Traffic Signal Technology

Edmonton uses a variety of different types of traffic signal technologies to detect and count pedestrians, micromobility users and vehicles. Engineers carefully evaluate the design of an intersection and surrounding infrastructure, traffic volume, pedestrian volume and other factors when determining which technologies are appropriate for a particular site; no one solution is optimal for all sites.

- Equipment costs are approximations based on standard intersections and include the purchase and basic installation of the device. Costs can vary depending on a number of factors, such as intersection configuration, number of units required, power source and whether retrofits or additional technology is necessary for operation. Ongoing maintenance and operating costs are not included.
- Data collected by counting technologies is used to inform specific projects or to assess traffic patterns (hourly, daily and yearly) for use in building traffic signal timing plans.

	Description	Cost Per Intersection
Standard Traffic Signal	A typical traffic signal with 4 vehicle approaches, pedestrian crosswalks and detection for some, but not all lanes of an intersection. Includes signal poles, electrical cabinets, cables, etc. for standard installation.	$300,000
Pedestrian Push Button	Button used to trigger the activation of a pedestrian crossing indication. Typically used in areas or directions of travel with lower volumes. ● Minimizes vehicle wait times and traffic interruptions when pedestrians are not present. ● Can be installed at signalized intersections.	$4,000 - $8,000
Accessible (Audible) Pedestrian Signal	Button that triggers audible signals during a pedestrian phase to indicate when it is safe to cross, and in what direction. Installed by request or in areas with need (e.g. near hospitals, shopping centres, attractions, etc.) or in intersections with non-standard geometry. ● Improves accessibility for users with visual impairments. ● Audible pedestrian signal buttons are identified with signage, however may be mistaken for typical pedestrian push buttons.	$15,000

	Description	Cost Per Intersection
Amber Crosswalk Light	Overhead flashing amber lights that indicate the presence of a pedestrian in a crosswalk. Not used at signalized intersections. • Immediately activated upon user detection by push button.	$100,000
Rapid Flashing Beacon	Flashing lights installed on street-level signage that indicate the presence of a pedestrian in a crosswalk. Not used at signalized intersections. • Immediately activated upon user detection by push button. • Can be solar powered or connected directly to an electrical power source.	$30,000 - $60,000
Inductive Loop (Roads and Paths)	Equipment installed in the road or path surface that detects vehicle or bicycle presence to influence traffic signals or obtain volume counts. Typically used to detect vehicles on side streets or in turning lanes, or to detect ETS vehicles and provide specific bus signals. • Can be used to detect count, speed, length and lane position of vehicles. • Can be damaged from road use or maintenance and may need to be repaired often.	$25,000 - $45,000
Video Camera	Video cameras equipped with software that identifies vehicles or pedestrians passing through the camera field of view. Currently used in Edmonton for on-road vehicle detection (influences signal timing) and pedestrian volume counting (does not influence signal timing). • Touchless detection. • Technology can have difficulty predicting pedestrian or micromobility travel directions. • Detection accuracy can be impacted by lens cleanliness or sun glare.	$40,000
Thermal	Infrared technology that detects pedestrians passing through a field by sensing body temperature. Currently used in Edmonton for limited pedestrian volume counting but not for pedestrian signal timing. • Touchless detection. • Can have difficulties predicting pedestrian or micromobility travel direction at intersections. • Battery operated; units require replacement and wired power to support detection for signal operation.	$6,500

	Description	Cost Per Intersection
Radar	Radar technology that records position, speed, length and gap between vehicles. Currently used in Edmonton for vehicle volume counting only. ● Can be used to influence traffic signal operation through pedestrian or vehicle detection with the installation of sensors at intersections.	$40,000
Adaptive Signal Operation	Software and hardware to control the adaptive operation of traffic signals. ● Adaptive operation requires the traffic signal to be fully-actuated (detection for every direction at an intersection). ● Current infrastructure may not be sufficient for every intersection to support additional detection technology.	Setup and annual costs are unknown without further investigation into specific technologies.