# Electrical Service Panel Upgrades

An electrical permit and inspection are required to upgrade the main electrical service panel of homes; no plans are required. Requirements for the upgraded electrical service panel are outlined below:

| Load calculations and undergrounding conduit are generally not required | Load calculations and undergrounding the main service entrance conduit are generally not required unless:  
- Additional load is being added and the inspector requires the calculations  
- The existing service entrance is underground or if PG&E or the Building Division determine the need to underground the service entrance |
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| Service panel installation requirements | Requirements for the upgraded electrical service panel are outlined below:  
- **Required meter height** - 36 to 75 inches above ground  
- **Required clear space in front of service panel** - 30 inches wide by 36 inches deep with a minimum headroom clearance of 6 feet-6 inches |
| Circuit breakers | The circuit breaker brand must be listed and approved for use as stated on the panel label.  
- A multi-wire circuit (3-wire, 120/240 volt circuit) requires a handle-tie on the circuit breakers. This is common where the wiring serves both the garbage disposal and the dishwasher.  
- Existing breakers must be replaced with GFCI or AFCI only if receptacles are being replaced OR wiring is being added or extended. |
| Grounding | If the water piping system is the sole grounding source, then a supplemental electrode must be installed.  
- If using only a single ground rod, a verification document from the contractor stating a resistance to earth of 25 ohms or less at the property is needed prior to final approval.  
- A minimum 5/8” ground rod must be buried at least 8 feet in the ground. Locate the ground rod as close as practicable to the electric service. |
| Bonding the water piping system | The water piping system must be bonded as follows:  
- **If main water service piping to the house is metallic** - Accessible bonding must occur within 5 feet of where the water service enters the house.  
- **If main water service piping is non-metallic** - The cold water piping system may be bonded at any accessible location. Piping is commonly bonded at the water heater.  
- The hot and cold water piping systems are effectively bonded together via the brass plumbing mixing valves at tubs and showers, etc. The City accepts a single bond to the cold water piping only; an independent bonding jumper to the hot water piping is not required. |
| Bonding the gas piping system | The gas piping system must be bonded as follows:  
- **If gas appliances are available** - The gas piping is bonded via the grounding conductor in the branch circuit to the gas appliances  
- **If the electrical system does not contain equipment grounds** - The gas piping system must be bonded externally with a bonding jumper (same as water pipe).  
- Gas bonding shall only be connected to the house side of the gas meter. |