current rating.
- Overcurrent protection device size with available interrupting current rating, circuit number, phase identification, total phase load.
- Load values in VA or KVA. If using KVA the value needs to be expressed out to two decimal places. (Example: 1237 VA = 1.24 KVA)
- Each circuit shall indicate the type of load category.
- Load summary by type of category provided at the bottom of the panel schedule with the connected and calculated load values and NEC demand factor(s) shown.
- Single panels and Multi-section panels shall indicate Main breaker size or lug configuration; Main lug only, Double lugs, Feed thru lugs.
- A separate panel schedule and calculation which includes downstream loads is required for each section of a Multi-section panel design.
- A “Before and After” panel schedule presentation, must be located side by side on the same plan sheet.

## Fault Current Calculations

The one line/riser diagram shall show the AIC value at all locations that are equal to or greater than 10,000 ampere. Fault calculations are required for new installations or existing installations when requested by Plan Review.

## Metered Demand Data

Metered demand data shall include the following:

- Copy of the current last 12 months of utility demand.
- Complete Calculations for all metered data shall be in KVA.
- Use of utility KW demand shall be converted to KVA using an appropriate power factor adjustment.
- Metered load studies shall include a minimum of 30 days continuously recorded.
- Provide the ampere value of each phase at the beginning of the study.
- The current transformer (CT) shall be connected to the highest ampere phase at the beginning of the study when all phase conductors are not being recorded.
- Where multiple load studies are conducted at different locations on the distribution system the recording of all phases at that metered location will be required.
- The one-line diagram shall indicate the metered point location for each load study. The following information is also required.
- Graph of the study with time periods, ampere values, and ampere maximum peak clearly identified.
- Make/model of recording equipment, make/model of current transformer’s.
- Where equipment is not or cannot be set to record a 15 minute demand mode (average value over a 15-minute period continuously recorded), contact plan review concerning acceptability of your alternate recording method before starting load study.
- Calculations provided shall be based on the ampere maximum peak value shown on the graph.
- Existing loads included in metered load data and removed or altered shall not be subtracted from the demand data or demand calculation.

**Generator or Alternate Power System**

- Where Generator unit(s) or alternate power system(s) are existing, or going to be installed, the locations are required to be provided on the plan sheets and clearly identified.
- Identification of generator or alternate power system **type** is required, such as...
- NEC-517 *****Essential Electrical System,
- NEC-700 *****Emergency System,
- NEC-701 Legally Required Standby System,
- NEC-702 Optional Standby System,
- NEC-705 Interconnected Electrical Power Production Sources,
- NEC-708 Critical Operations Power Systems (COPS).
- NEC-517, NEC-700, NEC-701 System Generator's. All the generator accessory loads shall be connected to the same system the generator supply's to maintain the integrity of the system. (Examples; battery chargers, block heaters, fuel pumps, dampers, equipment lighting)

***Only NEC-517 Essential Electrical System(s) and NEC-700 Emergency System(s) can supply Emergency load(s).**

**Documentation on System Coordination**

The documentation needs to clearly indicate that the Professional Engineer takes full responsibility that the installation, when installed as designed, shall comply with the requirements of NEC-700.32 Selective Coordination for Emergency System, **or** NEC-701.27 Selective Coordination for Legally Required Standby System, **or** NEC-517.26 Selective Coordination of Life Safety Branch of the Essential Electrical System, **and** Coordination of the Critical Branch, Equipment Branch of the Essential Electrical System. Provide documentation on plan sheet(s) or the professional engineer's company letterhead. Statement needs to include Professional Engineer's stamp and signature whether on plan sheet or company letterhead.

**Medium or High voltage Systems** (over 600v)

Shall be complete and include the following:

- Service point
- Conductor size, type, and number of
- Equipment conductor size, type and number of
- Conduit sizes
- Overcurrent protection devices
- System (Voltage, phase, wire.)
- Bus ratings
- AIC ratings
- Transformer primary/secondary voltages and KVA size
- Locations with fault calculation values greater than 10,000 AIC need to be identified.

**Hazardous Locations** (classified)

The boundary lines for any area classified as Class I, Division 1; Class I, Division 2; Class I, Zone 0; Class I, Zone 1; Class I, Zone 2; Class II, Division 1; Class II, Division 2; Class III, Division 1; Class III, Division 2; or any combination thereof shall be clearly indicated on the floor plan sheets and indicate the Classification of this area.

# Electrical Plan Review Screen in Check List

**Facility Name:** _____ Facility type: ☐ Assisted Living,

☐ Educational, ☐ Hospital, ☐Nursing Home, ☐ Institutional, ☐ Other specify: _____

## Professional Engineers stamp and signature

☐ Professional Engineers stamp and signature has been placed on each plan sheet. *(See check list instruction sheet)*

## Service Point

☐ Service Point has been verified and shown on sheet _____. *(See NEC -100 Definitions for **Service Point**)*

## Plan Sheets

☐ Number of **plan sheets** provided_____. Number of **plan sets** provided_____. Only one set is required. *(See check list instruction sheet for minimum requirements.)*

## One-Line/Riser diagrams

☐ Complete one-line is located on sheet(s) _____. *(See check list instruction sheet for minimum requirements.)*

## Panel Schedules

☐ Number of panel schedules _____. Panel schedules are required to be provided. *(See check list instruction sheet for minimum requirements.)*

## Fault Current Calculations

☐ AIC values greater than 10,000 have been identified on the one-line/riser diagram. *(See check list instruction sheet for minimum requirements.)*

## Metered Demand Data

☐ Where used, provide statement attesting to the validity of the demand data, signed by a professional electrical engineer; or where allowed, by the electrical administrator of the electrical contractor performing the work. *(See check list instruction sheet for minimum requirements.)*

## Generator or Alternate Power System

☐ Generator system(s) present at the facility is located on sheet(s) _____ and identified as _____. *(See check list instruction sheet for minimum requirements.)*

## Documentation on system "Selective" coordination

☐ Documentation is located on sheet(s) _____ or is provided by separate letter. *(See check list instruction sheet for minimum requirements.)*

## Medium or High voltage System (over 600v)

☐ Customer owned primary distribution one-line diagram is shown on sheet(s) _____. *(See check list instruction sheet for minimum requirements.)*

## Hazardous Locations (classified)

☐ The boundary lines are shown on sheet(s) _____. *(See check list instruction sheet for minimum requirements.)*

**Plan sheets, panel schedules, calculations, etc; provided in pencil, pen, or are illegible; are not acceptable.**

I have reviewed and provided all the required information for this submittal.

Print & Sign name and date_____

*Note: Plans submitted without this form signed & dated, or that do not comply with the requirements listed above may be returned Disapproved with fees charged.*

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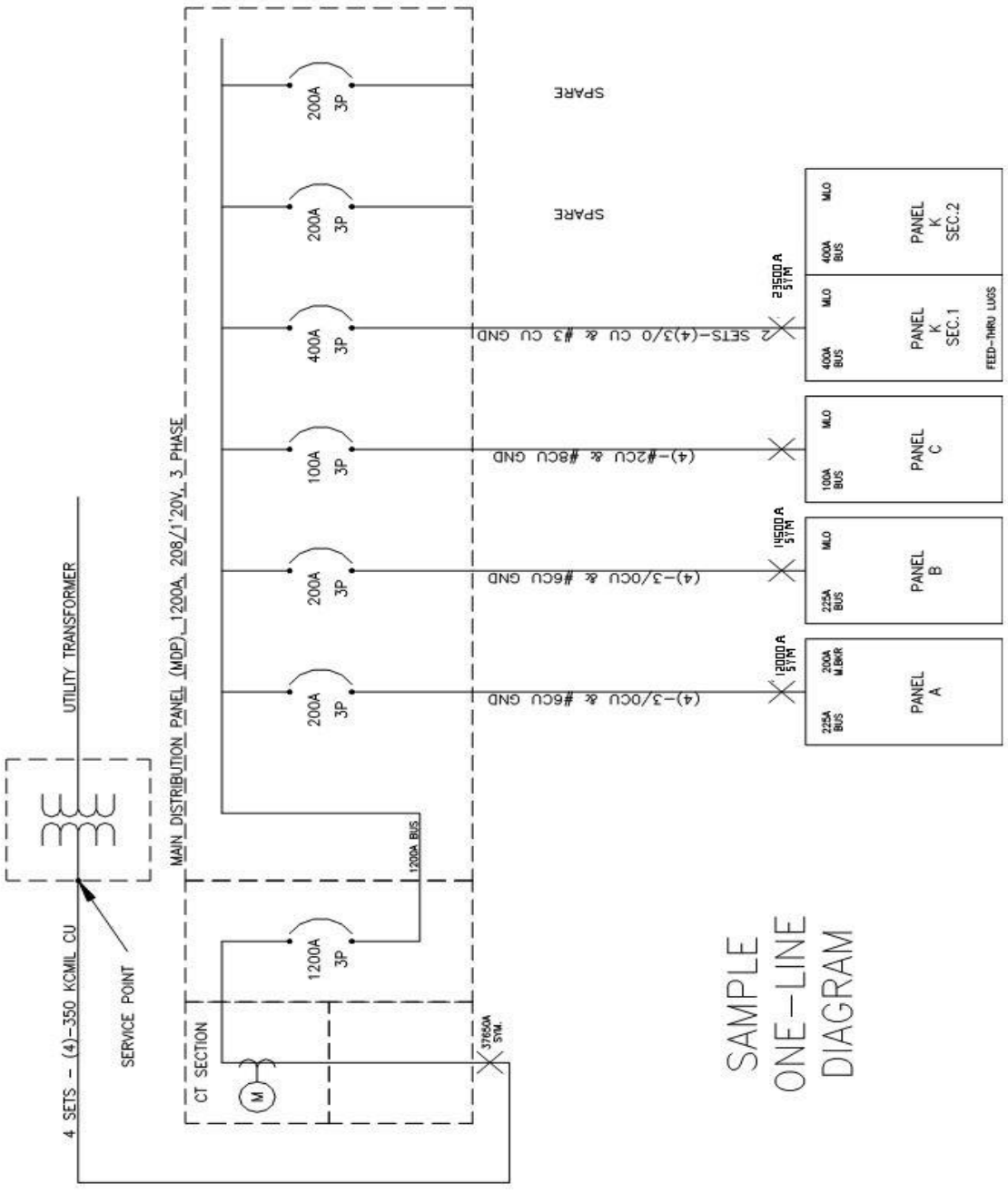


SAMPLE ONE-LINE DIAGRAM

*PANEL LOAD CALCULATION WORKSHEET*

Project:_____Date ____/____/____

Panel ID: _____

| LOAD TYPE | CONNECTED LOAD | NEC ADJUSTMENT FACTOR | | CALCULATED NEC LOAD |
|---|---|---|---|---|
| Lighting | _____ | X 125% | = | _____ |
| General-use Receptacles (First 10KVA) | _____ | X 100% | = | _____ |
| General-use Receptacles (Over 10KVA) | _____ | X 50% | = | _____ |
| Motors and Compressors | _____ | X 100% | = | _____ |
| (Largest Motor Load) | ( _____ ) | X 25% | = | _____ |
| Dedicated or Specific-use Receptacles | _____ | X 100% | = | _____ |
| HVAC and Mechanical Equipment Loads | _____ | X 100% | = | _____ |
| Kitchen Equipment (#___) | _____ | X ___% | = | _____ |
| Miscellaneous Loads | _____ | X 100% | = | _____ |
| _____ | _____ | X ___% | = | _____ |
| _____ | _____ | X ___% | = | _____ |
| _____ | _____ | X ___% | = | _____ |

❑ 240/120 ❑ 3Ø
❑ 208/120 ❑ 1Ø
❑ 480/277 ❑ _____
System Voltage

TOTAL CONNECTED LOAD

TOTAL CALCULATED LOAD

TOTAL CALCULATED AMPS

## Connected Load-

1. The nameplate rating of all appliances that are fastened in place, permanently connected, or located to be on a specific circuit. (Water heaters, space heaters, ranges, refrigerators, etc.)
2. 180 VA for each general-use receptacle.
3. Maximum VA of lighting fixtures.
4. VA of all motors based on full load amps from table 430-247, 248, 249 and 250 of the National Electrical Code.

## Calculated NEC Load-

The connected load after any adjustment factors allowed by code, have been applied. Load calculations shall be submitted/expressed in VA and converted to amps when sizing feeders and equipment, and is the minimum size allowed based upon these calculations.

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Panel ID: _____

Location: _____

Fed From: _____

***PANEL SCHEDULE***

***Single Phase***

**Bus Rating:**_____A

❑ Main Breaker _____A
❑ Main Lugs Only
❑ Fed-Thru Lugs
❑ Double Lugs

Single Phase
❑ 3-wire
❑ 4-wire
❑ Iso. GND

Voltage
❑ 240/120
❑ 208/120
❑ _____

Panel A.I.C. Rating: ❑ 10 K ❑ 14 K ❑ 18 K ❑ 22 K ❑ 25 K ❑ 42 K ❑ 65 K ❑ 100 K ❑ 150 K ❑ 200 K

| | Circuit Description | LOAD(VA) | Code | Breaker | BUS | Breaker | Code | LOAD(VA) | Circuit Description | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | A | | | | | 2 |
| 3 | | | | | B | | | | | 4 |
| 5 | | | | | A | | | | | 6 |
| 7 | | | | | B | | | | | 8 |
| 9 | | | | | A | | | | | 10 |
| 11 | | | | | B | | | | | 12 |
| 13 | | | | | A | | | | | 14 |
| 15 | | | | | B | | | | | 16 |
| 17 | | | | | A | | | | | 18 |
| 19 | | | | | B | | | | | 20 |
| 21 | | | | | A | | | | | 22 |
| 23 | | | | | B | | | | | 24 |
| 25 | | | | | A | | | | | 26 |
| 27 | | | | | B | | | | | 28 |
| 29 | | | | | A | | | | | 30 |
| 31 | | | | | B | | | | | 32 |
| 33 | | | | | A | | | | | 34 |
| 35 | | | | | B | | | | | 36 |
| 37 | | | | | A | | | | | 38 |
| 39 | | | | | B | | | | | 40 |
| 41 | | | | | A | | | | | 42 |

Code Description:
**L** = LIGHTING LOADS **M** = TOTAL MOTOR LOAD **H** = HVAC **LM** = LARGEST SINGLE MOTOR
**R** = GENERAL USE RECEPTACLES **S** = DEDICATED RECEPTACLES **K** = KITCHEN EQUIPMENT **Z** = MISC OR APPLIANCES

REVISION DATE: 07-01-2017

Panel ID: _____

Location: _____

Fed From: _____

***PANEL SCHEDULE***

***Three Phase***

**Bus Rating:**_____A

❑ Main Breaker _____A
❑ Main Lugs Only
❑ Fed-Thru Lugs
❑ Double Lugs

Three Phase
❑ 3-wire
❑ 4-wire
❑ Iso. GND

Voltage
❑ 480/277Y
❑ 208/120Y
❑ 240/120Δ
❑ _____

Panel A.I.C. Rating: ❑ 10 K ❑ 14 K ❑ 18 K ❑ 22 K ❑ 25 K ❑ 42 K ❑ 65 K ❑ 100 K ❑ 150 K ❑ 200 K

| Circuit Description | | LOAD(VA) | Code | Breaker | Ø | Breaker | Code | LOAD(VA) | Circuit Description | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | A | | | | | 2 |
| 3 | | | | | B | | | | | 4 |
| 5 | | | | | C | | | | | 6 |
| 7 | | | | | A | | | | | 8 |
| 9 | | | | | B | | | | | 10 |
| 11 | | | | | C | | | | | 12 |
| 13 | | | | | A | | | | | 14 |
| 15 | | | | | B | | | | | 16 |
| 17 | | | | | C | | | | | 18 |
| 19 | | | | | A | | | | | 20 |
| 21 | | | | | B | | | | | 22 |
| 23 | | | | | C | | | | | 24 |
| 25 | | | | | A | | | | | 26 |
| 27 | | | | | B | | | | | 28 |
| 29 | | | | | C | | | | | 30 |
| 31 | | | | | A | | | | | 32 |
| 33 | | | | | B | | | | | 34 |
| 35 | | | | | C | | | | | 36 |
| 37 | | | | | A | | | | | 38 |
| 39 | | | | | B | | | | | 40 |
| 41 | | | | | C | | | | | 42 |

Code Description:
**L** = LIGHTING LOADS
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**Z** = MISC. OR APPLIANCES

REVISION DATE: 07-01-2017

## *DISTRIBUTION CALCULATION WORKSHEET*

Date: _____

Name: _____

Address: _____ Inspection Office: _____

Project Description: _____

| LOAD TYPE | | | | | | | | | | | CONN. TOTAL | % | CALC. TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Loads** | | | | | | | | | | | | x125% | |
| **General use Receptacles≤10 KVA** | | | | | | | | | | | | x100% | |
| **General use Receptacles>10 KVA** | | | | | | | | | | | | x50% | |
| **Motors and Compressors** | | | | | | | | | | | | x100% | |
| **(Largest Motor)** | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | x25% | |
| **Specific-use Receptacles** | | | | | | | | | | | | x100% | |
| **HVAC Equipment and Mechanical** | | | | | | | | | | | | x100% | |
| **Kitchen Equipment** | | | | | | | | | | | | x____% | |
| **Miscellaneous or Appliances** | | | | | | | | | | | | x100% | |
| | | | | | | | | | | | | x____% | |
| | | | | | | | | | | | | x____% | |
| **CONNECTED LOAD** | | | | | | | | | | | | | |
| **CALCULATED LOAD** | | | | | | | | | | | | | |
| **AMPS** | | | | | | | | | | | | | |

# *PEAK DEMAND CALCULATION WORKSHEET*

## *PER NEC 220-87 and WAC 296-46B-900(3)(j)*

| | | | | |
|---|---|---|---|---|
| **1.** | **Recorded Peak Demand**<br>**on Date:** _ _ / _ _ / _ _<br>**Study Dates: From** _ _ / _ _ / _ _<br>**To** _ _ / _ _ / _ _ | **=** | | KW |
| **2.** | Power Factor | **÷** | | (P.F.) |
| | **Apparent Peak Demand** | **=** | | KVA |
| **3.** | NEC 220-87 adjustment factor | **X** | **1.25** | |
| | **Adjusted Peak Demand** | | | KVA |
| **4.** | Seasonal adjustment factor ✹ & ✹✹ | **X** | | |
| | **Seasonally Adjusted Peak Demand** | **=** | | KVA |
| **5.** | Occupancy adjustment factor ✹✹ | **X** | | |
| | **Occupancy Adjusted Peak Demand** | **=** | | KVA |
| **6.** | Other adjustment factor(s) ✹✹ | **X** | | |
| | **Total Peak Demand** | **=** | | KVA |
| **7.** | **New Calculated Load Added** | **+** | | KVA |
| | **Metered demand based CALCULATED LOAD:** | | | **KVA** |
| | | | | **AMPS** |

Note: See WAC 296-46B-900(3)(j) for additional metering requirements.

✹ Based upon 12 month utility data, or explain why not.

✹✹ Explain how the factor was derived for 30-day demand metering or explain why it doesn't apply.

Seasonal _____

_____

_____

Occupancy _____

_____

_____

Other _____

_____

_____

# APPROVED PLANS

WAC 296-46B-900 (3)(d)(v) requires that “approved” plans shall be available on the job site for use by the electrical inspector as soon as they are approved, and prior to the final inspection. The following illustrations represent the appearance of the approval stamps currently in use by the Labor and Industries Electrical Plans Examiners.

The large stamp below will be placed on the cover sheet of the complete plan package, on the first sheet of the electrical plans, or on both. It may be stamped with red or black ink. The signature of the electrical plans examiner will be on the approval stamp.

- APPROVED-Means that the plans have been approved as submitted without corrections.
- APPROVED **AS NOTED**-Means that the plans have been approved and the plans examiner has included notes, intended for the electrical inspector that describe corrections or changes in the original design submittal. These notes are always written or highlighted in RED INK and individually initialed by the plans examiner. Compliance with these notes is mandatory and a condition of the plan approval.

DEPT. OF LABOR & INDUSTRIES
Electrical Plan Review

PLANS ☐ APPROVED _____
☐ APPROVED
AS NOTED **SEP 14 2011**

BY *Examiner's Signature*
Plans Examiner

SUBJECT TO PERMIT FEE _____
PROJECT SUBJECT TO
CODE AND FIELD INSPECTION

The small stamp below will be placed on <u>each</u> approved electrical plan sheet. It may be stamped with red or black ink. The signature of the electrical plans examiner will be on each approval stamp.

STATE OF WASHINGTON
DEPT. OF LABOR AND INDUSTRIES
ELECTRICAL PLAN REVIEW SECTION
APPROVED

**SEP 14 2011**

SUBJECT TO CODE
AND FIELD INSPECTION

BY *Examiner's Signature*

All plan sheets, specifications, calculations, and other materials are stamped with the electrical plan review number: