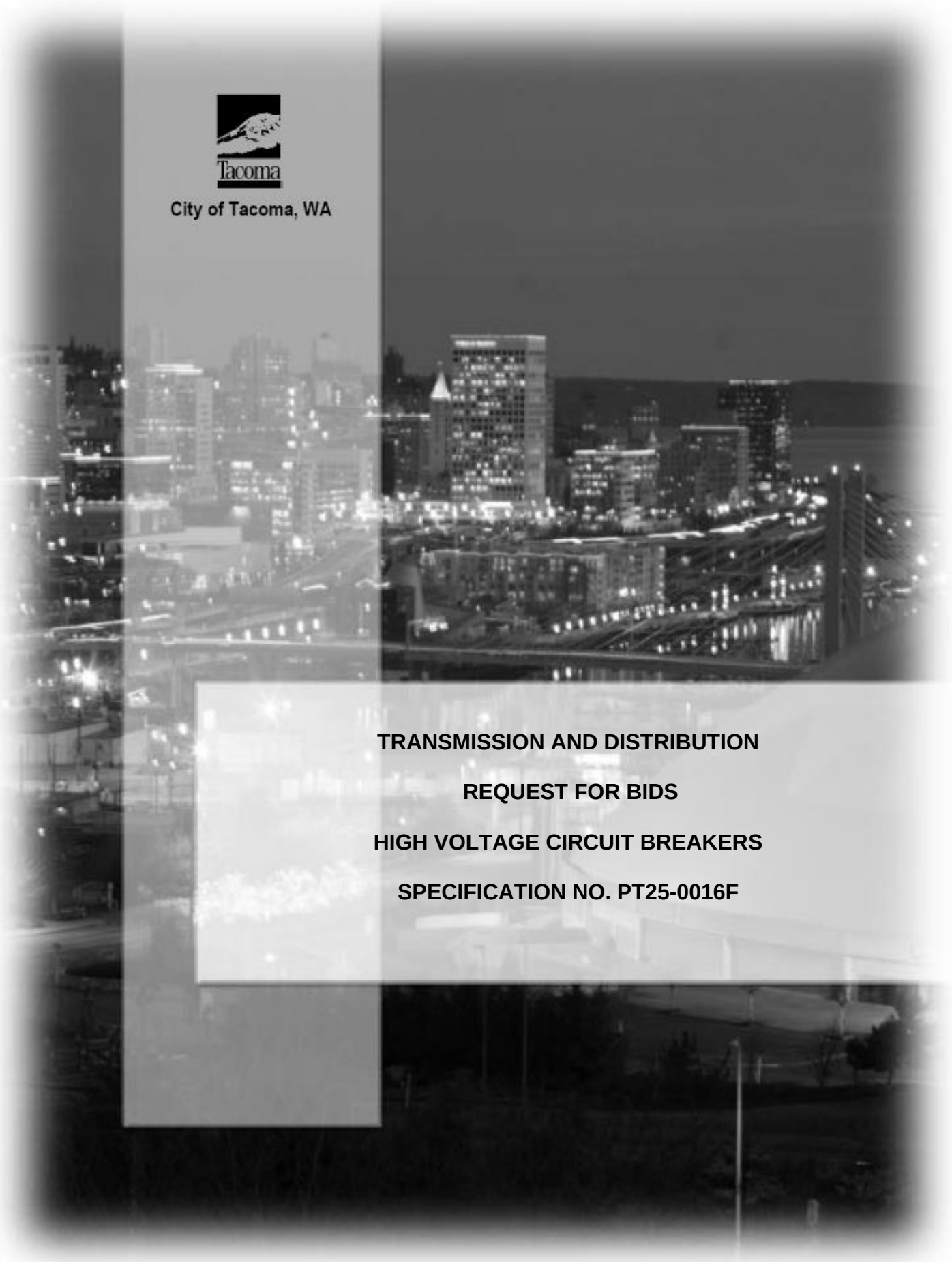


City of Tacoma, WA

TRANSMISSION AND DISTRIBUTION

REQUEST FOR BIDS

HIGH VOLTAGE CIRCUIT BREAKERS

SPECIFICATION NO. PT25-0016F

City of Tacoma

TRANSMISSION AND DISTRIBUTION
REQUEST FOR BIDS PT25-0016F
HIGH VOLTAGE CIRCUIT BREAKERS

Submittal Deadline: 11:00 a.m., Pacific Time, Tuesday, April 22, 2025

Submittals must be received by the City's Procurement and Payables Division by 11:00 a.m. Pacific Time.

For electronic submittals, the City of Tacoma will designate the time of receipt recorded by our email server, as the official time of receipt. This clock will be used as the official time of receipt of all parts of electronic bid submittals. Include the specification number in the subject line of your email. Your submittal must be sent as an attachment, links to your electronic submittal will not be accepted.

For in person submittals, the City of Tacoma will designate the time of receipt recorded by the timestamp located at the lobby security desk, as the official time of receipt. Include the specification number on the outside of the sealed envelope. Late submittals will be returned unopened and rejected as non-responsive.

Submittal Delivery: Sealed submittals will be received as follows:

By Email:	**In Person:**
sendbid@cityoftacoma.org Maximum email size including attachments: 35 MB. Multiple emails may be sent for each submittal. **Note:** Email may pass through multiple servers before arriving at its destination. Please allow sufficient time for email delivery of submittals. Timely electronic delivery is at the risk of the supplier.	Tacoma Public Utilities Administration Building North, Main Floor, Lobby Security Desk 3628 South 35th Street Tacoma, WA 98409 Monday – Friday 8:00 am to 4:30 pm

Bid Opening: Submittals must be received by the City's Procurement and Payables Division prior to 11:00 a.m. Pacific Time. Sealed submittals in response to a RFB will be opened Tuesday's at 11:15 a.m. by a purchasing representative and read aloud during a public bid opening held at the Tacoma Public Utilities Administrative Building North, 3628 S. 35th Street, Tacoma, WA 98409, conference room M-1, located on the main floor. They will also be held virtually Tuesday's at 11:15 a.m. Attend a Zoom meeting via this link or call 1 (253) 215 8782, using meeting ID # 884 0268 0573, passcode # 070737.
Submittals in response to an RFP, RFQ or RFI will be recorded as received, but not read at bid opening. As soon as possible, after 1:00 PM, on the day of submittal deadline, preliminary results will be posted to www.TacomaPurchasing.org.

If you believe your submittal was sent timely and was not read at bid opening, please contact sendbid@cityoftacoma.org immediately.

Solicitation Documents: An electronic copy of the complete solicitation documents may be viewed and obtained by accessing the City of Tacoma Purchasing website at www.TacomaPurchasing.org.

- Register for the Bid Holders List to receive notices of addenda, questions and answers and related updates.
- Click here to see a list of vendors registered for this solicitation.

Pre-Proposal Meeting: A pre-proposal meeting will not be held.

Project Scope: Contract for 115kV and 230KV circuit breakers

Estimate: $1,000,000

Paid Sick Leave: The City of Tacoma requires all employers to provide paid sick leave in accordance with State of Washington law.

Americans with Disabilities Act (ADA Information: The City of Tacoma, in accordance with Section 504 of the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA), commits to nondiscrimination on the basis of disability, in all of its programs and activities. Specification materials can be made available in an alternate format by emailing the contact listed below in the *Additional Information* section.

Title VI Information:
"The City of Tacoma" in accordance with provisions of Title VI of the Civil Rights Act of 1964, (78 Stat. 252, 42 U.S.C. sections 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin in consideration of award.

Additional Information: Requests for information regarding the specifications may be obtained by contacting Aaron Bratton by email to Abratton@cityoftacoma.org

Protest Policy: City of Tacoma protest policy, located at www.tacomapurchasing.org, specifies procedures for protests submitted prior to and after submittal deadline.

Meeting sites are accessible to persons with disabilities. Reasonable accommodations for persons with disabilities can be arranged with 48 hours advance notice by calling 253-502-8468.

TABLE OF CONTENTS

SUBMITTAL CHECK LIST

This checklist identifies items to be included with your submittal. Any submittal received without these required items may be deemed non-responsive and not be considered for award. Submittals must be received by the City of Tacoma Purchasing Division by the date and time specified in the Request for Bids page.

The following items make up your complete electronic submittal package (include all the items below):	
Signature Page (Appendix B) To be filled in and executed by a duly authorized officer or representative of the bidding entity. If the bidder is a subsidiary or doing business on behalf of another entity, so state, and provide the firm name under which business is hereby transacted.	
Price Proposal Form (Appendix B) The unit prices bid must be shown in the space provided. Check your computations for omissions and errors.	
After award, the following documents will be executed:	
City of Tacoma Contract (See sample in Appendix C) Must be executed by the successful bidder.	

SPECIAL NOTICE TO BIDDERS

Public works and improvement projects for the City of Tacoma are subject to Washington state law and Tacoma Municipal Code, including, but not limited to the following:

I. STATE OF WASHINGTON

A. RESPONSIBILITY CRITERIA – STATE OF WASHINGTON

In order to be considered a responsible bidder the bidder must meet the following mandatory state responsibility criteria contained in RCW 39.04.350:

1. Have a current certificate of registration as a contractor in compliance with chapters 18.27 RCW,18.106 RCW, 70.87 RCW, 19.28 RCW, which must have been in effect at the time of bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable:
    a. Have Industrial Insurance (workers' compensation) coverage for the bidder's employees working in Washington, as required in Title 51 RCW;
    b. Have a Washington Employment Security Department number, as required in Title 50 RCW;
    c. Have a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW and;

4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 (unlicensed or unregistered contractors) or 39.12.065(3) (prevailing wage).
5. Have received training on the requirements related to public works and prevailing wage under this chapter and chapter 39.12 RCW and must designate a person or persons to be trained on these requirements. The training must be provided by the department of labor and industries or by a training provider whose curriculum is approved by the department. Bidders that have completed three or more public works projects and have had a valid business license in Washington for three or more years are exempt from this subsection.

B. RECIPROCAL PREFERENCE FOR RESIDENT CONTRACTORS:

Effective March 30, 2012, RCW 39.04.380 imposes a reciprocal preference for resident contractors. Any bid received from a non-resident contractor from a state that provides an in-state percentage bidding preference is subject application of a comparable percentage disadvantage.

A non-resident contractor from a state that provides an in-state percentage bidding preference means a contractor that:

1. Is from a state that provides a percentage bid preference to its resident contractors bidding on public works projects, and
2. Does not have a physical office located in Washington at the time of bidding on the City of Tacoma public works project.

The state of residence for a non-resident contractor is the state in which the contractor was incorporated, or if not a corporation, the state in which the contractor's business entity was formed.

The City of Tacoma will evaluate all non-resident contractors for an out of state bidder preference. If the state of the non-resident contractor provides an in state contractor preference, a comparable percentage disadvantage will be applied to the non-resident contractor's bid prior to contract award. The responsive and lowest and best responsible bidder after application of any non-resident disadvantage will be awarded the contract.

The reciprocal preference evaluation does not apply to public works procured pursuant to RCW 39.04.155, RCW 39.04.280, federally funded competitive solicitations where such agencies prohibit the application of bid preferences, or any other procurement exempt from competitive bidding.

Bidders must provide the City of Tacoma with their state of incorporation or the state in which the business entity was formed and include whether the bidder has a physical office located in Washington.

The bidder shall submit documentation demonstrating compliance with above criteria on the enclosed State Responsibility and Reciprocal Bidder Information form.

C. SUBCONTRACTOR RESPONSIBILITY

1. The Contractor shall include the language of this subcontractor responsibility section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. The requirements of this section apply to all subcontractors regardless of tier.
2. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:
    a. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;
    b. Have a current Washington Unified Business Identifier (UBI) number;
    c. If applicable, have:
        i. Industrial Insurance (workers' compensation) coverage for the bidder's employees working in Washington, as required in Title 51 RCW;
        ii. A Washington Employment Security Department number, as required in Title 50 RCW;
        iii. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
        iv. An electrical contractor license, if required by Chapter 19.28 RCW;
        v. An elevator contractor license, if required by Chapter 70.87 RCW and;
3. Not be disqualified from bidding on any public works contract under RCW 39.06.010 (unlicensed or unregistered contractors) or 39.12.065(3) (prevailing wage).

II. CITY OF TACOMA

A. SUPPLEMENTAL RESPONSIBILITY CRITERIA – CITY OF TACOMA:

In order to be considered a responsible bidder, the prospective bidder shall have all of the following qualifications set forth in Tacoma Municipal Code 1.06.262:

1. Adequate financial resources or the ability to secure such resources;
2. The necessary experience, stability, organization and technical qualifications to perform the proposed contract;
3. The ability to comply with the required performance schedule, taking into consideration all existing business commitments;
4. A satisfactory record of performance, integrity, judgment and skills; and
5. Be otherwise qualified and eligible to receive an award under applicable laws and regulations.
    a. Bidder Responsibility. Bidders shall not be in violation of 39.04.350 RCW Bidder Responsibility Criteria - Supplemental Criteria.

In addition to the mandatory bidder responsibility criteria listed immediately above, the City may, in addition to price, consider any or all of the following criteria contained in Tacoma Municipal Code Chapter 1.06.262 in determining bidder responsibility:

1. The ability, capacity, experience, stability, technical qualifications and skill of the respondent to perform the contract;
2. Whether the respondent can perform the contract within the time specified, without delay or interference;
3. Integrity, reputation, character, judgment, experience, and efficiency of the respondents, including past compliance with the City's Ethics Code;
4. Quality of performance of previous contracts;
5. Previous and existing compliance with laws and ordinances relating to contracts or services;
6. Sufficiency of the respondent's financial resources;
7. Quality, availability, and adaptability of the supplies, purchased services or public works to the particular use required;
8. Ability of the respondent to provide future maintenance and service on a timely basis;
9. Payment terms and prompt pay discounts;
10. The number and scope of conditions attached to the submittal;
11. Compliance with all applicable City requirements, including but not limited to the City's Ethics Code and its Small Business Enterprise and Local Employment and Apprenticeship programs;
12. Other qualification criteria set forth in the specification or advertisement that the appropriate department or division head determines to be in the best interests of the City.

The City may require bidders to furnish information, sworn or certified to be true, to demonstrate compliance with the City responsibility criteria set forth above. If the city manager or director of utilities is not satisfied with the sufficiency of the information provided, or if the prospective respondent does not substantially meet all responsibility requirements, any submittal from such respondent must be disregarded.

B. ADDITIONAL SUPPLEMENTAL CRITERIA

Lifetime Capital Costs = Bid Price

This provision and the results obtained from its application shall not be construed as

limiting any freedom of action the City may deem necessary to obtain equipment that will

fulfill all the provisions of this contract.

1.13.2 EVALUATION CALCULATION AND TOTAL EVALUATED COST

Bids shall be ranked according to the Total Evaluated Cost. Total Evaluated Cost (TEC)

shall be defined as follows:

TEC=Lifetime Capital Costs + Warranty Penalty (if any).

Warranties of less than five (5) years will be evaluated at one percent (1%) of the bid

price for every year under five (5) years.

C. MODIFICATIONS TO SUPPLEMENTAL CRITERIA

Potential bidders may request modifications to the City's supplemental criteria by submitting a written request to the Purchasing Division via email to bids@cityoftacoma.org no later than 5:00

p.m. Pacific Time, three days prior to the submittal deadline. Please include the Specification No. and Title when submitting such requests. Requests must include justification for why certain criteria should be modified. Requests received after this date and time will not be considered.

The City will respond to a timely submitted request prior to the bid opening date. Changes to the supplemental criteria, if warranted, will be issued by addendum to the solicitation documents and posted to the City's website for the attention of all prospective bidders.

D. DETERMINATION OF BIDDER RESPONSIBILITY

If the City determines the bidder does not meet the criteria above and is therefore not a responsible bidder, the City shall notify the bidder in writing with the reasons for its determination. If the bidder disagrees, the bidder may appeal the determination in a manner consistent with the City's Protest Policy. Appeals are coordinated by the Purchasing Division heard by the Procurement and Payables Division manager for contracts less than or equal to $500,000 and by Contracts and Awards Board for contracts greater than $500,000.

1. MINIMUM REQUIREMENTS

The Respondent shall be experienced in the design, manufacture, direct sale, warranty service, and support of this type of material or equipment to electrical power utilities in the United States. The Respondaent shall have a record of successful delivery and performance over the last 10 years or more to clients in the United States.

2. STANDARD TERMS AND CONDITIONS / GENERAL PROVISIONS

City of Tacoma Standard Terms and Conditions apply.

3. INSURANCE REQUIREMENTS

Successful proposer will provide proof of and maintain the insurance coverage in the amounts and in the manner specified in the City of Tacoma Insurance Requirements contained in this solicitation. (See Appendix)

4. DESCRIPTION OF WORK

The City of Tacoma (City) / Tacoma Public Utilities (TPU) is soliciting bids to establish one or more contracts with qualified vendors to fulfill the City's needs for 115kV and 230kV Circuit Breakers . Contract(s) will be awarded to the lowest responsive and responsible bidder(s) based on price, product quality and availability.

5. ANTICIPATED CONTRACT TERM

5 years with no extensions.

6. CALENDAR OF EVENTS

This is a tentative schedule only and may be altered at the sole discretion of the City.

Contract may be issued after Public Utility Board and/or City Council approval.

The anticipated schedule of events concerning this RFB is as follows:

Approved Equivalent Deadline:	**3/26/2025**
Question Deadline:	**4/2/2025**
City response to Questions:	**4/9/2025**
Submittal Due Date:	**4/22/2025**
Anticipated Award Date, on or about:	**May 2025**
Public Utility Board/City Council Approval, on or about:	**May 2025**

7. INQUIRIES

7.1 Questions can be submitted to *Aaron Bratton*, Senior Buyer, via email to abratton@cityoftacoma.org. Subject line to read:
PT25-0016F-High Voltage Circuit Breakers – *VENDOR NAME*

7.2 Questions are due by 3 pm on the date included in the Calendar of Events section.

7.3 Questions marked confidential will not be answered or included.

7.4 The City reserves the discretion to group similar questions to provide a single answer or not to respond when the requested information is confidential.

7.5 The answers are not typically considered an addendum.

7.6 The City will not be responsible for unsuccessful submittal of questions.

7.7 Written answers to questions will be posted alongside these specifications at www.tacomapurchasing.org.

8. PRE-BID MEETING

No pre-proposal meeting will be held; however, questions and request for clarifications of the specifications may be submitted as stated in the inquiries section.

9. DISCLAIMER

The City is not liable for any costs incurred by the Respondent for the preparation of materials or a proposal submitted in response to this RFB, for conducting any presentations to the City, or any other activities related to responding to this RFB, or to any subsequent requirements of the contract negotiation process.

10. RESPONSIVENESS

Bid submittals must provide ninety (90) days for acceptance by City from the due date for receipt of submittals. All submittals will be reviewed by the City to determine compliance with the requirements and instructions specified in this RFB. The Respondent is specifically notified that failure to comply with any part of this RFB may result in rejection of the submittal as non-responsive. The City reserves the right, in its sole discretion, to waive irregularities deemed immaterial. The City also reserves the right to not award a contract or to issue subsequent RFB's

11. AWARD

Awardee shall be required to comply with 2 CFR part 25, and obtain a unique entity identifier and/or be registered in the federal System for Award Management as appropriate.

Award will be made to the lowest responsive, responsible bidder. All bidders shall provide unit or lump sum pricing for each line item. Each line item will be added up for a subtotal price. The subtotal price will be compared amongst each bidder, including any payment discount terms offered twenty (20) days or more. The City may also take into consideration all other criteria for determining award, including evaluation factors set forth in Municipal Code Section 1.06.262.

All other elements or factors, whether or not specifically provided for in this specification, which would affect the final cost to and the benefits to be derived by the City will be considered in determining the award of the contract. The final award decision will be based on the best interests of the City.

The City reserves the right to let the contract to the lowest responsible bidder whose bid will be the most advantageous to the City, price and any other factors considered. In evaluating the proposals, the City may also consider any or all of the following:

1. Compliance with specification.
2. Proposal prices, listed separately if requested, as well as a lump sum total
3. Time of completion/delivery.
4. Warranty terms.

5. Bidder's responsibility based on, but not limited to:
   a) Ability, capacity, organization, technical qualifications and skill to perform the contract or provide the services required.
   b) References, judgment, experience, efficiency and stability.
   c) Whether the contract can be performed within the time specified.
   d) Quality of performance of previous contracts or services

12. DELIVERY

12.1 Delivery shall be to the Tacoma Power Warehouse, 3628 South 35th Street, Tacoma, WA 98409-3192. Additional Destinations: If additional delivery destinations are desired by the City, they will be noted on the appropriate purchase order. .

Each vendor will be required to submit a delivery timeline they can commit to. Purchase order delivery dates will reflect this timeline. In the event a purchase order deliver date is not met, the City reserves the right to purchase these products elsewhere if they are in a time constraint. If constant late deliveries occur, the City may terminate the contract.

12.2 Hours of operation shall be Monday through Friday, 9:00 a.m. to 3:30 p.m., excluding legal holidays, as referred to in the Standard Terms and Conditions or as otherwise approved by the City.

13. WARRANTY

Labor: Minimum three (3) year warranty.

Parts: Manufacturer's warranty or minimum five-year warranty whichever is greater.

Contractor shall arrive on-site at the Tacoma Power Warehouse within 48 hours of notification for all warranty repairs during normal work hours of 8:00 a.m. to 5:00 p.m. Monday through Friday. Repairs shall include free pick-up and delivery. Repairs must be completed and vehicle returned within 48 hours of pick-up.

Contractor agrees to allow City to make minor warranty repairs where that is most cost effective and, if requested, contractor will credit City for cost of parts, but not labor.

Vendor will warrant goods according to the manufacturer's warranty guidelines. The start of the warranty commences once the goods are delivered and accepted by the City.

14. INSPECTION

All goods are subject to final inspection and acceptance by the City. If any inspection fails, the vendor shall be required to make arrangements to exchange the goods at their own expense and replace it in a timely manner acceptable to the City.

Material failing to meet the requirements of this contract will be held at Vendor's risk and may be returned to Vendor. If so returned, the cost of transportation, unpacking, inspection, repackaging, reshipping, or other like expenses are the responsibility of the Vendor.

15. APPROVED ITEM EQUIVALENT

A specific manufacturer for almost all line items has been listed in the Technical Specifications because this is the current manufacturer accepted. For those line items, which do not list a specific manufacturer, bidders shall provide the technical specifications for the manufacturer they are offering. The City may request, after the bid due date, a sample of that product for review and approval by the City. The City reserves all rights to be the sole judge as to whether any other manufacturer can meet or exceed the current specifications they use. Unless an item is indicated "No Substitute", approved equivalents shall be submitted by the date listed in the Calendar of Events section. Equivalents will be approved by Addendum to the solicitation.

16. COMPLIANCE WITH SPECIFICATIONS

All products shall be new and unused. Any product that does not comply with any part of these technical specifications shall be rejected and the vendor shall, at its own expense, including shipping, replace the item.

17. MATERIALS AND WORKMANSHIP

The successful bidder shall be required to furnish all materials necessary to perform contractual requirements. Materials and workmanship for this contract shall conform to all codes, regulations and requirements for such specifications contained herein and the normal uses for which intended. Material shall be manufactured in accordance with the best commercial practices and standards for this type of goods. All literature and products must be packaged and labeled to sell in the United States.

18. ENVIRONMENTALLY PREFERABLE PROCUREMENT

In accordance with the City's Sustainable Procurement Policy and Climate Action Plan, it is the policy of the City of Tacoma to encourage the use of products or services that help to minimize the environmental and human health impacts of City Operations. Respondents are encouraged to incorporate environmentally preferable products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, products, manufacturing, packaging, distribution reuse, operation, maintenance or disposal of the product or service.

The City of Tacoma encourages the use of sustainability practices and desires any awarded contractor(s) to assist in efforts to address such factors when feasible for:

- Durability, reusability, or refillable
- Pollutant releases, especially persistent bioaccumulative toxins (PBTs), low volatile organic compounds (VOCs), and air quality and stormwater impacts
- Toxicity of products used
- Greenhouse gas emissions, including transportation of products and services, and embodied carbon
- Recycled content

- Energy and water resource efficiency

19. LEAP REQUIREMENTS

This project has no LEAP requirements, however, the City of Tacoma is committed to equality in employment for WA-State approved Apprentices, City of Tacoma residents, residents of local economically distressed areas, youth, veterans, minorities, and women. Please contact the LEAP Office for assistance in locating qualified employees. Visit the LEAP website for more information.

20. EQUITY IN CONTRACTING

This project has no EIC requirements, however, the City of Tacoma is committed to encouraging firms certified through the Washington State Office of Minority and Women's Business Enterprise to participate in City contracting opportunities. See **TMC 1.07 Equity in Contracting Policy** at the City's Equity in Contracting Program website.

APPENDIX A - TECHNICAL SPECIFICATIONS

Technical Specifications

SECTION 2 – TECHNICAL PROVISIONS

2.1 GENERAL

These specifications cover the furnishing of SF6 gas-insulated circuit breakers and circuit switchers to include all required SF6 gas, miscellaneous equipment, materials, and accessories. Equipment furnished shall be complete with all accessories ready for mounting, assembly, connection and immediate service with the exception of anchor bolts.

2.2 CODES AND STANDARDS

All equipment, components (including, but not limited to, all threaded fasteners), and materials provided under this specification shall conform to the applicable standards of ANSI, ASME, ASTM, IEEE, and NEMA. All materials and devices shall be in accordance with the applicable requirements of the Federal Occupational Safety and Health Standards.

The circuit breakers and switchers shall be designed, fabricated and tested in accordance with ANSI/IEEE C37 Series, NEMA SG 4, and these specifications.

2.3 CONSTRUCTION DETAILS

- Circuit breakers shall be a three-pole, single-break, gang-operated SF6 interrupter.
- The circuit breaker design shall be the dead-tank type for outdoor application.
- Each breaker shall be designed and constructed for operation on a 115kV or 230kV, as specified, three-phase 60 hertz, effectively grounded system and the following usual service conditions applicable: at a maximum ambient temperature of +104°F (40°C) to -22°F (-30°C) and an altitude below 3,300 feet (1000 meters).

The following articles describe the general construction of the circuit breakers and circuit switchers.

2.3.1 OPERATING MECHANISM

The preferred operating mechanism shall consist of spring-charged stored-energy mechanism for trip and close. Hydraulic or spring-hydraulic mechanism will be evaluated. The operating mechanism shall include all auxiliary devices and other accessories for the operating mechanism furnished. The mechanism shall be electrically trip free and shall include anti-pump auxiliary relays and devices. The mechanism shall be charged via an electric motor in 15 seconds or less after a single close-open operation.

The operating mechanism shall include a mechanical position indicator. The indicator shall provide a positive indication of the breaker/switcher position by direct mechanical coupling to the operating rod. The indicator shall consist of a suitable sign utilizing green with the word "OPEN" or “O” when in the open position and red with the word "CLOSED" or “C" when in the closed position.

The operating mechanism shall include a spring energy indicator. The indicator shall provide a positive indication of the spring status. The indicator shall consist of a suitable sign utilizing the words "CHARGED" and “DISCHARGED”.

The preferred operating mechanism shall include two low-energy-type (below ten (10) amperes operating current) trip coils. Trip coil operating current greater than ten (10) amperes will be evaluated. The trip coils shall be electrically, mechanically, and magnetically independent. The trip coils shall be located such that heat or fire damage to one trip coil shall not preclude the proper operation of the other trip coil. The trip coils shall be suitable for parallel trip coil operation. Loss of DC voltage to one trip coil shall not impair the operation of the other trip coil or the breaker close mechanism. The trip coils shall be wired to individual terminals to allow independent activation and testing.

The stored-energy operating mechanism shall operate according to the duty cycle stated in the Specification and Data Sheets. Each unit shall include an automatic throw over scheme which shall supply the mechanism motor from the City's DC station service system when normal auxiliary AC power is lost.

Each operating mechanism shall include spare auxiliary switch contacts for use by the City. The spare auxiliary switch contacts shall be mechanically linked to the mechanism operating rod.

2.3.2 AUXILIARY POWER SUPPLY

The City will furnish one auxiliary power supply to each breaker/switcher at the voltage specified in Section 2.8.2.3. If the Supplier chooses to furnish motors or other auxiliary

equipment designed to operate at a different voltage from the specified auxiliary power supply, Supplier shall furnish all equipment required to transform the voltage of auxiliary power to the design voltage of the equipment furnished. The Supplier shall provide suitable branch circuit protection.

2.3.3 OVERCURRENT DEVICES AND ISOLATION SWITCHES

Circuit breakers shall be supplied with over current protective devices for the trip power, close power and auxiliary circuits. Each circuit, including trip coils, shall have its own knife switch for circuit isolation.

2.3.4 SF6 GAS SYSTEM

The Supplier shall supply the new SF6 gas to fill, test and energize each breaker/switcher, as specified in price adders. The return of gas cylinders shall be arranged and provided by the Supplier.

The SF6 gas leak rate shall not be greater than 0.5% per year.

Temperature-compensated pressure switches or gas density switches shall be provided to monitor the SF6 gas density. A drop in SF6 gas density shall initiate a low SF6 gas density alarm. A further drop in density shall initiate a City selectable trip or block operation of the breaker/switcher. Each breaker/switcher shall provide a test valve, or an acceptable means, to test the gas monitor.

To accommodate gas processing and sampling, the Supplier shall provide one (1) 3/8” NPT male gas pipe fitting per breaker.

Corrosive arc products, due to moisture infiltration, shall be prevented to the maximum extent possible through the use of desiccant moisture-absorbing chambers and an arc product filter.

2.3.5 ARC CONTAINMENT CHAMBER

The arc containment chamber shall be designed to prevent mechanical failure and withstand pressure buildup if the breaker fails to interrupt full-rated fault current. A pressure-relief device is required.

2.3.6 DUAL MONITORING AND CONTROL SYSTEM

The circuit breaker/switcher shall be furnished with dual control schemes which monitor the SF6 gas system. The dual control schemes shall be mechanically and electrically independent with each control scheme wired into a separate trip-coil circuit.

2.3.7 INSTRUMENT TRANSFORMERS

Each breaker shall be capable of a minimum of two (2) instrument transformers (current transformers) per bushing.

Current transformers shall be provided as specified in accordance with NEMA SG 4, Section 1, and as set forth in Section 2.8. Current transformers shall be bushing-type with fully distributed windings for relaying service. Current transformers shall be five-lead, multi-ratio-type, thermal rating factor of 2.0 at 30°C, C800 class, and/or 0.3B1.8 class.

All secondary leads of each instrument transformer, including all taps of each transformer, shall be wired to shorting-type terminal blocks located in the circuit breaker control cabinet. Each set of current secondary winding taps shall terminate on a six-pole shorting block, with the sixth pole permanently connected to the shorting bar and to ground.

2.3.8 ASSEMBLY AND CONFIGURATION

The circuit breakers/switchers shall be factory assembled into integral shipping sections as complete as possible to minimize assembly requirements at the site. A structural steel frame common to all breaker/switcher components shall be furnished.

The assembly shall be complete, including bushings, if shipping clearances permit.

2.3.9 BUSHINGS/INSULATORS

All bushings shall be rated in accordance with ANSI and NEMA standards and as specified in the Specification and Data Sheets. All bushings shall be ANSI 70 sky gray SF6 gas-filled porcelain.

Any damage to porcelain, such as chips or cracks, will require the supplier to replace the damaged item; repairs will not be accepted.

2.3.10 AUXILIARY POWER AND CONTROL CIRCUITS

Breaker/switcher auxiliary power, control and alarm circuits shall be provided with terminal blocks for connection to external circuits. The terminal blocks shall have circuit identification and shall be located in the control cabinet to provide external circuit connections from a common raceway entrance.

2.4 FACTORY TESTS

Each circuit breaker/switcher shall be completely assembled and tested at the factory. The assembled components, including bushings, shall be those which will be a permanent part of the breaker assembly. After each breaker is completely assembled, it shall be subjected to, and shall meet, all requirements of the production tests as listed and described in ANSI/IEEE C37 series.

2.5 PREPARATION FOR SHIPMENT

Circuit breaker components shall be clean, dry, and sealed when shipped from the factory. Each component not shipped with SF6 gas shall contain a packaged moisture absorbing chemical, as required, to keep it moisture free during shipment. Tanks, interrupters, support insulators or other SF6 containers which are found to contain moisture when received at the job site shall be dried. Moisture damage shall be repaired at the Supplier's expense.

Complete instructions outlining the Supplier's recommended procedures for inspection upon receipt at the construction site, moisture-free maintenance during storage, and preparation for SF6 filling shall accompany each breaker/switcher. These instructions shall be shipped inside the control cabinet.

2.6 SPECIFICATION DATA

2.6.1 SPECIFICATION RATINGS

Performance Criteria	Rating
Application	Circuit Breakers to be used throughout Tacoma Power's service area for Transformer (230/115 Auto and 115/13.8 Delta-Wye and Wye-Delta), Bus, & Line/Cable Switching & Protection.

City of Tacoma
REQUEST **FOR BIDS**
Specification No. PT25-0016F
Tacoma Power
HV Circuit Breakers

General Application	Outdoor Frame Mounted
Breaker Type, Minimum Requirements	Breaker Preferred Ratings C37.06 “General Purpose”
Pollution Level	Medium
Seismic Qualification Level, Minimum	High
Rated maximum voltage:	123kV rms; 245kV rms

Performance Criteria (Cont'd)	**Rating (Cont'd)**
Rated full-wave withstand voltage:	550kV peak; 900kV peak
Rated continuous current:	1200, 2000, or 3000 amps rms (as specified)
Rated short-circuit current	40kA, 50kA, or 63kA, rms (as specified)
Duty Cycle	Circuit Breaker, O-0.3s-CO-15S-CO
Rated interrupting time	3 cycles
Rated reclosing time	20 cycles
Circuit X/R > 17	YES, and Tacoma's 3LG fault < 80% & 1LG fault < 70% For 40kA and 63kA
Vertical Distance from Insulator Base to Bottom of Breaker	8'-6" min
Vertical Distance from the Lowest Live Part to Bottom of Breaker	11'-7" min (123kV) 13'-9" min (245kV)
Additional Testing above C37	NA
Mechanical endurance class	M1

2.6.2 ADDITIONAL REQUIREMENTS

2.6.2.1 LOGIC FOR LOW SF6 GAS OPERATING PRESSURE

Functionality available for both scenarios below. "X" indicates normal configuration.

_____Auto Trip and Block Close

_____**X**_____Block Trip and Block Close

2.6.2.2 BUSHING DATA/INSULATOR:

Basic impulse level: Match Rated full-wave withstand voltage.

Color: ANSI 70 gray

2.6.2.3 NOMINAL STATION SERVICE POWER SUPPLY VOLTAGES:

Auxiliary power: 120 VAC, 60 hertz, 1-phase, 3-wire

Close and trip: 48 VDC or 125VDC, ungrounded, as specified per each project

2.6.2.4 CONTROL POWER OVERCURRENT PROTECTIVE DEVICE:

____X__ Molded-case circuit breakers _____Fuse blocks

2.6.2.5 INSTRUMENT TRANSFORMERS:

The default circuit breaker configuration shall be the following unless specified on the purchase order. Purchase order may include the replacement of a default current transformer with linear coupler and/or a metering class current transformer.

Location	Ampere Ratio	Quantity in Each Bushing	Total	Accuracy Class
Bushing 1,2,3,4,5,6	MR*-5	2	12	C800
*Multi-Ratio at Continuous Current Rating of Breaker For example: Item #1 provide MR1200:5				

2.6.3 ACCESSORIES

The following Standard accessories shall be provided with each breaker/switcher. Accessories shall include, but not necessarily be limited to, the following:

- An auxiliary switch with (12) "a" and (12) "b" contacts, in addition to those required for control of breaker/switcher mechanism. All contacts shall be wired to terminal blocks. An auxiliary switch with (6) “a” and (6) “b” contacts shall be available for switchers.
- One (1) local-remote control switch wired for local-remote operation.
- Two (2) independent trip coils.
- One (1) trip-close push button station or control switch wired for local breaker/switcher test operation.
- Mechanical trip and close capability located inside breaker/switcher.
- Position indicator visible from the outside of the control cabinet.
- Loss of voltage alarm relay on each auxiliary power and control power circuit inside the breaker/switcher. For example: one for the AC motor power, heater power, DC motor power, one for close control power, and one for each of the trip coil circuits.
- Operations counter for trip operations that cannot be reset and is connected to the mechanical linkage of the breaker/switcher mechanism.
- One (1) maintenance closing and opening device (Slow Open/Close Device), if applicable.
- One (1) Manual spring charging tool per breaker/switcher.
- 120VAC lamps with door-operated switch in the control cabinet.
- One (1)120VAC, single-phase, 3-wire, GFCI receptacle shall be accessible from inside the cabinet. It shall not be necessary to reach beyond any exposed, energized terminals to plug into the receptacle.
- Nameplates to identify switches, relays, and other auxiliary devices.
- Bushing terminals, NEMA four-hole (minimum), with both sides of terminal suitable for aluminum electrical connections and mountable on either side of the interrupter.
- Two (2) NEMA two-hole grounding pads. The grounding pads shall be on diagonally opposite locations on the frame.

2.6.4 REQUIRED ALARM CONTACTS FOR SCADA

The following alarm contacts and associated “normal” states shall be provided and wired to terminal blocks for connection to the City’s SCADA system. All alarm contacts shall be rated for 125VDC.

IEEE Device	Description	"0"state	"1"state	"normal" state
52/a	PCB Status	Open	Closed	1
43LR	PCB Local/Remote Switch	Local	Remote	1
27	PCB Motor AC*	Normal	Alarm	0
27	PCB Heaters*	Normal	Alarm	0
27	PCB Motor DC	Normal	Alarm	0
27	PCB DC Close Circuit	Normal	Alarm	0
27	PCB Primary DC Trip Circuit	Normal	Alarm	0
27	PCB Secondary DC Trip Circuit	Normal	Alarm	0
63	PCB Low SF6 Gas Alarm	Normal	Alarm	0
63	PCB Low SF6 Gas Lockout	Normal	Lockout	0
	Motor excess run or low spring energy alarm timer	Normal	Alarm	0

*NOTE: The Heaters may be on same 27 device as Motor AC, if a single overcurrent device is used to supply both circuits.

2.6.5 DOBLE ROLLER-TYPE TRANSDUCER KIT & MOUNTING BRACKET

The City uses Doble’s TR3160 Rotary/Linear Transducer. For each type of breaker, a total of three (3) travel recorder kits (lever & rod assemblies, or rotary attachment) shall be provided. For each breaker, one (1) mounting bracket shall be provided.

2.7 EARTHQUAKE STRENGTH REQUIREMENTS

The completely assembled breaker/switcher shall meet the High Seismic Qualification Level, as defined in IEEE Standard 693-2018. All applicable seismic identification plates, drawings, calculations and required test reports shall be provided in the instruction books as specified in IEEE Standard 693.

GENERAL SECTION

APPENDIX #1 - CITY CAD STANDARDS

City shall expect that all drawings will be in computer files that conform to the standards set forth in this section. Drawings shall be prepared electronically on IBM PC using Autodesk AutoCAD Version 2000 for Windows or greater, saved in a .DWG or .DXF file format, and submitted per Appendix #2.

CAD STANDARDS

ENTITY PROPERTY ASSIGNMENT STANDARD

All entity colors and line types shall be BY LAYER.

All text should be on text layers and all lines should be on line layers.
Entity Property to **Ink Jet Plotter**-Pen Assignment Standard
Entity colors and line types shall be assigned to pens 1 through 8 PLOT setup menu as follows:

ENTITY COLOR	PEN NO.	PEN ASSIGNMENT WIDTH (MM)	COLOR
1 (RED)	1	0.012	RED
2 (YELLOW)	7	0.010	BLACK
3 (GREEN)	3	0.012	GREEN
4 (CYAN)	7	0.013	BLACK
5 (BLUE)	5	0.012	BLUE
6 (MAGENTA)	7	0.015	BLACK
7 (WHITE)	7	0.020	BLACK
8 (GRAY)	8	0.012	BLACK

LAYER NAMING STANDARD

The layer name convention shall be a four-part hyphenated name. Examples of standard layer names:

Layer Name	Description
DRWG-BRDR-LIN-LIGHT	Border - continuous line will plot with (*or 0.020 mm width)
DRWG-LINE-000-LIGHT	Lines - continuous lines will plot with (*or 0.010 mm width)
DRWG-TEXT-THN-LIGHT	Drawing text - text will plot with (*or 0.013 mm width)
DRWG-LINE-DSH-LIGHT	Lines - dashed lines will plot with (*or 0.010 mm width)

As many layers as needed may be defined as long as layer convention format is followed.

LINE TYPES

BASIC	DESCRIPTION	LAYER COLOR	PEN WIDTH (IN MM)
HVY	BROAD LINE	WHITE	(*.025)
MED	MEDIUM LINE	MAGENTA	(*.020)
THN	THIN LINE	CYAN	(*.014)
000	NARROW LINE	YELLOW	(*.010)
DSH	NARROW LINE	YELLOW	(*.010)

*DENOTES INK JET PLOTTER PEN SETTINGS

SIGNATURES

Each drawing submitted shall be identified by a drawing number and be dated.

DIMENSIONS AND UNITS

Dimensions and tolerances shall conform to ANSI Y14.5. Dimensions shall be complete and in U.S. customary units. If the manufacturer fabricates in the SI unit system (metric system), both units shall be shown on the drawings. Conversion tolerance shall be within a maximum of 1/32 inch (0.79 mm).

SCHEMATIC AND WIRING DIAGRAMS

Schematic and wiring diagrams furnished by the Vendor shall be on a per-circuit- breaker basis. All graphic symbols for electrical diagrams shall be represented as shown in IEEE 375, with the exclusion of IEC symbols. Device connection shall have near each termination the conductor identification consisting of the opposite end destination. Function information and wire run codes are not required. The wiring diagrams shall be drawn with all devices indicated in their relative physical locations and shall represent the equipment and terminals arranged as they would appear to a person wiring the equipment.

Where interconnecting wiring from different items of equipment or sectional wiring diagrams of the same item of equipment appear on different wiring diagram sheets, all interconnections shall be clearly identified. Where sectional wiring diagrams are required for a single item of equipment, such as a relay panel or control panel, that section of the panel that is represented by each individual wiring diagram sheet shall be keyed on that sheet in a manner acceptable to the City.

Information indicated on the Vendor's drawings shall include wiring of the individual panel items as they will actually appear in the panel, contact arrangements of switches, and internal wiring of relays and instruments.

Schematic diagrams shall be cross-referenced to terminal markings on the wiring diagrams, but need not indicate complete terminal to terminal details of circuits. Each item of panel-mounted equipment indicated on the diagrams shall be identified by item number and/or name.

Sufficient space shall be left on the City's side of outgoing terminal blocks for adding cable color codes and circuit numbers.

COMPLIANCE WITH THIS APPENDIX

Contact engineer for questions concerning drafting conventions. A preliminary electronic copy of drawings shall be sent to the Project Engineer for review with our Lead Engineering Technician prior to approval. (See Appendix #2)

The following are samples of drawing content, drawings examples, labeling and abbreviations standards that represent compliance with this Appendix:

Tacoma Power Drawing Standardization Matrix Tacoma
Power Drawing Standardization One-line Tacoma Power
Drawing Standardization Three-Wire 1 Tacoma Power
Drawing Standardization Three-Wire 2 Tacoma Power
Drawing Standardization DC Schematic Tacoma Power
Drawing Standardization Wiring 1 Tacoma Power
Drawing Standardization Wiring 2
A-S S-0025 Substation Labeling
A-SS-0030 Abbreviations
Electronic versions of the attachment drawings will be available to the Vendor after award of contract.

APPENDIX #2 - CITY DRAWING/DESIGN APPROVAL PROCESS

All new drawings created by the Vendor or by manufacturers shall be electronically created using AutoCAD Version 2000 or greater. Drawings shall utilize City CAD Standards per Appendix #1.

GENERAL CONSIDERATIONS

Only certified drawings shall be submitted. Certified drawings shall mean drawings fully completed and certified by the Vendor as to the compliance of the information contained thereon with the requirements of this specification and documents. Certified drawings will be reviewed by City and processed as specified in this Section. Each drawing submitted, regardless of origin, shall be stamped with the approval of the Vendor and clearly marked with the name of the project, the specification title, the specification number, and the Vendor's name.

The Vendor's stamp of approval will be representation to the City that the Vendor has assumed full responsibility for determining and verifying all applicable information (i.e. quantities, dimensions, field construction criteria, materials, catalog numbers) and/or similar data, and that the Vendor has reviewed or coordinated each submittal with the requirements of the work and the contract.

If drawings submitted by the Vendor show variations from the contract requirements, the Vendor shall describe such variations in writing, separate from the drawings, at the time of submission.

DRAWING SUBMITTAL

Five (5) hardcopy prints of each drawing and one (1) electronic copy on CD shall be submitted for review purposes. Prints shall be black line on white background. Print size shall not exceed 30 inches by 42 inches. Drawings shall be folded to 8-1/2 inches by 11 inches.

All drawings shall be clearly legible, even when reduced to 11 inches by 17 inches in size.

DRAWING PROCESSING

A copy of each drawing reviewed will be returned to the Vendor as stipulated in this Section. Copies of drawings returned to the Vendor will be in the form of a print with City's marking.

When a drawing is revised and resubmitted, the Vendor shall include an issue number and revision description in the drawing revision block. All revisions pertaining to that particular drawing issue shall be back-circled or otherwise clearly noted on the drawing.

Any work performed before City has approved the drawings shall be at the Vendor's own risk and responsibility. Work may proceed when the drawings have been returned marked ACCEPTANCE, provided the work is performed in accordance with City's notations.

If changes are made at the project site, revised drawings indicating the changes made shall be prepared by the Vendor and submitted to City.

REVIEWS AND SUBMITTALS

The Vendor shall provide required project documents for review consistent with the submittal dates per this Section or mutual agreement of the City and Vendor. The City will provide timely review and comment on all required submittals in order not to delay the progress of the work. Unless otherwise specified herein or waived by the City during the course of the project, the City will review all submittals and return consolidated comments to the Vendor within 14 calendar days of receiving the submittal.

DRAWING/DESIGN REVIEWS

The City will review design documents for consistency with City requirements and CAD standards. All submittals shall require City approval. Acceptance of a specific item shall not include acceptance of an assembly or more general part of the work of which the item is a component. The City will respond to all elements of review as itemized below within fourteen (14) working days of receipt of the complete information from the Vendor. The City's response may include ACCEPTANCE, REQUEST FOR RESUBMISSION WITH CHANGE, or REJECTION.

"ACCEPTANCE" shall constitute acceptance of the specific items reviewed with or without comment. It shall not imply acceptance of any items or matters inferred or extrapolated from the accepted elements, nor relieve the Vendor from the requirement to provide designs that comply with this specification.

A "REQUEST FOR RESUBMISSION WITH CHANGE" shall be provided with a description of the reason for lack of acceptance. The description shall serve the purpose of assisting the Vendor in understanding the reason for change and resubmission requirement. A "REQUEST FOR RESUBMISSION WITH CHANGE" shall be issued when the submitted elements are reasonably close to acceptable but require modification and are not worthy of complete rejection.

A "REJECTION" response shall occur when the submitted design is not in compliance with the specifications. A written description of the noncompliance will be provided.

TACOMA POWER
TACOMA PUBLIC UTILITIES

Labeling of T&D Substation Control House Equipment

A-SS-0025

Purpose

This standard is to identify substation labels and the rules that apply to them. It is ***limited to labels on control house equipment*** as seen from the front of each panel. They fall into five categories:

- Panels
- Switches
- Relays
- IEDs
- Other Equipment

General Guidelines

General

Label names will use the guidelines in this standard. They should:

- be brief and consistent
- be operationally relevant
- be intuitive - in plain language
- have matching SCADA alarm text (alarm text abbreviated if necessary)
- have characters large enough to be easily read (larger on certain controls)
- have a single label at top if the panel/rack is dedicated to single purpose
- have additional labels (as needed) if controls/relays are for more than one line/device on a panel/rack

Location

Labels should always appear ***above the device***, so tags will not block view. Refer to standard ***A-SS-0020 "Relay & Control Panels Layout, 110/230 kV Substations"***, Figure A, for examples of label locations.

Label Characteristics

Refer to standard **Drawing XX25**, "Typical Label Details" for ordering information, dimensions, and other physical details for labels.

Phase Reference

All phase information will be in the form of City Phase 1, Phase 2, and Phase 3. Manufacturer phasing can be kept on drawings for future reference and troubleshooting purposes, but City phase references should be included and clearly marked. "A, B, C" designation should be used for manufacturer references only.

Panel Labels

Panel Labels

For panels placed within any substation, the Panel # should be placed on the angled front & back portion of each panel. The panel name is to be placed on the front on the 1U panel below the angled portion of the panel. The back of the panel will have the matrix wiring labeling. Refer to these examples:

Panel Numbers

Distribution panels should be numbered Panel P1, Panel P2, Panel P3, etc. Replaced transmission panels will keep their original panel number. New transmission panels will be assigned on a station by station basis based on the slot number. 110kV panels will utilize the format AR1XX and 230kV panels will utilize the format AR2XX, where XX is the slot number and AR is defined by A = Control, R = Relay, B = Miscellaneous (example DFR panels), and C = Communications. Examples of this:

PANEL AR105	← *Angled portion of panel* →	PANEL P1

Panel Names

Panel names are to be the primary equipment for which the panel contains the relaying and control. When this includes transmission line relaying and control, the format for the Panel name is to be BREAKER NUMBER followed by LINE NAME. Example of this:

PCB 10-222 COWLITZ-LAGRANDE #2	← *1U directly below* →	PCB 10-457 NE-BLAIR

Line Names

All line names should be Source-Load based on the power flow from dispatch under normal or historical circumstances, for example Cowlitz – Southwest #1. In the case of a radial line, the line name shall be from the source terminal to the first substation, for example Southwest - Orchard. Exceptions to this rule are the three-terminal Potlatch and LaGrande lines which would have a complex three-terminal designation.

Panel Labels (continued)

Panel Names (continued)

Bus Names

Bus names will be developed on a station by station basis. The names will be developed in conjunction with the protection scheme so that in-station labels and prints will be as similar as possible to SCADA descriptions.

High Side Breaker Names

High side breaker numbers are assigned by Operations. The high side breaker names will always be of the format PCB XX-XXX where the XX-XXX number is assigned by Operations. No reference to VCB, OCB, ACB, etc. will be used. If there are space constraints for labels the PCB can be dropped and only the breaker number used if necessary.

Low Side Switchgear Names

For low side switchgear cubicles, the names, as shown below, are to be assigned from the factory and are to be used for all references. Cubicle number references are not to be used for any items (drawings, SCADA descriptions, labels, etc.). Examples:

BANK #X PCB	BUS TIE	FEEDER #X	AUX UNIT #X
			(drop "#x" if one aux)

Switches

Handle Switches

Switches are to be labeled using a descriptive label and not the IEEE numbers.

Test Switches

All test switches are to have a unique name. For test switches used for metering or relay purposes, an additional descriptive label is to be added for further clarity and safety purposes.

Test Switch Names

Test switch labels will be unique to each panel, and restart on each panel, following the format TSX where X is an alphabetical designation.

Test Switch Descriptions

Test switches for specific purposes have customized labels including extra descriptors and phasing indication as described below. Some of these specific types are current, potential, relay, MFPM and WHDM test switches. See label examples on Standards Labels Drawing, XX25.

Test switches used for **metering** shall use the individual potential and/or current descriptive label.

For the **potential** descriptive label, the bus potential magnitude and where the PT is located are to be included as the first line. For example, 13kV Bank #1 or simply 13kV if there is only one transformer at the station will be the first line of text. Because of the different type of test switch used for a QUAD4 meter, the potential label will include the neutral designation as well as the phasing.

For the descriptive label for **current**, the descriptive element of the label and the test switch name will be combined into the first line of text. Therefore the convention for the first line will be CT SOURCE TSX. Examples of this are FDR1 TSX, or 10-250 TSX, or Bank #1 TSX, etc.

Test switches used for **relaying** applications will be one of two formats.

1. Current and potential inputs that follow the labeling format described above for the metering test switches.
2. For other items, only the test switch name label is to be used.

Relays

General Rules

For this type relay …..	Use this format
single function	Equipment/Line Relay Function (IEEE Designation number from drawing).
multi-function	Multi-function X Relay where X is a sequential number designation such as 1 or 2. (No IEEE Designation number)
remote relay	The line name, bus name or Bank X should be included. For example: LAGRANDE-COWLITZ #1 MULTI-FUNCTION 1 RELAY LAGRANDE-COWLITZ #2 MULTI-FUNCTION 2 RELAY

Relay Designation & Manufacturer Name

Because the relay designation (i.e. the Manufacturer's name) is already on the relay, it is not necessary to include it on the label (SEL 551 for example). Also, keeping the labels generic allows future relay changes without necessitating label changes.

Equipment Designation

When all relays associated with a line or bank are located on the control panel, it is only necessary to have a single label at the top of the panel rather than include the line or bank designation on each label. However, if a relay is located on another panel remote from the control panel it should state the name of the equipment it protects.

Relays (continued)

Single Function Relays

Relay labels for single function relays will:

- Include a description of the relay's function and the line/equipment it serves.
- Include the IEEE standard designation number of its function.

For example:

BLAIR-LINCOLN LINE DIFFERENTIAL (87L)

110kV BUS DIFF (87B)

If single phase units are used, the label will include the phase 1, 2, or 3. For example:

BANK #2 PH 1 OVERCURRENT (50/51)

Multi-Function Relays

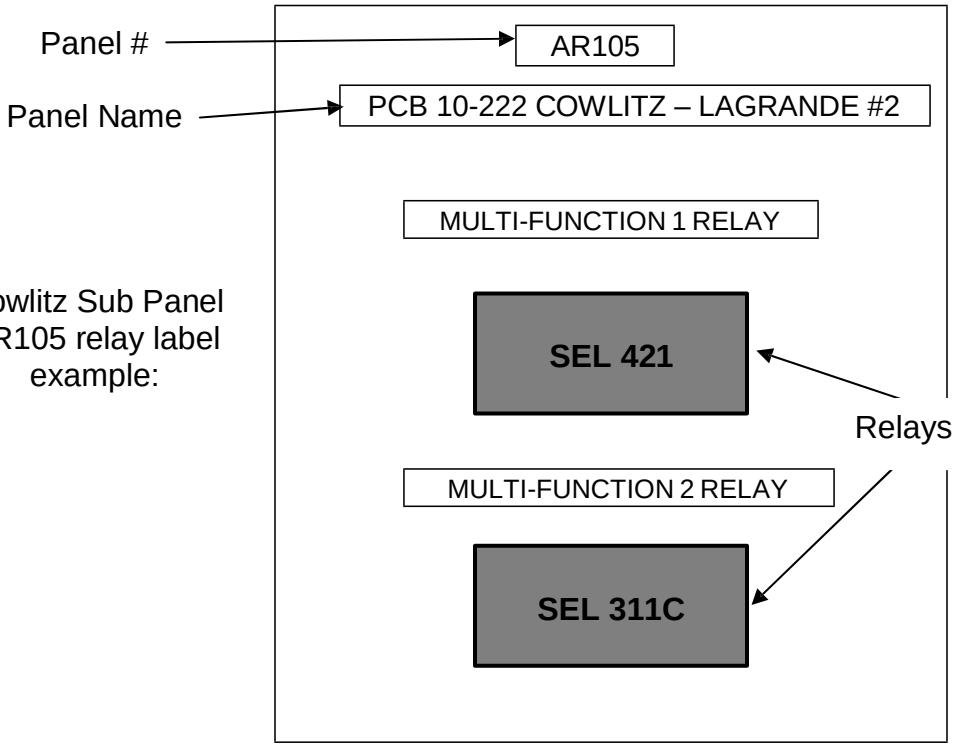
Label should read "MULTI-FUNCTION X RELAY" If there is only one relay, X will be a 1 and will always be included. If there are two redundant relays then designate them as 'MULTI-FUNCTION 1 RELAY' and 'MULTI-FUNCTION 2 RELAY'. The label will have ***no device number*** because it more closely matches the actual relay function (i.e. multi) and the redundant protection scheme of both relays. It also relieves the concern that labels such as 'primary/back-up' may indicate more or less protection.

Relays (continued)

Example 1, On the Same Panel

The SEL 421 and SEL 311C relays at Cowlitz on the LaGrande #1 and #2 110kV lines are both multi-function relays providing dual, 100% protection for distance, directional and ground faults.

Cowlitz Sub Panel AR105 relay label example:



Example 2, On Different Panel

COWLITZ-LAGRANDE #2
MULTI-FUNCTION 1 RELAY

COWLITZ-LAGRANDE #2
MULTI-FUNCTION 2 RELAY

IED (Intelligent Electronic Device)

General Rules

IED names are to follow the EQUIPMENT-DEVICE**X** convention. There are two exceptions because of historical purposes and the minimum number of future installations expected. D25 and D200 will not be considered IEDs and will continue to utilize D25-X or D200-X for their naming conventions. As new IEDs are added, there are to be no exceptions to the EQUIPMENT-DEVICE**X** established convention.

Device names are to be generic, non-manufacturer specific. Examples of previously developed device names are as follows:

Device	IED Device Name	Device Example
Distributed Architecture RTU	RTU	GE iBox
		SATEC ez-Pac
		SEL I/O device
Automatic Tap Changer Control	90	Qualitrol 90 device
		ABB 90 device
Transformer Electronic Temperature Monitor	ETM	Qualitrol ETM
Multi-function Power Meter	MFPM	SEL Multi-function Meter
		SATEC PM171/172E/172HA
Watt Hour Demand Meter	WHDM	Quad4

Multiple Devices, Same Equipment

A 1 or 2 is added to the end of the device so the convention would be EQUIPMENT-DEVICE**X**.

For example:

BK1-MFPM1
BK1-MFPM2

FDR1-RTU1
FDR1-RTU2

note: If there is only one relay, X will be a 1 and will always be included.

Other Equipment

Battery Chargers

Battery charger labels will be "***XXX VDC Battery Charger***". If this is readily apparent on the front of the battery charger, a separate custom label is not necessary. Some examples of custom labels are:

125VDC BATTERY CHARGER	**48VDC BATTERY CHARGER**

AC & DC Panels

For substations with ……	Label examples are ……
Single panel	AC PANEL-**X** DC PANEL-**X** note: If there is only one panel, **X** will be a 1 and will always be included.
Multiple panels	AC PANEL-1 (for main panel) AC PANEL-1A (for sub panels) AC PANEL-1B Etc DC PANEL-1 DC PANEL-1A (sub panels) DC PANEL-1B Etc DC PANEL-2 DC PANEL-2A Etc
For multiple DC voltages	125VDC PANEL 48VDC PANEL
For multiple DC voltages with sub panels	125VDC PANEL-1 125VDC PANEL-1A Etc 48VDC PANEL-1 48VDC PANEL-1A 48VDC PANEL-2 48VDC PANEL-2A Etc

Transmission & Distribution Labels

note: XX25 Label # refers to standards Drawing XX25, "Standards, Typical Label Details"

Equipment Description	IEEE #	Transmission & Distribution Description	Label Examples	XX25, Label #	Comment
Panel Labels					
Panel Number	N/A	Panel #	PANEL P1 PANEL AR105	#1-1	*Distribution Panels = PX; Transmission Panels=ARXXX*
High Side Breaker Panel Name	52	PCB XX-XXX	PCB 10-457 NE-BLAIR PCB 10-222 COWLITZ-LAGRANDE #2	#1-2	*No reference to VCB, OCB, ACB, etc. Short descriptions will drop the PCB and only use the breaker number.*
Low Side Switchgear Panel Name	52	Feeder #X Bank #X PCB	BANK#1 PCB BUS TIE FEEDER #1	#1-2	*The control switch relays will reflect this description.*
Switch Labels					
Instantaneous Trip Cutoff Switch	250CO	Inst Trip	INSTANTANEOUS ENABLE	#2-1	*The 250CO switch is used on underground feeders.*
SPARE				#2-2	
Instantaneous Bypass Timer Switch	69TD	Inst Bypass Timer	See Drawing XX25	#2-3	*This switch is not used on feeders with microprocessor relays.*
Relay Setting Selector Switch	243S	Relay Setting Switch	See Drawing XX25	#2-4 & #2-5	*For distribution feeder label #2-5 will be used and for transmission lines label #2-4 will be used.*
Supervisory Switch	269	Spvy Switch	SCADA	#2-6	*Always the same.*
Recloser Cutoff Switch	279CO	Recloser	RECLOSER	#2-7	*None*
Control Switch	101	Ctrl Switch	10-456 FEEDER #1 BANK #1 PCB	#2-8	*The label for control switches should be the name of the device it controls.*

Transmission & Distribution Labels

note: XX25 Label # refers to standards Drawing XX25, "Standards, Typical Label Details"

Equipment Description	IEEE #	Transmission & Distribution Description	Label Examples	XX25, Label #	Comment
Lockout Relay	86	Lockout Relay	See Drawing XX25	#2-9 & #2-10	Shall reflect the protective zones, not I.E.E.E. references.
Metering Test Switches	N/A	Metering Test Switches	See Drawing XX25	#2-11 & #2-12	*Test switches for metering shall use the individual potential and/or current descriptive label.*
WHDM Test Switch	N/A	WHDM Test Switch	See Drawing XX25	#2-13	*None*
Test Switch	N/A	TSX	TSA TSB	#2-14	*"X" is alphabetical designation, unique to each panel, restart on each panel*
Relay Labels					
Single Function Relay	N/A	Single Function Relay	BLAIR-LINCOLN LINE DIFFERENTIAL (87L) 110KV BUS DIFFERENTIAL (87B)	#3-1	*Equipment/Line Relay Function (IEEE Designation from Drawing)*
Multi-Function Relay (device on same panel)	N/A	Multi-Function Relay	MULTI-FUNCTION 1 RELAY	#3-2	*Instances with a single multi-function relay will keep the number 1 designation; multiple relays will be incrementally numbered.*
Multi-Function Relay (device on remote panel)	N/A	Multi-Function Relay	LAGRANDE-COWLITZ #2 MULTI-FUNCTION 2 RELAY	#3-3	*Line name, Bus name or Bank # will be included on the label for remote relays. Instances with a single multi-function relay will keep the number 1 designation.*
IED Labels					
MFPM	N/A	MFPM	FDR5 MFPM1	#4-1	*For low side switchgear and bank MFPM's*

Transmission & Distribution Labels

note: XX25 Label # refers to standards Drawing XX25, "Standards, Typical Label Details"

Equipment Description	IEEE #	Transmission & Distribution Description	Label Examples	XX25, Label #	Comment
MFPM	N/A	MFPM	10-457 MFPM1	#4-2	*For high side breaker MFPM's*
RTU	N/A	RTU	BK1 PCB RTU1	#4-3	*For low side switchgear and bank RTU's*
RTU	N/A	RTU	10-457 RTU2	#4-4	*For high side breaker RTU's*
D25	N/A	D25	D25-1	#4-5	*For all D25's – even a single D25 station will use the designation 1.*
Automatic Tap Changer Control	90	LTC	BK1 LTC1	#4-6	*None*
Transformer Electronic Temperature Monitor	N/A	ETM	BK1 ETM	#4-7	*None*
Integration Server	N/A	IS	See drawing XX25	#4-8	Equipment = Substation Name

References

- Drawing XX25, "Standards, Typical Label Details"
- A-SS-0020 "Relay & Control Panels Layout, 110/230 kV Substations"
- A-SS-0030 "Abbreviations"

TACOMA POWER
TACOMA PUBLIC UTILITIES

Abbreviations

A-SS-0030

Purpose

To identify abbreviations used for substation equipment, switches, relays, devices, and controls. For the sake of clarity, abbreviations should only be used when dealing with **space constraints**.

Abbreviations

Full Text	ABBREV-IATION	Source
Abnormal	ABNL	ASME
Accumulator	ACC or ACCUM	ASME / TPWR
Air Break Switch	AB	TPWR
Air Circuit Breaker	ACB *	ASME
Alarm	ALM	ASME
Amps	A	TPWR
Analog	ANLG	ASME
Analog Input	AI	TPWR
Annunciator	ANN or ANNC	TPWR
Auxiliary	AUX	TPWR
BackUp	BU	TPWR
Bank	BK	TPWR
Battery	BATT	TPWR
Bearing	BRG	ASME
Blocked	BLKD	TPWR
Breaker	BKR	TPWR
Breaker Failure	BF	TPWR
Building	BLDG	TPWR
Butterfly Valve	BFV	TPWR
Bypass	BYP or BY(extreme)	TPWR
Bypass Valve	BPV	TPWR
Capacitor	CAP	TPWR
Channel	CH	TPWR
Charge	CHRG	TPWR
Charger	CHGR	TPWR
Circuit	CKT	ASME
Close	CLS	TPWR
Communication	COMM	TPWR
Compressor	CMPRS	TPWR
Condition	COND	TPWR

Full Text	ABBREV-IATION	Source
Configuration	CONFIG	TPWR
Control	CTRL	TPWR
Control Switch Relay	CSR	TPWR
Cooling	COOL	TPWR
Cooling Stage	COOL STG	TPWR
Cooling Water	CW	TPWR
Cooling Water Valve	CWV	TPWR
Corrupt	COR	TPWR
Coupler	CPLR	TPWR
Cubic Feet per Second	CFS	TPWR
Current	CURR	TPWR
Current Transformer	CT	TPWR
Cylinder	CYL	TPWR
De-energized Tapchanger	DETC	TPWR
Demand	DMND	TPWR
Device	DVC	TPWR
Differential	DIFF	TPWR
Digital Fault Recorder	DFR	TPWR
Digital Input	DI	TPWR
Disable(d)	DSBL(D)	TPWR
Disconnect	DISC	ASME
Elevation	ELEV	TPWR
Emergency	EMER	TPWR
Enable	ENBL	TPWR
Enabled	ENBLD	TPWR
Equipment	EQUIP	TPWR
Existing	(E)	TPWR
Export	EXPT	TPWR
External Wetting	EW	TPWR
Failure	FAIL	TPWR
Fault	FLT	TPWR

TACOMA POWER
TACOMA PUBLIC UTILITIES

Abbreviations

A-SS-0030

Full Text	ABBREV-IATION	Source
Feeder	FDR	ASME
Fuse	FU	TPWR
Future	(F)	TPWR
Generator	GEN	TPWR
Hard wired`	HW	TPWR
Hardware	HARDWR	TPWR
Hazardous	HAZ	ASME
High Side	HS	TPWR
Hot Line	HTLN	TPWR
Import	IMP	TPWR
Indicator	IND	TPWR
Input	INPT	TPWR
Intelligent Electronic Device	IED	TPWR
Integration Server	IS	TPWR
Invalid	INVLD	TPWR
Latching Switch Relay	LSR	TPWR
Level	LVL	TPWR
Linear Coupler	LC	TPWR
Load Tap Changer	LTC	TPWR
Local/Remote	LOC/REM	TPWR
Lockout	L/O	TPWR
Low Side	LS	TPWR
Machine	MACH	TPWR
Main	MN	TPWR
Malfunction	MALF	TPWR
Manual	MAN	TPWR
Meter	MTR	TPWR
Microwave	MWAV	TPWR
Motor Operated Disconnect	MOD	TPWR
Multifunction	MF	TPWR
Multifunction Power Meter	MFPM	TPWR
Oil Circuit Breaker	PCB	TPWR
Oscillograph	OSC	TPWR
Override	OVR	TPWR
Panel	PNL	TPWR
Phase	PH	TPWR
Pilot Wire	PW	TPWR
Plant Control System	PCS	TPWR
Potential	POT	TPWR
Potential (Voltage) Transformer	PT	TPWR

Full Text	ABBREV-IATION	Source
Power	PWR	TPWR
Power Circuit Breaker	PCB	TPWR
Power Factor	PF	TPWR
Power Supply	PS	TPWR
Pressure	PRESS	TPWR
Primary	PRI	TPWR
Progress	PGRS	TPWR
Propogation	PROP	TPWR
Reactive	RECT	TPWR
Received	RCVD	TPWR
Recloser	RECL	TPWR
Redundant	REDNT	TPWR
Reference	REF	TPWR
Regulator	REG	TPWR
Relay	RLY	TPWR
Relay Transfer Switch	RTS	TPWR
Remote	REM	TPWR
Remote Terminal Unit	RTU	TPWR
Request	REQ	TPWR
Response(s)	RESP	TPWR
Restart	RESTRT	TPWR
Schedule(d)	SCHED	TPWR
Secondary	SEC	TPWR
Sectionalizing	SECTION	TPWR
Sequence	SEQ	TPWR
Service	SVC	TPWR
Short & Ground	S&G	TPWR
Solicited	SOLCTD	TPWR
Spare	SP	TPWR
Spillgate	SPLGT	TPWR
Spillway	SPLWY	TPWR
Spring	SPRG	TPWR
Stage	STG	TPWR
State	ST	TPWR
Station	STA	TPWR
Station Service	SS	TPWR
Status	STAT	TPWR
Substation	SUB	TPWR
Successive	SUCC	TPWR
Supervisory	SPVY	TPWR
Surge Arrester	SA	TPWR
Switch	SW	TPWR
Switchgear	SWGR	TPWR
Switchyard	SWYD	TPWR

TACOMA POWER
TACOMA PUBLIC UTILITIES

Abbreviations

A-SS-0030

Full Text	ABBREV-IATION	Source
Synchronizing or Synchronization	SYNC	TPWR
System	SYS	TPWR
Tacoma Power	TPWR	TPWR
Tacoma Public Utilities	TPU	TPWR
Tag/UnTag	TAG/UNT	TPWR
Telemetry	TELEM	TPWR
Temperature	TEMP	TPWR
Test Switch	TS	TPWR
Transaction	XACT	TPWR
Transducer	XDCR	TPWR
Transfer	XFER	TPWR
Transfer Trip	TT	TPWR
Transformer	XFMR	TPWR
Transmission & Distribution	T&D	TPWR

Full Text	ABBREV-IATION	Source
Trip	TRP	TPWR
Trouble	TRBL	TPWR
Turbine	TURB	ASME
Unbalance	UNBAL	TPWR
Underfrequency	UF	TPWR
Undervoltage	UV	TPWR
Unit	UNIT	TPWR
Unsolicited	UNSOLCTD	TPWR
Vacuum Circuit Breaker	PCB	TPWR
Value	VAL	TPWR
Voltage Φ Angle	VPA	TPWR
Watt-Hour Demand Meter	WHDM	TPWR
Winding	WIND	TPWR

Transmission & Distribution Substations

Station Name	Abbreviation
Alexander	ALX
Blair	BLR
Browns Point	BRN
Bridgeport	BRD
Cedar	CDR
Clement	CLM
Clover Park	CLV
Collins	CLL
Commencement Bay	CMM
Cowlitz	COW
Crandall	CRN
Crescent	CRS
Croft	CRF
Cushman Sub	CUSH
Custer	CST
Defiance	DFN
East F	EAF
Elk Plain	ELK
Far West	FRW
Fife	FIFE
Flett	FLT

Station Name	Abbreviation
Fort Lewis Central	FLC
Fort Lewis South	FLS
Frederickson	FRD
Gove	GV
Graham	GRH
Hawthorne	HWT
Highland	HGH
Hilltop	HLL
Huson	HSN
Hylebos	HLB
Knoble	KNB
Lacamas	LCM
LandfillGas	LFG
Lidford	LDF
Lincoln	LNC
Praxair	PRX
McChord	MCRD
McNeil	MCN
Menlo	MNL
Mobile Sub	MOB1
Mobile Sub	MOB2

Station Name	Abbreviation
Mobile Sub	MOB3
Mobile Sub	MOBX
Nisqually	NSQ
Northeast	NE
Pioneer	PNR
Old Town	OLT
Orchard	ORC
Pearl	PRL
Pennwalt	PNN
Plaza	PLZ
Polk	PLK
Portland	PRT
Roosevelt	RSV

Station Name	Abbreviation
Salishan	SLS
Sequalitchew	SEQ
Schnitzer	SCH
Simpson	SMP
Southwest	SW
Stadium	STD
Sto-Beh-Lah	STB
Sunset	SNS
Tideflats	TF
Union	UNN
University	UNV
Wapato	WPT
Westgate	WST

note: 3-letter abbreviations are preferred, but 4 letters maximum if needed for clarity.

BPA Interchanges

Station Name	Abbreviation
Peninsula Light Co.	PNLT
Steilacoom	STIL

References

- American Society Mechanical Engineer (ASME)
- Institute of Electrical and Electronics Engineers (I.E.E.E.) & American National Standards Institute (A.N.S.I.)
  - Std 260.1-2004 or latest, Standard Letter Symbols for Units of Measurement
  - Std 260.4-1996 or latest, Letter Symbols and Abbreviations for Quantities
  - Std C37.2-1996 or latest, Electrical Power System Device Function Numbers and Contact Designations

Relay & Control Wiring Design, 115kV or Higher Racks

Scope

This standard provides generalized guidelines for the wiring of relay and control racks in substations. Although the focus is on panels with microprocessor based, multi-function relays, the principles should be applied in any panel that requires new wiring or rearrangement of existing wiring.

Viewing Convention

Throughout this standard, any description and/or representation of Control and Relay rack components will be ***REAR*** views only.

Older Substations

Upgrades and replacements

Many *relay* and *control* functions were installed on separate panels, primarily due to the size of the protective relays. With the advent of the microprocessor based relays, multiple relays for one application are being eliminated and protection and control are being moved into a common panel. In some cases, microprocessor based relays are being blended in with existing controls and legacy equipment.

Due to the potential density of these panels, along with the size of the relay enclosures, it is important to standardize on how wiring is terminated on the back of the panel to promote consistency and safety.

In some cases, a complete set of new panels/terminal blocks will be installed which would easily accommodate the principles outlined here. On smaller projects, acknowledging the intent and doing whatever is reasonable for the situation is the best that can be hoped for. Consistency is the ultimate goal.

New Substations

New Panel Wiring

In new substations, the expectations will be that the principles outlined here should be followed and the layouts will be consistent from station to station. The wiring layout will be complementary to the panel layout described in standard A-SS-0020, "Relay & Control Panels Layout, Transmission Substations".

In general, field wiring will be terminated on blocks close to where the connections will be made to equipment. Power supplies, CT, PT and status and control circuits will land in the same areas.

Helpful Wiring Practices

- Whenever possible, wiring should be of the shortest and most direct point to point path possible.
- Avoid having no more than two wires connected to any single point. Crews can use their judgment if it would be easier and possible to land more than two.
- Due to space constraints and wiring difficulties, only one wire should be landed on the terminals of the Square D switches (used for 43LR, 269, 69TD, etc.), 279CO, and all points on the Agastat timing relays.

Panel Wiring

CT Wiring

CT wiring is preferred on the left side of each panel, and terminates on the left-most test switch. This is typical for all CT wiring applications.

Grounding

Panels shall be fitted with a copper ground bus behind each rack at the lowest point possible. The ground bus of each panel shall be connected to both adjacent ground busses. All panel-mounted device grounds shall be wired directly to the ground bus. The interconnected ground busses shall be connected to the station ground grid at two points for safety. The two ground grid connections shall be connected on a row of relay racks at the end.

Exception for Communication Racks – The interconnected ground busses shall be connected to the station ground grid at one point, (roughly midway if possible), so as not to create ground loops.

Panel Wiring (continued)

Instrument Transformer Circuits

The point of grounding in the instrument transformer secondary circuit should be located electrically at one end of the secondary winding of each instrument transformer. The point of grounding should be located physically at the first point of application, which is defined to be the first point where the exporting cable lands from the instrument transformer, except (as in the case of some potential transformer secondary circuits) when the grounded conductor of the exporting cable is connected to that of any other exporting cables; in the latter case, the point of grounding should be located physically as close as possible to where the grounded conductor of the exporting cables are connected.

In general, the non-polarity side of the instrument transformer should be grounded and the polarity side should enter the test switch.

In situations when the instrument transformer polarity is reversed due to physical orientation of the instrument transformer and power flow direction is important to the application (i.e. metering circuits, differential relay circuits), every attempt to perform option #1 below should be made. When option #1 is not possible, either due to outage constraints or physical limitations, option #2 should be used to correct the power flow direction.

Option #1 - When at all possible, every reasonable attempt should be made to re-wire the outputs at the instrument transformer. The polarity side of the instrument transformer would then be the grounded side and the non-polarity side would enter the test switch. No other rolling of the circuit into individual devices would be required.

Option #2 - If it is not possible to re-wire the outputs at the instrument transformer, roll the inputs between the test switch and the device to correct the power flow direction. Ensure the drawings appropriately reflect the wiring.

If option #2 is chosen because an outage cannot be obtained to re-wire the instrument transformer (not because it is physically impossible to complete the re-wire), place the item on the System Assessment List (T&D Engineering SharePoint site) so that it can be corrected at a later date when an outage is possible.

Panel Wiring (continued)

AC Test Switch Wiring

This section refers to test switches used for rack-mounted meters and relays. For these applications, the current circuit will enter the test switch on the jaw side and star on the blade side. For test switches used in external WHDM metering cabinets, refer to Tacoma Power Construction Standard A-MR-1019. Refer to standard A-SS-0025 for naming conventions and nameplates required for test switches.

Test switch wiring for current and potential circuits for all rack-mounted devices will be the same regardless of application (relaying, metering, DFR, etc.)

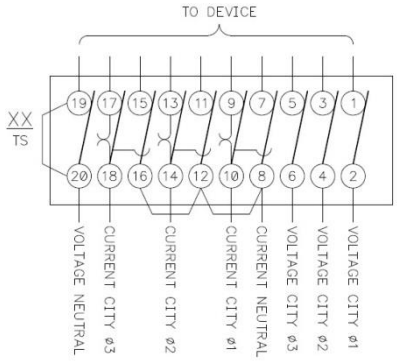
Current circuits will enter the test switch as follows:

1. City phase 1 enters on position 10
2. City phase 2 enters on position 14
3. City phase 3 enters on position 18

The circuit then leaves opposite sides 9, 13, & 17, respectively; are then connected to the device; and return on positions 7, 11 & 15, respectively. The star point is on the “entrance side” at positions 8, 12 & 16, respectively, and returns to the CT neutral on position 8.

Voltage circuits will enter the test switch on the even numbered side as well. City phase 1 enters on position 2, City phase 2 enters on position 4, and City phase 3 enters on position 6. The circuit then leaves on the opposite sides 1, 3 & 5, respectively, and is then connected to the device. Voltage (grounded) neutral will enter position 20 and go out opposite on position 19 to the device. The neutral position 19 & 20 will also maintain a hard-external jumper.

Figure 1 AC Test Switches



Panel Wiring (continued)

Terminal Blocks

Terminal blocks will not be placed adjacent to devices that limit worker's access to equipment. See standard A-SS-0020 for layout explanation.

Field wiring should enter the bottom of the terminal block.

Terminal blocks shall be numbered, starting at 1, from the inside of the panel outward.

On AC terminal blocks, conductors should be landed in order of phase (i.e. phase 1 on terminal block x, phase 2 on terminal block x+1, phase 3 on terminal block x+2 and common/neutral on terminal block x+3).

Communication Wiring

Communication wiring should be shown on wiring diagrams. Refer to T&D standard A-SS-0100 for further information.

Cables

All cables run in a tray or conduit must be at least 600V rated. For communication cables, a required space separation or conduit is required to run in cable trays or conduits with power cables.

Any communication cable that leaves the switchgear or control house should be converted to fiber. This eliminates the possibility of interference or noise on the cable.

Communication Wiring (continued)

4-Wire RS485 Master to 4-Wire RS485 Slave

Cables shall be twisted pair, shielded, with ground wire
Be sure to always double check the manufacturer information for port assignments and adjust assignments to pins as necessary. Color codes to functionality should remain the same (i.e. –RX Master to –TX Slave should always be on White/solid pair, i.e. white-orange).

Any multi-dropped slaves will keep the same port assignments and colors (i.e. Slave #1 pin 3 will be –TX with white-blue, Slave #x pin 3 will be –TX on white-blue)

Master Function	Slave Function	Balanced Twisted Pair	Wire Color
-RX	-TX	Pair 1	White-Blue
-TX	-RX	Pair 1	Blue
+TX	+RX	Pair 2	White-Orange
+RX	+TX	Pair 2	Orange
Chassis	Not used	-	Shield
Comm GND	Comm GND	-	Not Used

All shielded cables; grounded at chassis on one end only.

Ethernet 10BaseT 100BaseT Terminals

Copper Ethernet devices shall be wired to conform to the USOC EIA/TIA 568B standards. Category 5 cable, unshielded twisted pair is acceptable for short cable lengths without “power influence” or risk of surges. Device jacks are commonly RJ45.

RJ45/568B Pinout

Cable End	Color	Pair	Pin
	White-Orange	Pair 2	1
C	Orange	Pair 2	2
A	White-Green	Pair 3	3
B	Blue	Pair 1	4
L	White-Blue	Pair 1	5
E	Green	Pair 3	6
	White-Brown	Pair 4	7
	Brown	Pair 4	8

Control Wiring

All relevant control wiring should be shown on wiring diagrams.

Description	Control Cable #	Color	Size
Trip	1	Black	#12 or larger cable
Lights	2	White	
Close	3	Red	
Negative	4	Green	
Positive	5	Orange	
Relay Trip	6	Blue	
Annunciator	7	White/Black	
A-1 or X	8	Red/Black	
A-2 or Y	9	Green/Black	
Description	**Current #**	**Color**	**Size**
Phase 1	3	Red	#10 or larger cable
Phase 2	2	White	
Phase 3	4	Green	
Common	1	Black	
Description	**AC Potential #**	**Color**	**Size**
Phase 1	3	Red	#12 or larger cable
Phase 2	1	Black	
Phase 3	2	White	
Ground	4	Green	
Description	**DC Potential #**	**Color**	**Size**
DC Positive	3	Red	#12 or larger cable
DC Negative	1	Black	
DC Ground	4	Green	
Description	**Transformer Control #**	**Color**	**Size**
Power (PLTC#)	4	Green	#12 or larger
Auto (201A)	2	White	
Raise (201R)	1	Black	
Lower (201L)	3	Red	

Control Wiring (continued)

Description	Power Supply 120/208/240V Cable #	Color	Size
Power (L1)	1	Black	#12 or larger cable
Neutral (N)	2	White	
Power(L2)	3	Red	
Ground (GND)	4	Green	

Status cable should be #18 with an overall shield. The shield should be continuous, and landed on one side only, nearest to the terminating device RTU).

References

Tacoma Power Standards:

- Construction Standard A-SS-0020, “Relay & Control Panel Layout, Transmission Substations”
- Construction Standard A-SS-0025, “Labeling of T&D Substation Control House Equipment”
- Construction Standard A-SS-0100, “Drawing Guidelines for Communication Equipment in Electrical Substations”
- Work Practice W-SS-1020, “Substation Control Panel Wiring”

Reference Drawings

Refer to these reference drawings for examples of wiring design:

Drawing Standardization Wiring Diagram 1 & 2 of 2

PANEL LABELS

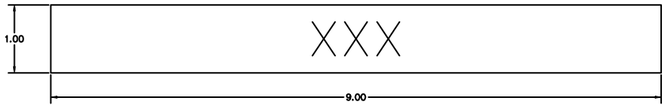
#1-1

LABEL FOR PANEL NUMBER

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .50 - CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 9"

EXAMPLES:
XX = P1
XX = AR105

#1-2



LABEL FOR PANEL NAME

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .50 - CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 9" OR IF ADDITIONAL ROOM IS NEEDED 1" X 18"

EXAMPLES:
XXX = PCB 10-457 NE-BLAIR
XXX = PCB 10-222 COWLITZ-LAGRANDE #2
XXX = BANK #1 PCB
XXX = PCB 10-365
XXX = FEEDER #1

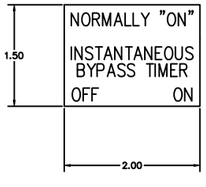
SWITCH LABELS

#2-1

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 - CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

#2-2 SPARE

#2-3

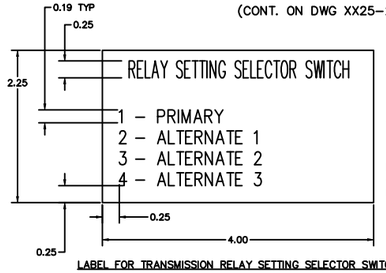


- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .19
- DIMENSIONS: 1.5" X 2"

SWITCH LABELS

(CONT. ON DWG XX25-2)

#2-4

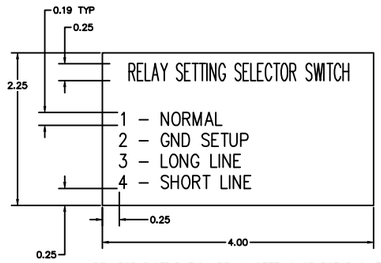


LABEL FOR TRANSMISSION RELAY SETTING SELECTOR SWITCH

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: AS NOTED
- DIMENSIONS: 2.25" X 4"

NOTE:
ONLY THE SWITCH POSITIONS THAT ARE IMPLEMENTED ARE INCLUDED ON LABEL

#2-5

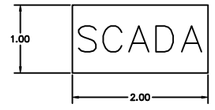


LABEL FOR DISTRIBUTION RELAY SETTING SELECTOR SWITCH

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: AS NOTED
- DIMENSIONS: 2.25" X 4"

NOTE:
ONLY THE SWITCH POSITIONS THAT ARE IMPLEMENTED ARE INCLUDED ON LABEL

#2-6



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .38 - CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 2"

#2-7

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 - CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

#2-8

LABEL FOR CONTROL SWITCH

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 - CENTER ON LABEL
- DIMENSIONS: 1" X 3"

EXAMPLES:
XXX = FEEDER #1
XXX = BANK #1 PCB
XXX = 10-256

GENERAL ORDERING INFORMATION:

1. UNLESS OTHERWISE SPECIFIED:
   - LABELS TO BE BACKED WITH 1/32 ADHESIVE FOAM TAPE.
   - ALL EDGES TO BE BEVELED.
   - LABEL MATERIAL TO BE UV PROTECTED ULTRA-MATTE FINISH OR EQUIVALENT.
2. VENDOR CONTACT INFORMATION:
   - DUREN CONTROLS (SAP VENDOR #109407)
     12314 BEVERLY PARK ROAD
     LYNNWOOD WA 98087-1513
     PH 425-745-4987
     FAX 425-355-1630
     * PRICING & FONT INFORMATION AVAILABLE @ WWW.DURENCONTROLS.COM
     * LABELS CAN BE MADE FROM AUTOCAD OR .DXF FILE
   - BIG JOHN'S TROPHY (SAP VENDOR #105671)
     5510 PACIFIC AVE
     TACOMA WA 98408
     PH 253-472-5258
   - PDQ (SAP VENDOR #106416)
     9318 STEELE ST S
     TACOMA WA 98444
     PH 253-536-9433

REFERENCE DRAWINGS:

A-SS-0025	LABELING OF SUBSTATION CONTROL HOUSE EQUIPMENT
XX25-2	TYPICAL LABEL DETAILS SHEET 2
XX25-3	TYPICAL LABEL DETAILS SHEET 3
XX25-4	TYPICAL LABEL DETAILS SHEET 4

DWG FILED IN: A-STANDARDS

NO.	DATE	REVISION	BY	CHECKED	APPROVED

ENGR.
DATE REV. NO.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

STANDARDS
TYPICAL LABEL DETAILS
SHEET 1

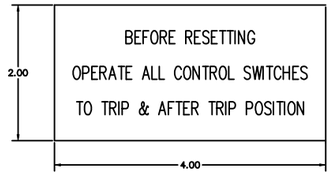
DESIGNED	DRAWN	CHECKED
ANG	RHC	XXX

SUBMITTED: AMY N. GRICE
APPROVED: MICHAEL W. SIMPSON
DATE: 3-29-06
SCALE: NONE
DRAWING NO.: XX25-1

SWITCH LABELS

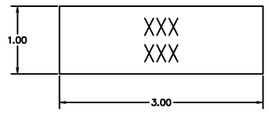
(CONT. FROM DWG XX25-1)

#2-9



- WHITE LETTERING ON RED BACKGROUND
- TEXT HEIGHT: .19 - CENTER TEXT ON LABEL
- DIMENSIONS: 2" X 4"

#2-10

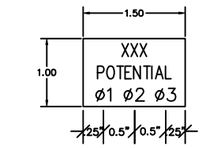


LABEL FOR LOCKOUT RELAY

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 - CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3" OR
  IF ADDITIONAL ROOM IS NEEDED 1" X 4"

EXAMPLES:
XXX = BANK #1 LOCKOUT
XXX = 110kV BUS LOCKOUT BANK #1
XXX = SWGR BUS LOCKOUT BANK #1
XXX = LS BUS LOCKOUT BANK #1

#2-11

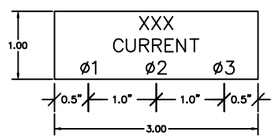


LABEL FOR STATES TEST SWITCH FMS-10E1-ST

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .19
- DIMENSIONS: 1.0" X 1.5"

EXAMPLES:
XXX = D25-1 13kV
XXX = 110kV BK1
XXX = 13kV BK1
XXX = 110kV
XXX = 13kV

#2-12

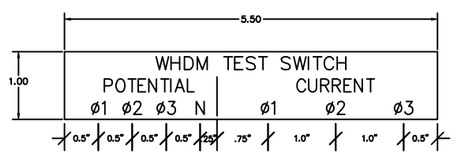


LABEL FOR STATES TEST SWITCH FMS-10E1-ST

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .19
- DIMENSIONS: 1.0" X 3"

EXAMPLES:
XXX = FEEDER #1 TSA
XXX = BANK #1 PCB TSB
XXX = 10-256 TSA

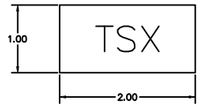
#2-13



LABEL FOR STATES TEST SWITCH FMS-10A1-ST

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .19
  CENTER "POTENTIAL" & "CURRENT" TEXT
  ABOVE PHASE NUMBERS.
  PHASE NUMBERS (ø"X") TO BE PLACED AS SHOWN.
  "WHDM TEST SWITCH" TEXT TO BE CENTERED
  ON LABEL.
- DIMENSIONS: 1.0" X 5.5"

#2-14



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .38 - CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 2"

EXAMPLES:
X = A
X = B
X = C

REFERENCE DRAWINGS:

A-SS-0025	LABELING OF SUBSTATION CONTROL HOUSE EQUIPMENT
XX25-1	TYPICAL LABEL DETAILS SHEET 1
XX25-3	TYPICAL LABEL DETAILS SHEET 3
XX25-4	TYPICAL LABEL DETAILS SHEET 4

NOTE:

1. SEE DWG XX25-1 FOR GENERAL LABEL ORDERING INFORMATION.

DWG FILED IN: A-STANDARDS

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

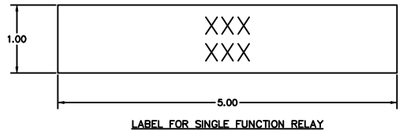
STANDARDS
TYPICAL LABEL
DETAILS
SHEET 2

ENGR.
DATE REV. NO.

SUBMITTED	DESIGNED	DRAWN	CHECKED
AMY N. GRICE	ANG	RHC	XXX
APPROVED	DATE	SCALE	
MICHAEL W. SIMPSON	3-29-06	NONE	
	DRAWING NO.		
	XX25-2		

RELAY LABELS

#3-1



LABEL FOR SINGLE FUNCTION RELAY

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 5"
  (LENGTH MAY VARY DEPENDING ON DESCRIPTION)

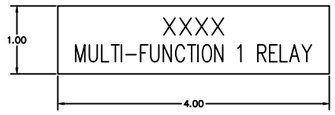
EXAMPLES:
XXX = BLAIR-LINCOLN LINE DIFFERENTIAL (87L)
XXX = 110kV BUS DIFF (87B)
XXX = BANK #2 PHASE 1 OVERCURRENT (50/51)

#3-2

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

(SEE NOTE 2)

#3-3



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

EXAMPLES:
XXXX = LAGRANDE-COWLITZ #1
XXXX = BANK #2

(SEE NOTE 2)

IED LABELS

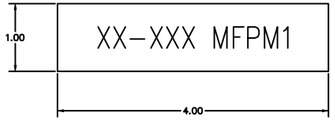
#4-1

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

EXAMPLES:
XXX = FDR5
XXX = BK1

(SEE NOTE 2)

#4-2



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

EXAMPLES:
XX-XXXX = 10-457
XX-XXXX = 12-1663

(SEE NOTE 2)

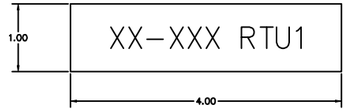
#4-3

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

EXAMPLES:
XXX = FDR2
XXX = BK1PCB

(SEE NOTE 2)

#4-4

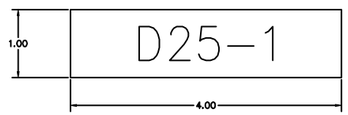


- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

EXAMPLES:
XX-XXX = 12-1665M
XX-XXX = 10-457

(SEE NOTE 2)

#4-5



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .50 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

(SEE NOTE 2)

#4-6

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

EXAMPLES:
X = 1
X = 2

#4-7

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

EXAMPLES:
X = 1
X = 2

REFERENCE DRAWINGS:

A-SS-0025	LABELING OF SUBSTATION CONTROL HOUSE EQUIPMENT
XX25-1	TYPICAL LABEL DETAILS SHEET 1
XX25-2	TYPICAL LABEL DETAILS SHEET 2
XX25-4	TYPICAL LABEL DETAILS SHEET 4

NOTE:

1. SEE DWG XX25-1 FOR GENERAL LABEL ORDERING INFORMATION.
2. FOR SINGLE DEVICE:
   THE "1" DESIGNATOR IS ALWAYS PRESENT
   FOR MULTIPLE DEVICES:
   THE DESIGNATOR SHOULD REFLECT SEQUENTIAL NUMBERING
   (EXAMPLE: BK1 MFPM1, BK1 MFPM2)

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

STANDARDS
TYPICAL LABEL
DETAILS
SHEET 3

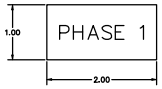
ENGR.
DATE REV. NO.

SUBMITTED	DESIGNED	DRAWN	CHECKED
AMY N. GRICE	ANG	RHC	XXX
APPROVED	DATE 3-29-06	SCALE NONE	
MICHAEL W. SIMPSON	DRAWING NO. XX25-3		

DWG FILED IN: A-STANDARDS

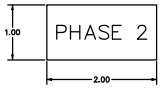
OTHER EQUIP. LABELS

#5-1



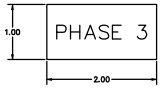
- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 2"

#5-2



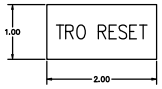
- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 2"

#5-3



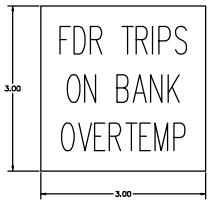
- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 2"

#5-4



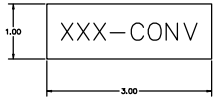
- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 2"

#5-5



- WHITE LETTERING ON RED BACKGROUND
- TEXT HEIGHT: .50" – CENTER TEXT ON LABEL
- DIMENSIONS: 3" X 3"

#5-6

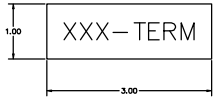


- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

EXAMPLES:
XXX = BK1
XXX = N2C1

#5-7 SPARE

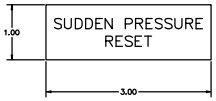
#5-8



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .31 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

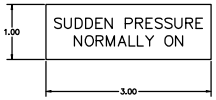
EXAMPLES:
XXX = BK1
XXX = P3

#5-9



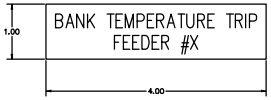
- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .19 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

#5-10



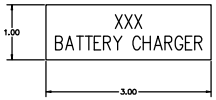
- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .19 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

#5-11



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 4"

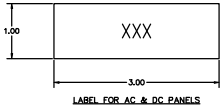
#5-12



- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

EXAMPLES:
XXX = 125VDC
XXX = 48VDC

#5-13



LABEL FOR AC & DC PANELS

- WHITE LETTERING ON BLACK BACKGROUND
- TEXT HEIGHT: .25 – CENTER TEXT ON LABEL
- DIMENSIONS: 1" X 3"

EXAMPLES:
XXX = AC PANEL–1
XXX = DC PANEL–2A
XXX = 125VDC PANEL
XXX = 48DC PANEL
XXX = 48DC PANEL–2
XXX = 125VDC PANEL–1

REFERENCE DRAWINGS:

A–SS–0025	LABELING OF SUBSTATION CONTROL HOUSE EQUIPMENT
XX25–1	TYPICAL LABEL DETAILS SHEET 1
XX25–2	TYPICAL LABEL DETAILS SHEET 2
XX25–3	TYPICAL LABEL DETAILS SHEET 3

NOTE:

1. SEE DWG XX25–1 FOR GENERAL LABEL ORDERING INFORMATION.

DWG FILED IN: A–STANDARDS

NO.	DATE	REVISION	BY	CHECKED	APPROVED

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

STANDARDS
TYPICAL LABEL
DETAILS
SHEET 4

DESIGNED	DRAWN	CHECKED
ANG	RHC	XXX

SUBMITTED	DATE
AMY N. GRICE	3–29–08

APPROVED	DRAWING NO.
MICHAEL W. SIMPSON	XX25–4

DWGR.
DATE REV. NO.

T&D Engineering Substation & Communication Drawing Standard

Last Update: 03/16/2010 (Red text denotes current matrix change)

Content	Drawing Type					
	One-Line Diagram	**Three-Wire Diagram**	**DC Schematic**	**Comm Block Diagram**	**Wiring Diagram**	**Reference Drawing**
Purpose	Single line high-level representation of power system equipment schemes and electrical order.	Three-wire representation of rotation, instrument transformer circuits, and station service source.	DC schematic assists in understanding the functional relationship between devices. It is a branch style representation of the trip, close and indication schemes among substation devices and it is not intended to necessarily follow wiring order or duplicate the wiring diagram purpose.	Communications block diagrams function similarly to the schematic diagrams produced by substation, protection and control engineers and technicians. They are logical representation showing the function and relationships between equipment.		
Breaker Trip/Close Sources	In general, show the following: -Dashed line with arrows indicating the flow of control -Initiating devices shown in-line with the dashed line -Supervising (blocking) contacts shown in-line with the dashed line with their label nearby and contact positions in √ normal state -"T" or "C" For multi-function relays capable of three or more functions, underline abbreviated label with show relevant IEEE designations below, separated by commas. For single or two-function relays, show IEEE designation(s).	x	√ See Circuit Designations.	x	√ See Circuit Designations.	x
Cable Numbers	x	√ Show only for AC current and voltage circuits between instrument transformer location and panel or between panels. Include conductor numbers in lasso.	x	x	√ All cables are to be represented.	x
Capacitor Banks	√ Show symbol & rating.	√ Show symbol & rating.	x	x	√	x
Circuit Breakers (Low-Voltage)	√ For Station Service w/ ratings	√ For Station Service w/ ratings	√ Include symbol, dashed line between poles (for DC breakers), source voltage and type (AC or DC) & continuous amp rating.	x	√ Generally, station service breakers are not shown on wiring diagrams. DC breakers shown on DC panel wiring diagram.	x

Content	Drawing Type					
	One-Line Diagram	Three-Wire Diagram	DC Schematic	Comm Block Diagram	Wiring Diagram	Reference Drawing
Circuit Breakers and Switchers	For 110 or 230kV breakers, show breaker operations # within a box. Outside the box, show the continuous current rating. √ For 12.5kV or 13.8kV breakers, show "52" within a box, feeder number clearly shown elsewhere & in-line double arrows on both sides of box (if draw-out type). Outside the box, show the continuous current rating.	For 110kV or 230kV breakers/circuit switchers, show breaker/circuit switcher operations # within a box. A dashed box should be shown adjacent to the breaker/circuit switcher box symbol to represent the breaker control cabinet location in relation to the bushings. √ Bushing numbers and symbol shall be shown beyond the bushing CTs. For 12.5kV or 13.8kV breakers, show "52" within a box, feeder number clearly shown elsewhere, and in-line double arrows on both sides of box (if draw-out type).	√ Breaker/circuit switcher operations # to be included on the breaker wiring diagram title block.	X	Breaker/circuit switcher operations # to be included on the breaker or circuit switcher wiring diagram title block.	X
Circuit Designations	X	X	√ Show only breaker/circuit switcher DC positive, negative, trip, and close designations and also also P&C SX designations for polarity verification into relay/IED. A lasso will be used to indicate which portion of the circuit is labeled.	X	√ Show only breaker/circuit switcher DC positive, negative, trip, and close and also P&C SX designations for polarity verification into relay/IED. Show only on terminal	X
City Phasing	X	√	X	X	√ See Current Transformers and Voltage Transformers.	X
Contact Development Charts	X	X	√	X	X	X
Contacts	√ Refer to Breaker Trip/Close Sources.	X	Show contacts in de-energized or reset state, except for the following: 1. Show 279CO contacts in the ON (Normal) position. 2. Show 269 contacts in the REMOTE position. √ 3. Show 101 contacts in the open position. Use the contact development chart to determine the state. 4. Show 43L/R contacts in the REMOTE state. 5. Show 243S contacts open. Use the contact development chart to determine the state.		Show contacts in de-energized or reset state, except for the following: 1. Show 279CO contacts in the ON (Normal) position. 2. Show 269 contacts in the REMOTE position. √ 3. Show 101 contacts in the open position. Use the contact development chart on the DC schematic to determine the state. 4. Show 43L/R contacts in the REMOTE state. 5. Show 243S contacts open. Use the contact development chart to determine the state.	

Content	Drawing Type					
	One-Line Diagram	**Three-Wire Diagram**	**DC Schematic**	**Comm Block Diagram**	**Wiring Diagram**	**Reference Drawing**
Current Transformers	√ Show symbol, ratio used, wye/delta connection & polarity dots.	√ Show symbol, ratio at full tap, ratio used, winding connection(s), ground connection, class, polarity dots & phasing.	X	X	√ Included on breaker, circuit switcher, or transformer wiring diagram.	X
Device Location	X	√ Show in a box above terminal blocks where cables land.	√ If the drawing includes the relay, RTU, meter, or switch operating coil or power supply, show in a box adjacent to the operating coil or power supply only. If the drawing does not include the relay, RTU, or switch operating coil or power supply, show in a box adjacent to each output contact or input.	X	√ Location to be included on title block.	X
Fiber	√ Show line with arrow & ultimate destination.	X	X	√ Use label to indicate use of optical fibers. 10BaseFL, 100BaseFX are Ethernet optical port standards.	√ Include line with cable number and destination.	
Fuses	√ Show symbol and continuous current rating. If draw-out, show in-line double arrows on both sides of fuse	√ Show symbol and continuous amp rating. If draw-out, show in-line double arrows on both sides of fuse	√ Include symbol & continuous amp rating.	X	√ Include symbol & continuous amp rating.	X
Inductors	√ Show symbol only.	√ Show symbol, series reactance & current rating.	X	X	X	X
Legend	√ Include only IEEE designations that are shown on the specific drawing.	X	√ Include only IEEE designations that are shown on the specific drawing.	X	X	X
Manufacturer, Model, and Part Information	√ Show breaker, tranformer, switchgear, or other if available manufacturer reference number.	X	X	X	√ Included only if neither a stock number nor an SAP number has been assigned and if <u>not</u> included in an SME database. Abbreviated model numbers for RTUs and relays are allowed (e.g., D25, SEL-587).	X
Meters	√ Show in a box. Include the abbreviated label.	In a box, show AC current and voltage inputs with device-specific label (e.g., IA, V1, IA87), terminal numbers & polarity marks. √ While not desirable, it may be cleaner to represent one set of AC current or voltage inputs within a separate box than another set, even on the same drawing. Show the abbreviated label above each box.	√ Include power supply connection with terminals.	√ Show in a box. Use identical appreviated label as others. Show Serial data, time format, or ethenet communications to source.	√ Include a backplane of the meter.	X
Power Transformers	√ Show symbol, ratio(s), capacity(ies) & delta/wye connection(s).	√ Show symbol, phasing, ratio(s), capacity(ies), winding connection(s) & bushing designations beyond bushing CTs.	X	X	√ Included on transformer wiring diagram.	X
Reference Drawings	X	X	X	X Only reference to Comm system drawings outside of substation	X	√

Content	Drawing Type					
	One-Line Diagram	Three-Wire Diagram	DC Schematic	Comm Block Diagram	Wiring Diagram	Reference Drawing
Reference to Adjacent Substation	√	√	x	√	x	x
Relays	√ For single-function relays, show IEEE designation within a circle. For two-function relays, show IEEE designations with a slash between them, all within a circle. For multi-function relays capable of three or more functions, show a partitioned box. In one partition, show the abbreviated label. In the other partition, show all IEEE designations used by the relay, each within a circle. Use this representation even if only one or two functions are used.	√ In a box, show AC current and voltage inputs with device-specific label (e.g., IA, V1, IA87), terminal numbers & polarity marks. While not desirable, it may be cleaner to represent one set of AC current or voltage inputs within a separate box than another set, even on the same drawing. Show the abbreviated label (for multi-function relays) or the IEEE designation above each box.	√ For single-function or two-function relays, show the IEEE designation next to the contact with terminal numbers. Include any seal-in circuits with terminal numbers. For multi-function relays capable of three or more functions, show DC output contacts and inputs with device-specific label (e.g., OUT101, IN203) and terminal numbers. Also, include a very brief description (e.g., TRIP, 79, 87L) of the purpose of the output contact or input and the abbreviated label. If two or more output contacts and/or inputs can be grouped in the same area of the drawing, show a dashed box around the output contacts and/or inputs. Include the abbreviated label (and location, if applicable) outside the box. Show power supply connection with terminal numbers.	√	√ Include a backplane of the relay.	x
RTUs/ Integration Servers	√ Show only if an RTU collects AC analogs directly. Then, show a box with the abbreviated label. Show 201 for supervisory control (from an RTU) in trip/close circuits.	√ Include only if RTU collects AC analogs directly. Then, show AC current and voltage inputs and terminal numbers, all within a box. Include the abbreviated label adjacent to the box.	√ Include power supply connection with terminals. Show output contacts (controls) with device-specific label (e.g., 201C/C1C) and terminal numbers. If two or more output contacts can be grouped in the same area of the drawing, show a dashed box around the output contacts. Include abbreviated label outside the box.	√ Include devices. Show Ethernet and serial connectivity.	√ Include a backplane of the RTU/server.	
Station Service Transformers	√ Show symbol, "STATION SERVICE", ratio, capacity, 1ph or 3 ph & phase connection.	√ Show symbol, "STATION SERVICE", ratio, capacity & phase connection.	x	x	x	x
Surge Arrestors	√ Show symbol with "S.A."	√ Show symbol with "S.A." and rating.	x	x	x	x
Switches	√ Show operations number & symbol (different for MOD, gang-operated (GO) switch & hook-operated (HO) switch). For distribution, include continuous current rating.	√ Show symbol & operations number. (MODs, GO switches, and HO switches are shown the same.)	x	x	x	x
Terminal Blocks	x	√ Include only where AC current or voltage circuits first land in a panel or where there is inter-panel wiring. Show terminal block label and terminal numbers.	x	x	√	x

Content	Drawing Type					
	One-Line Diagram	Three-Wire Diagram	DC Schematic	Comm Block Diagram	Wiring Diagram	Reference Drawing
Test Switches	x	√ Show only AC current and voltage test switches. Show symbol(s) and terminals all within a box. Include the label adjacent to the box. While not desirable, it may be cleaner to represent one set of AC current or voltage test switches within a separate box than another set, even on the same drawing.	√ Include only DC test switches. Show symbol and terminals with label.	x	√	x
Voltage Transformers	√ Show symbol, ratio(s) & wye/delta connection.	√ Show symbol, ratio(s), power rating, winding connection(s), ground connection & phasing.	x	x	√ Include on PT wiring diagram.	x

APPENDIX B – SUBMITTAL PACKAGE

Signature Page

Price Proposal Form

SIGNATURE PAGE

CITY OF TACOMA
Power Transmission and Distribution

All submittals must be in ink or typewritten, executed by a duly authorized officer or representative of the bidding/proposing entity, and received and time stamped as directed in the **Request for Bids Page near the beginning of the specification**. If the bidder/proposer is a subsidiary or doing business on behalf of another entity, so state, and provide the firm name under which business is hereby transacted.

REQUEST FOR BIDS SPECIFICATION NO. PT25-0016F
High Voltage Circuit Breakers

The undersigned bidder/proposer hereby agrees to execute the proposed contract and furnish all materials, labor, tools, equipment and all other facilities and services in accordance with these specifications.

The bidder/proposer agrees, by submitting a bid/proposal under these specifications, that in the event any litigation should arise concerning the submission of bids/proposals or the award of contract under this specification, Request for Bids, Request for Proposals or Request for Qualifications, the venue of such action or litigation shall be in the Superior Court of the State of Washington, in and for the County of Pierce.

Non-Collusion Declaration

The undersigned bidder/proposer hereby certifies under penalty of perjury that this bid/proposal is genuine and not a sham or collusive bid/proposal, or made in the interests or on behalf of any person or entity not herein named; and that said bidder/proposer has not directly or indirectly induced or solicited any contractor or supplier on the above work to put in a sham bid/proposal or any person or entity to refrain from submitting a bid/proposal; and that said bidder/proposer has not, in any manner, sought by collusion to secure to itself an advantage over any other contractor(s) or person(s).

_____
Bidder/Proposer's Registered Name

_____
Address

_____
City, State, Zip

_____
Authorized Signatory E-Mail Address

_____
E.I.No. / Federal Social Security Number Used on Quarterly Federal Tax Return, U.S. Treasury Dept. Form 941

_____
E-Mail Address for Communications

_____ _____
Signature of Person Authorized to Enter into Contracts for Bidder/Proposer — Date

_____
Printed Name and Title

_____
(Area Code) Telephone Number / Fax Number

_____
State Business License Number
in WA, also known as UBI (Unified Business Identifier) Number

_____
State Contractor's License Number
(See Ch. 18.27, R.C.W.)

Addendum acknowledgement #1_____ #2_____ #3_____ #4_____ #5_____

THIS PAGE MUST BE SIGNED AND RETURNED WITH SUBMITTAL.

Item Name	Description	Unit Price	Quantity	Manufacturer Name	Part Number
Dead Tank Circuit Breaker, 123kV, 2000A, 40kA with SF6 gas			1		
Dead Tank Circuit Breaker, 123kV, 3000A, 40kA with SF6 gas			1		
Dead Tank Circuit Breaker, 123kV, 3000A, 50kA with SF6 gas			1		
Dead Tank Circuit Breaker, 245kV, 2000A, 50kA with SF6 gas			1		
Dead Tank Circuit Breaker, 245kV, 3000A, 50kA with SF6 gas			1		
Dead Tank Circuit Breaker, 245kV, 3000A, 63kA with SF6 gas			1		
Total					

APPENDIX C – SAMPLE CONTRACT

Sample Contract

CONTRACT

Resolution No.
Contract No.

This Contract is made and entered into effective as of [Month], [Day], [Year] ("Effective Date") by and between the City of Tacoma, a Municipal Corporation of the State of Washington ("City"), and [supplier name as it appears in Ariba, including dbas or trade names] ("Contractor").

That in consideration of the mutual promises and obligations hereinafter set forth the Parties hereto agree as follows:

I. Contractor shall fully execute and diligently and completely perform all work and provide all services and deliverables described herein and in the items listed below each of which are fully incorporated herein and which collectively are referred to as "Contract Documents":

1. Specification No. [Spec Number] [Spec Title] together with all authorized addenda.
2. Contractor's submittal [or specifically described portions thereof] dated [Enter Submittal Date] submitted in response to Specification No. [Spec Number] [Spec Title].
3. Describe with specific detail and list separately any other documents that will make up the contract (fee schedule, work schedule, authorized personnel, etc.) or any other additional items mutually intended to be binding upon the parties.

II. If federal funds will be used to fund, pay or reimburse all or a portion of the services provided under the Contract, the terms and conditions set forth at this Appendix A are incorporated into and made part of this Contract and CONTRACTOR will comply with all applicable provisions of Appendix A and with all applicable federal laws, regulations, executive orders, policies, procedures, and directives in the performance of this Contract.

If CONTRACTOR's receipt of federal funds under this Contract is as a sub-recipient, a fully completed Appendix B, "Sub-recipient Information and Requirements" is incorporated into and made part of this Contract.

III. In the event of a conflict or inconsistency between the terms and conditions contained in this document entitled Contract and any terms and conditions contained the above referenced Contract Documents the following order of precedence applies with the first listed item being the most controlling and the last listed item the least controlling:

1. Contract, inclusive of Appendices A and B.
2. List remaining Contract Documents in applicable controlling order.

IV. The Contract terminates on xxxxx, and may be renewed for xxxxxxxx

V. The total price to be paid by City for Contractor's full and complete performance hereunder, including during any authorized renewal terms, may not exceed:
$[Dollar Amount], plus any applicable taxes.

VI. Contractor agrees to accept as full payment hereunder the amounts specified herein and in Contract Documents, and the City agrees to make payments at the times and in the manner and upon the terms and conditions specified. Except as may be otherwise provided herein or in Contract Documents Contractor shall provide and bear the expense of all equipment, work and labor of any sort whatsoever that may be required for the transfer of materials and for constructing and completing the work and providing the services and deliverables required by this Contract.

VII. The City's preferred method of payment is by ePayables (Payment Plus), followed by credit card (aka procurement card), then Electronic Funds Transfer (EFT) by Automated Clearing House (ACH), then check or other cash equivalent. CONTRACTOR may be required to have the capability of accepting the City's ePayables or credit card methods of payment. The City of Tacoma will not accept price changes or pay additional fees when ePayables (Payment Plus) or credit card is used. The City, in its sole discretion, will determine the method of payment for this Contract.

SAMPLE

VIII. Failure by City to identify a deficiency in the insurance documentation provided by Contractor or failure of City to demand verification of coverage or compliance by Contractor with the insurance requirements contained in the Contract Documents shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

IX. Contractor and for its heirs, executors, administrators, successors, and assigns, does hereby agree to the full performance of all the requirements contained herein and in Contract Documents.

It is further provided that no liability shall attach to City by reason of entering into this Contract, except as expressly provided herein.

IN WITNESS WHEREOF, the Parties hereto have accepted and executed this Contract, as of the Effective Date stated above, which shall be Effective Date for bonding purposes as applicable.

CITY OF TACOMA:	CONTRACTOR:
Signature:	Signature:
Name:	Name:
Title:	Title:

(City of Tacoma use only - blank lines are intentional)

Director of Finance: _____

Deputy/City Attorney (approved as to form): _____

Approved By: _____

Approved By: _____

Approved By: _____

Approved By: _____

Approved By: _____

Approved By: _____

SAMPLE

APPENDIX A
FEDERAL FUNDING

1. Termination for Breach

CITY may terminate this Contract in the event of any material breach of any of the terms and conditions of this Contract if CONTRACTOR's breach continues in effect after written notice of breach and 30 days to cure such breach and fails to cure such breach.

2. Prevailing Wages

1. If federal, state, local, or any applicable law requires CONTRACTOR to pay prevailing wages in connection with this Contract, and CONTRACTOR is so notified by the CITY, then CONTRACTOR shall pay applicable prevailing wages and otherwise comply with the Washington State Prevailing Wage Act (RCW 39.12) in the performance of this Contract.

2. If applicable, a Schedule of Prevailing Wage Rates and/or the current prevailing wage determination made by the Secretary of Labor for the locality or localities where the Contract will be performed is made of part of the Contract by this reference. If prevailing wages apply to the Contract, CONTRACTOR and its subcontractors shall:

    i. Be bound by and perform all transactions regarding the Contract relating to prevailing wages and the usual fringe benefits in compliance with the provisions of Chapter 39.12 RCW, as amended, the Washington State Prevailing Wage Act and/or the Davis-Bacon Act (40 U.S.C. 3141- 3144, and 3146-3148) and the requirements of 29 C.F.R. pt. 5 as may be applicable, including the federal requirement to pay wages not less than once a week.

    ii. Ensure that no worker, laborer or mechanic employed in the performance of any part of the Contract shall be paid less than the prevailing rate of wage specified on that Schedule and/or specified in a wage determination made by the Secretary of Labor (unless specifically preempted by federal law, the higher of the Washington state prevailing wage or federal Davis-Bacon rate of wage must be paid.

    iii. Immediately upon award of the Contract, contact the Department of Labor and Industries, Prevailing Wages section, Olympia, Washington and/or the federal Department of Labor, to obtain full information, forms and procedures relating to these matters. Per such procedures, a Statement of Intent to Pay Prevailing Wages and/or other or additional documentation required by applicable federal law, must be submitted by CONTRACTOR and its subcontractors to the CITY, in the manner requested by the CITY, prior to any payment by the CITY hereunder, and an Affidavit of Wages Paid and/or other or additional documentation required by federal law must be received or verified by the CITY prior to final Contract payment.

3. COPELAND ANTI-KICKBACK ACT

For Contracts subject to Davis Bacon Act the following clauses will be incorporated into the Contract:

A. CONTRACTOR shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this Contract.

B. CONTRACTOR or subcontractor shall insert in any subcontracts the clause above and such other clauses federal agencies may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts.

SAMPLE

The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these Contract clauses.

C. Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

4. EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this Contract, CONTRACTOR will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. If the CONTRACTOR does over $10,000 in business a year that is funded, paid or reimbursed with federal funds, CONTRACTOR will take specific and affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

A. Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

B. CONTRACTOR will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

C. CONTRACTOR will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Contractor's legal duty to furnish information.

D. CONTRACTOR will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

E. CONTRACTOR will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

F. In the event of CONTRACTOR’s noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the CONTRACTOR may be declared ineligible for further federally funded contracts in accordance with procedures

SAMPLE

authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

G. CONTRACTOR will include the portion of the sentence immediately preceding paragraph (A) and the provisions of paragraphs (A) through (G) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. CONTRACTOR will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event CONTRACTOR becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the CONTRACTOR may request the United States to enter into such litigation to protect the interests of the United States.

5. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

A. Overtime requirements. Neither CONTRACTOR or subcontractor contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

B. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (3)(A) of this section the CONTRACTOR and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such CONTRACTOR and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (3)(A) of this section, in the sum of $27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (3)(A) of this section.

C. Withholding for unpaid wages and liquidated damages. The CITY shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the CONTRACTOR or subcontractor under any such contract or any other Federal

SAMPLE

contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such CONTRACTOR or sub-contractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (3)(B) of this section.

D. Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (3)(A) through (D) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime CONTRACTOR shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (3)(A) through (D) of this section.

6. CLEAN AIR ACT

A. CONTRACTOR agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

B. CONTRACTOR agrees to report each violation to the CITY and understands and agrees that the CITY will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

CONTRACTOR agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with federal funds.

7. FEDERAL WATER POLLUTION CONTROL ACT

A. CONTRACTOR agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

B. CONTRACTOR agrees to report each violation to the CITY and understands and agrees that the CITY will, in turn, report each violation as required to assure notification to the appropriate federal agency.

C. CONTRACTOR agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with federal funding.

8. DEBARMENT AND SUSPENSION

A. This Contract is a Covered Transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the CONTRACTOR is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

B. CONTRACTOR must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier Covered Transaction it enters into.

SAMPLE

C. This certification is a material representation of fact relied upon by the CITY. If it is later determined that the CONTRACTOR did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to CITY, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

D. CONTRACTOR agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C throughout the period of this Contract and to include a provision requiring such compliance in its lower tier covered transactions.

9. BYRD ANTI-LOBBYING AMENDMENT

A. Contractors who apply or bid for an award of $100,000 or more shall file the required certification with CITY. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the CITY.

B. If applicable, CONTRACTOR must sign and submit to the CITY the certification required by Appendix A to 44 CFR Part 18 contained at Appendix A-1 to this Contract.

10. PROCUREMENT OF RECOVERED MATERIALS

A. In the performance of this Contract, CONTRACTOR shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired:

   i. Competitively within a timeframe providing forcompliance with the contract performance schedule;

   ii. Meeting contract performance requirements; or

   iii. At a reasonable price.

B. Information about this requirement, along with the list of EPA- designated items, is available at EPA's Comprehensive Procurement Guidelines web site, https://www.epa.gov/smm/comprehensive- procurement-guideline-cpg-program.

C. CONTRACTOR also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

SAMPLE

APPENDIX A-1

APPENDIX A to 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING
Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap.38, Administrative Remedies for
False Claims and Statements, apply to this certification and disclosure, if any.

SAMPLE

_____
Signature of Contractor's Authorized Official

_____
Name and Title of Contractor's Authorized Official

_____Date

APPENDIX B—Sub-recipient information and requirements

Pursuant to 2 CFR 200.332(a)(1) Federal Award Identification

(i) **Agency Name (must match the name associated with its unique entity identifier)**		(ii) **Unique Entity Identifier** *(i.e., DUNS)*	**City of Tacoma Number for This Agreement**
(iii) **Federal Award Identification Number (FAIN)**	(iv) **Federal Award Date**	(v) **Federal Period of Performance Start and End Date**	(vi) **Federal Budget Period Start and End Date**
(vii) **Amount of Federal Funds *Obligated* to the agency *by this action*:** $	(viii) **Total Amount of Federal Funds *Obligated* to the agency**	(ix) **Total Amount of the Federal Award *Committed* to the agency** $	
(x) **Federal Award Project Description:** CORONAVIRUS STATE AND LOCAL FISCAL RECOVERY FUNDS– City of Tacoma			
(xi) **Federal Awarding Agency:** DEPARTMENT OF THE TREASURY	**Pass-Through Entity:** City of Tacoma	**Awarding Official Name and Contact Information:**	
(xii) **Assistance Listing Number and Name (the pass-through entity must identify the dollar amount made available under each Federal award and the Assistance Listing number at time of disbursement)**			(xiii) **Identification of Whether the Award is R&D**
(xiv) **Indirect Cost Rate for the Federal Award**	**Award Payment Method (lump sum payment or reimbursement)** REIMBURSEMENT		