APPENDIX A

THE CORPORATION OF THE CITY OF WINDSOR
POLICY

Primary Owner:	Financial Acctg & Corp Controls	Policy No.:	TBD
Secondary Owner:	Taxation & Financial Projects and	Approval Date:	TBD
	Information Technology	Approved By:	TBD
Subject:	**PAYMENT CARD DATA**	Effective Date:	**IMMEDIATE**
	SECURITY POLICY	Procedure Ref.:	n/a
Review Date:	TBD	Pages: 7	Date: TBD
Prepared By:	Marco Aquino, Jocelyn De Luna		Replaces:

1. POLICY

1.1. To reduce the risk of credit card fraud, the Payment Card Industry (**PCI**), which consists of the five major credit card brands including VISA and MasterCard, requires its merchants to meet certain conditions when handling credit card data. These conditions are referred to as PCI Data Security Standards (**DSS**).

1.2. The Corporation of the City of Windsor ("the City") is considered a merchant, because it processes credit card transactions through the course of normal business and thus is required to comply with PCI DSS.

1.3. The City is committed to safeguarding cardholder information when storing, transmitting, and/or processing credit/debit card transactions and will comply with the PCI DSS as established and revised by the PCI Security Standards Council.

2. PURPOSE

2.1. To communicate the rules and expectations necessary to facilitate compliance with PCI DSS.

3. SCOPE

3.1. This policy applies to all of the City Departments funded by the City, in whole or part, or whose governing body contains the City's representation **AND** whose financial transactions are accounted for within the City's financial systems **OR** accept credit cards using a City of Windsor merchant identification number (MID).

3.2. Agencies, Boards and Commissions (ABCs) and wholly owned corporations incorporated by the City under Section 203 of the Municipal Act 2001, are encouraged to have a similar policy in the establishment of their respective policies.

3.3. This policy also applies to all of the City employees (including permanent, part-time, temporary, contractual, or seasonal staff) who are involved in accepting or processing credit card payments, including those that have access to cardholder data or cardholder data systems (e.g. network, applications, etc.).

4. DEFINITIONS

4.1. **Attestation of Compliance (AOC)** – a document completed by the company itself or a Qualified Security Assessor that states the company's PCI DSS compliance status.

4.2. **Card Verification Value (CVV**) or **Card Verification Number (CVN**) – the 3 digit security code that is printed on the back of a credit card.

4.3. **Cardholder Data (CHD**) – the full primary debit/credit account number including any of the following: Cardholder name, expiration date, and/or 3 digit security code, that is printed on front/back of the card.

4.4. **Payment Card** – for the purposes of this policy, a debit/credit payment card/device that bears the logo of a member of the PCI Security Standards Council.

4.5. **Payment Channel –** for the purpose of this policy, the methods (e.g. in person, over the phone) by which the public will be able to use a credit card to purchase goods or services from the City.

4.6. **Payment Terminal** – the device used to take customer card payments via swipe, dip, insert, tap, or manual entry of the card number. Point of Sale (POS) terminal, PIN pad, and credit card machine are also names used to describe these devices.

4.7. **PCI Executive Committee** – the governance group for the City's PCI efforts. The group consists of a representative from each Department/Board that processes credit card transactions.

4.8. **PCI Security Standards Council** – the governance body representing the major credit card brands. The "Council's mission is to enhance global payment account data security by developing standards and supporting services that drive education, awareness, and effective implementation by stakeholders."

4.9. **PCI Working Group** – a group comprised of representatives from the City's Finance and Information Technology Departments.

4.10. **Primary Account Number (PAN**) – the 16-digit numeric code (typically for credit or debit cards) located on the front of the card that identifies the issuer and the cardholder account.

4.11. **Qualified Security Assessor (QSA)** – independent security organization or individual that has been qualified by the PCI Security Standards Council to validate an entity's adherence to PCI DSS.

4.12. **Self-Assessment Questionnaires (SAQs)** – validation tools intended to assist merchants and service providers to report their compliance with PCI DSS.

4.13. **Third-Party Service Providers** – any entity directly involved in the processing, storage, or transmission of cardholder data on behalf of the City. This also includes companies that provide services that control or could impact the security of cardholder data.

5. RESPONSIBILITY

5.1. The **Chief Administrative Officer (CAO)** has the following responsibilities:

5.1.1. Ensure that PCI compliance is made a priority at the City by assigning the necessary resources to work on PCI-related matters.

5.1.2. Completion of annual documentation with regards to PCI Compliance.

5.2. The **Chief Financial Officer (CFO)/City Treasurer** or designate has the following responsibilities:

5.2.1. Communicate this policy to all stakeholders

5.2.2. Ensure stakeholder compliance to this policy.

5.2.3. Direct the review of this Policy, at a minimum every five (5) years, or sooner if required, and recommend updates when necessary.

5.3. The **Deputy Treasurer – Taxation, Treasury, and Financial Projects or** designate has the following responsibilities:

5.3.1. Coordination of annual review to facilitate ongoing certification with respect to compliance to PCI DSS.

5.3.2. Coordinate any new installation, removal, returns or replacement of any credit card payment solutions/processes.

5.3.3. Maintain a master list of third-party service providers that accept and/or process online payments, including PCI DSS compliance status (e.g. via an Attestation of Compliance).

5.3.4. Review and approve Third-Party Service Providers' contracts/agreements, and ensure they include an acknowledgement that the Third-Party Service Providers will maintain all applicable PCI DSS requirements and will protect all customers' cardholder data and the Cardholder Data Environment.

5.3.5. Maintain a master list of payment terminals (e.g. PIN Pads, Point of Sale Terminals, and credit card machines).

5.3.6. Develop, implement, and maintain procedures for the use of payment terminals, and provide training regarding those procedures to the users of that technology.

5.4. The **Chief Information Officer/Executive Director of Information Technology** or designate has the following responsibilities:

5.4.1. Coordination of annual review to facilitate ongoing certification with respect to compliance to PCI DSS.

5.4.2. Develop, implement, and maintain procedures, documentation, practices, and standards to address the PCI DSS requirements that pertain to the cardholder data technology being managed by Information Technology Department staff.

5.4.3. Maintain an inventory of system components (software, networking, and hardware (with the exception of PIN Pads and Third-Party Service Providers)) that are in scope for PCI DSS, including all components sourced from a third party.

5.4.4. Implement a formal security awareness program/training for all Information Technology Department staff handling cardholder data and those who support the processes, systems, and applications within the cardholder data environment.

5.5. The **Executive Directors** (or ABC equivalents) or designates have the following responsibilities:

5.5.1. Notify the Deputy Treasurer-Taxation, Treasury and Financial Projects and Chief Information Officer/Executive Director of Information Technology:

5.5.1.1. Prior to adding, removing, or changing any Payment Channel.

5.5.1.2. If any Cardholder Data is being stored and the process being used to store and secure it**.**

5.5.1.3. Of any processes the respective department uses for transmitting cardholder data, so the Deputy Treasurer-Taxation, Treasury and Financial Projects and Chief Information Officer/Executive Director of Information Technology can verify whether those transmissions are secure**.**

5.5.2. Develop, implement, and maintain procedures for the use of the Payment Channels and the security of the Cardholder Data in their respective department.

5.5.3. Ensure all individuals involved in handling cardholder data transactions complete the PCI Security Awareness Program/Training and any other specific PCI training required.

5.5.4. Participate or have a designate participate in the PCI Executive Committee if their department processes credit card transactions.

5.5.5. Ensure employees comply with the provisions of this policy.

5.6. Department Employees who are involved in the storing, processing, or transmitting or have access to cardholder data have the following responsibilities:

5.6.1. Complete the PCI Security Awareness Program/Training and any other specific PCI training required.

5.6.2. Maintain confidentiality of the cardholder data.

5.6.3. Ensure adherence with this policy, procedures and directives to facilitate compliance with PCI DSS.

6. GOVERNING RULES AND REGULATIONS

6.1. PAYMENT CARDS

The City only accepts the following Payment Cards for the payment of goods, services, or donations: Visa, Visa Debit, MasterCard, and MasterCard Debit.

6.2. PAYMENT CHANNELS

The City accepts payment card transactions only via the following payment channels with the restrictions noted below: In Person, Postal Mail, Online, and via Phone. Regardless of the Payment Channel, all credit card transactions will be processed directly into a PIN pad or via a Third-Party Service Provider that has been approved by the Deputy Treasurer – Taxation, Treasury, and Financial Projects and the Chief Information Officer/Executive Director of Information Technology.

6.2.1. In Person

- Credit card payments should be completed using an authorized payment solution.

6.2.2. Postal Mail

- Credit card payments should be completed using an authorized payment solution. Cardholder data that is provided in paper format must be treated as confidential and protected against unauthorized access.

6.2.3. Online

- All on-line payments must be processed using a PCI compliant third-party service provider.

6.2.4. Phone

- The use of phones for the collection of cardholder data is only permitted when using technology that has been approved for that purpose by the Chief Information Officer/Executive Director of Information Technology.
- The employee must enter the cardholder data directly into a payment terminal.
- The phone conversation with the customer must not be recorded during the time that the customer is providing credit card information.

6.2.5. Other Payment Channels

- Other than the Payment Channels listed above, no other Payment Channels will be permitted. Under **NO** circumstances will the cardholder data be transmitted/received or accepted via e-mail, fax, voicemail, instant/text messaging or chat.

6.3. CARDHOLDER DATA ACCESS

6.3.1. Each Department must maintain an up-to-date list of individuals (i.e. managers, supervisors, and other staff) who may accept or access cardholder data.

6.3.2. Access to system components and cardholder data must be restricted appropriately based on individual job classification and functions.

6.3.3. Physical access rights granted based on individual function must be regularly reviewed and revoked immediately upon termination or job transfer.

6.4. PROTECTING PIN PADS

6.4.1. All of the City Departments using credit card devices for processing customer transactions must ensure that all devices are secured and protected from tampering and substitution.

6.4.2. Device surfaces must be regularly examined to detect tampering (e.g. addition of card skimmers to devices) or substitution (e.g. by checking the serial number or other device characteristics to verify it has not been swapped with a fraudulent device).

6.4.3. The identity of third-party personnel requesting access to payment terminals for reasons such as repairs, inspections, equipment swapping, etc. must be verified prior to granting them access to modify devices. Employees must always verify with their manager that the third party personnel and their devices are legitimate and from a trusted source.

6.4.4. Any new installation, removal, returns, or replacement of any payment terminals from the City's premises must be documented and authorized by the Deputy Treasurer-Taxation, Treasury and Financial Projects or designate.

6.4.5. Departments must maintain an up-to-date inventory of payment terminals (e.g. PIN pads, Point of Sale terminals and Credit card machine) in coordination with the Deputy Treasurer of Taxation, Treasury, and Financial Projects. This inventory should be reviewed at a minimum annually for accuracy.

6.5. MANAGING THIRD PARTY SERVICE PROVIDERS

Third party service providers contracted by the City are an integral part of the City's business and may impact the City's PCI compliance, as well as the security of the cardholder data environment. Departments who work directly with third-party service providers are required to:

6.5.1. Ensure agreements or contracts include clauses that states annual provision of AOC, termination for non-compliance, and that the service provider will be responsible for the security of cardholder data in their possession on behalf of the City.

6.5.2. Consider to include in agreements or contracts clauses related to indemnification rights and special insurance provisions.

6.5.3. Maintain a list of service providers, including pertinent information such as business owner, address, contact information, term of contract, and renewal date, etc.

6.5.4. Annually monitor service providers' PCI DSS compliance status or request proof of PCI DSS compliance via an Attestation of Compliance.

6.6. RETENTION AND STORAGE

6.6.1. Cardholder data must **NOT** be entered/stored on any electronic device including network servers, workstations, laptops, tablets, and cell phones unless it is explicitly approved for use as part of the cardholder data environment.

6.6.2. Cardholder data must **NOT** be stored on any removable storage devices such as USB keys/drives and portable external hard drives. This includes **cardholder data that is contained within** Excel, Word, or PDF file formats.

6.6.3. Cardholder data storage should be kept to a minimum, and retention time should be limited to that which is required for business, legal, and/or regulatory requirements.

6.6.4. All paper records (e.g. receipts, forms) containing cardholder data may only be retained where it is necessary for business or legal purposes and must be kept in a locked cabinet in a secured area or a safe that is accessible only by authorized staff. When no longer needed, the paper record must be securely destroyed (cross-cut shredded) or placed in the designated confidential shred receptacles.

6.6.5. Sensitive authentication data should never be stored or retained after authorization. This includes the 3 digit security code (CVV or CVN) printed on the back of a payment card and personal identification numbers (PINs) entered by the cardholder.

6.6.6. Cardholder data must never be duplicated or scanned using a photocopier or multifunctional devices.

6.7. SECURITY AWARENESS PROGRAM/TRAINING

6.7.1. Employees involved in handling cardholder transactions, including those who support the processes, systems, and applications within the cardholder data environment, must annually complete the PCI Security Awareness Program/Training. That PCI Security Awareness Program/Training may include web-based, pre-recorded, or in-person formal training. Employees will acknowledge that they have read and understood the various information, security policies, and procedures described during that PCI Security Awareness Program/Training.

6.8. INCIDENT REPORTING

6.8.1. In the event of suspected theft or loss of cardholder data, potential cardholder data security breach, or suspected tampering or substitution of a payment terminal or payment card capture device (PIN pad), employees must immediately inform their manager/supervisor. The manager/supervisor will report to the following and assist with investigation of the suspected incident:

- Chief Information Officer/Executive Director of Information Technology
- Deputy Treasurer-Taxation, Treasury and Financial Projects

6.8.2. The Deputy Treasurer-Taxation, Treasury and Financial Projects and Chief Information Officer/Executive Director of Information Technology must report to the CAO all **confirmed** incidents.

6.9. CONSEQUENCE OF NON-COMPLIANCE

6.9.1. Failure to comply with PCI DSS can result in serious consequences for the City including substantial fines and penalties, litigation, reputational damage, revocation of the City's right to accept credit card payments, and other financial costs.

6.9.2. Any employees found to be in violation of their responsibilities under this policy are subject to disciplinary action up to, and including, dismissal.

7. REFERENCES AND RELATED DOCUMENTS

7.1. Information Security Policy

7.2. Acceptable Use Policy

7.3. Fraud and Misuse of Assets Policy

7.4. Accounts Receivable Collections Policy

7.5. Corporate Accounts Receivable Policy

Operations Department
Fleet Division

MANDATE - DRAFT

- To provide quality fleet management services to our customers in the acquisition, maintenance, repair, disposal and management of the corporate fleet and in the provision of services for outside agencies in a timely, effective and fiscally responsible manner including consideration for alternate service delivery.

- Assist the Fleet Review Committee to meet its mandate as per the Fleet Review Committee Charter as follows:

  > " . . . *responsible for reviewing and making recommendations to City Council through the Chief Administrative Officer on all fleet equipment acquisitions, including replacements and additions as well as the appropriate means for financing for the Corporate, Parks Equipment and Fire First Response fleets*."
  >
  > " . . . *responsible for ensuring the ongoing financial sustainability of the Fleet Replacement Reserve, the Parks Equipment Reserve and the Fire First Response Reserve ensuring the appropriate reserve funds are available for future acquisitions*."

- To operate on a full cost recovery position.

- To provide fuel management services to our customers in the supply and availability of fuel and operation of fuel sites managed by the Fleet Division.

- To provide inventory control service for automotive parts and operational materials.

- To consider emerging technology and trends in the fleet industry while attempting to reduce environmental impacts.

- To develop, recommend and administer corporate fleet policies and guidelines to be adhered to by the Fleet Division customers.

Revised: October 17, 2011 – CR258/2011
October 4, 2021

THE CORPORATION OF THE CITY OF WINDSOR

POLICY

Service Area:	Public Works	Policy No.:	**Fleet – General – M246-2013**
Department:	Operations	Approval Date:	
Division:	Fleet Division	Approved By:	**City Council**
		Effective Date:	
Subject:	Fleet Use Policy - DRAFT	Procedure Ref.:	
		Pages:	Replaces: Fleet-General-M246-2013
Prepared By:			Date: June 17, 2013

1. POLICY

1.1 To provide effective and efficient delivery of the City of Windsor fleet services through the delivery of safe, reliable, economical and environmentally sound transportation and related support services that are responsive to the needs of stakeholder divisions, while conserving vehicle value and equipment investment.

2. PURPOSE

2.1 Communicate responsibilities of all employees in the use and safe-guarding of City vehicles and equipment including:

- How vehicles are assigned
- Who can drive a City Vehicle
- Responsibilities and obligations of employees driving City Vehicles.

3. SCOPE

3.1 This Policy covers the use of all City of Windsor supplied vehicles managed by the Operations Department – Fleet Division and used by Divisions with a direct reporting relationship to the Chief Administrative Officer.

4. RESPONSIBILITY

4.1 Chief Administrative Officer and Corporate Leadership Team are responsible to:

4.1.1 Support this policy and ensure compliance and adherence by the City Departments.

4.1.2 Assign City Vehicles to positions based on specific criteria described in this policy.

4.1.3 Review mileage and related financial information provided by Finance annually and determine continued eligibility for vehicles assigned to a position.

4.1.4 Approve locations where City Vehicles may be parked.

4.2 The Executive Director of Operations (in the role of Chair of the Fleet Review Committee) or designate is responsible to:

4.2.1 Ensure the communication, distribution and availability of this Policy to all City employees.

4.2.2 Review the policy content, effectiveness, and scope periodically and initiate required revisions as legislation changes with a review every 5 years.

4.2.3 Represent the City of Windsor as the Director for the Commercial Vehicle Operator Registration #062-452-600 with the Ministry of Transportation.

4.3 The Fleet Manager is responsible to:

4.3.1 Coordinate and integrate fleet policy and procedures that impact on and support the goals of the Fleet Use Policy.

4.3.2 Control the assignment of City Vehicles and equipment to authorized departments/divisions; (See 'City Vehicle Assignment' attachment to this policy).

4.3.3 Control the recovery of vehicle and equipment charges to user Departments.

4.3.4 Monitor the usage and the rotation of vehicles to maximize vehicle life.

4.3.5 Complete monthly Commercial Vehicle Operator Registration (CVOR) Abstract searches to monitor the City of Windsor's CVOR.

4.3.6 Ensure compliance with the CVOR legislative requirements.

4.3.7 Provide current vehicle listings to Risk Management for the purposes of insuring the corporate fleet.

4.4 The Fleet Division is responsible for:

4.4.1 The acquisition, maintenance, repair, disposal and management of corporate vehicles in a timely, effective and fiscally responsible manner including consideration for alternative service delivery.

4.4.2 Placing appropriate documents in the glove compartment (e.g. ownership, insurance slip, CVOR certificate, etc.)

4.4.3 Ensuring a supply of fuel is available for use at corporate fuel sites with contingency fuelling locations to ensure business continuity.

4.4.4 Prepare information packages to be placed in each vehicle.

4.5 The Executive Directors and their Subordinates are responsible to:

4.5.1 Provide and communicate applicable policy, procedure and protocol pertaining to the use of City Vehicles and equipment to the employees whom they supervise.

4.5.2 Ensure that employees receive appropriate training in the safe use of vehicles and equipment where required and ensure compliance with retraining requirements.

4.5.3 Regularly monitor use of City Vehicles to ensure proper and safe usage.

4.5.4 Issue discipline for misuse of a City Vehicle or for violations of the rules, regulations or conditions of its use.

4.5.5 Advise all staff of the appropriate contacts in the event of an accident.

4.5.6 Complete and submit to Human Resources, Health and Safety and Risk Management all accident/incident reports within 48 hours and comply with all requirements set out in the Accident/Incident Procedure.

4.5.7 Contact the Fleet Division for service in the event of a vehicle/equipment failure.

4.5.8 Budget for pool and seasonal vehicle usage as well as actual cost vehicle billings and damage repairs to external rental vehicles.

4.5.9 Ensure that preventable accidents are addressed with the responsible employee, and that the employee receives retraining where appropriate.

4.5.10 Return both sets of keys and fuel fob with vehicle when vehicle replacements are picked up.

4.6 City of Windsor Employees must:

4.6.1 Abide by all required legislation in relation to the Highway Traffic Act, Commercial Vehicle Operator's Registration (CVOR) regulations, the Income Tax Act and related City of Windsor by-laws, policies and procedures as they relate to the use of City Vehicles.

4.6.2 Employees driving City Vehicles must possess and maintain an appropriate driver's license for the class of vehicle being operated.

4.6.3 Comply with training and retraining requirements as determined by Corporate Health & Safety.

4.6.4 Comply with the Personal Use of City Vehicle - Taxable Benefit Procedure.

4.7 The Human Resources department is responsible to:

4.7.1 Adhere to the Driver's Licence and Abstract procedure to obtain a copy of valid driver's licenses and driver's abstracts, including a CVOR abstract when applicable, of prospective drivers upon hire or transfer to a job that requires a driver's licence for the purpose of completing a Driver's Abstract Report.

4.7.2 Complete quarterly Driver's Abstract searches on all active City drivers to ensure the validity of driver licenses (Corporate Health and Safety division).

4.7.3 Provide commercial and non-commercial defensive driving courses to facilitate compliance with Section 25(2)(h) of the Occupational Health & Safety Act (Corporate Health and Safety Division).

4.7.4 Provide other training courses relating to the use of City Vehicles to facilitate compliance with legislative requirements.

4.7.5 Update the Corporate Driver Management Program to ensure training programs meet legislative and operational requirements.

4.8 The Risk Management department is responsible to:

4.8.1 Ensure that all vehicles and equipment used in the undertaking of City business activity are appropriately insured.

4.8.2 Investigate and assess all vehicle accidents/incidents as necessary.

4.8.3 Facilitate communication with insurance companies in case of injury and/or property damage and obtain appropriate recoveries.

4.8.4 Respond to staff inquires as they pertain to insurance coverage of City owned/leased vehicles and equipment.

4.8.5 Obtain liability slips from the City's insurance company for all City owned/leased vehicles and equipment and provide to the Fleet Division.

4.8.6 Distribute certificates of insurance as required to third parties for rental of vehicles and equipment.

4.9 The Finance department is responsible to:

4.9.1 Calculate taxable benefits and mileage reimbursements based on information received from user departments and the individual employee.

4.9.2 Annually review the mileage reimbursement of employees and reporting the amount annually to the Chief Administrative Officer.

4.10 The Collision Review Committee is responsible to:

4.10.1 Adhere to the Collision Review Committee Terms of Reference.

4.10.2 Use Defensive Driving guidelines to review vehicle collisions to determine cause, preventability and make recommendations for avoidance of future incidents.

5. GOVERNING RULES, STATUTES AND REGULATIONS

5.1 This policy is in accordance with the *Highway Traffic Act, Occupational Health and Safety Act, Insurance Act*, *Income Tax Act, Provincial Offences Act, Fuel Tax Act* and any other applicable legislative requirements including Regulations under the applicable Acts, City of Windsor By-laws, policies and procedures.

5.1.1 Employees will be personally responsible for any and all traffic/parking violations or other fines incurred while using a City Vehicle. This requirement applies regardless of whether the charge or fine is imposed upon the City or the Employee. In circumstances where the City is charged or fined as a result of an Employee using a City Vehicle, the City will comply with all legislative requirements pertaining thereto, but will seek reimbursement for its costs from the Employee.

5.2 Accident/Incident Reporting Policy;

5.3 Driver's License and Driver's Abstract Procedure.

5.4 Assignment of a City Vehicle to a Department

5.4.1 Assignment of City Vehicles is subject to review by the corporate Fleet Review Committee and the budgetary process. In the event a department exceeds 5 preventable accidents per year, it will need to bring forward to the Fleet Review Committee a proposal to address accident prevention, and this will be considered prior to City Vehicle assignment.

5.4.2 As part of the annual review of fleet requirements, departments shall rationalize their assigned vehicles for possible consolidation or elimination.

5.4.3 Any changes or upgrades being requested for existing vehicles being considered for replacement MUST be submitted to the Fleet Review Committee for consideration and approval.

5.4.4 The Fleet Division maintains a pool of marked City Vehicles to supplement departments' fleet needs and meet short-term requirements on a seasonal basis. If a vehicle is not available in the pool, the Fleet Division will rent

seasonal units from a third party. The user department will be billed for the full cost of damages that must be repaired prior to returning external rentals.

5.5 City Vehicle Use

5.5.1 City Vehicles are for municipal business during working hours.

5.5.2 Only City employees who have completed required training are authorized to operate City Vehicles unless approval is received from Risk Management and Fleet.

5.5.3 City Vehicles are not permitted outside the limits of the City of Windsor without prior authorization from the employee's immediate supervisor or council approved service level or initiative as applicable.

5.5.4 City Vehicles are not to be used for personal matters.

5.5.5 Under normal circumstances, the City Vehicle shall not be used for the transportation of any persons other than City of Windsor employees or persons engaged in City of Windsor business without prior authorization from the employee's Executive Director or designate. Only in exceptional or emergency situations will passage in a City Vehicle by non-employees be permitted.

5.5.6 City Vehicles should contain only those items for which the vehicle is designed.

5.5.7 Employees are to keep the interior of City Vehicles clean and ensure projectile items are secured.

5.5.8 Employees shall report any malfunction or damage to their supervisor immediately.

5.5.9 All Employees must wear seatbelts during the operation of the City Vehicle, whether a driver or a passenger.

5.5.10 Employees must not, under any circumstance, operate City Vehicles under the influence of alcohol, illegal or recreational drugs, or prescription drugs or medications which may interfere with effective and safe operation.

5.5.11 Employees using a City Vehicle must ensure that any materials or equipment being transported in a City Vehicle is secure at all times. Employees can request covers, ties or other restraining devices from their supervisor as required.

5.5.12 Employees using a City Vehicle are responsible to remove ice and snow build-up that may fly from the top of a City Vehicle prior to its use to ensure the safety of other motorists and the general public.

5.5.13 Employees are to ensure they take every precaution to avoid a collision when driving a City Vehicle.

5.5.14 Employees must ensure the City vehicle is left in a safe position and secured to avoid damages or theft.

5.5.15 Employees driving City Vehicles shall obey all applicable traffic and parking regulations, ordinances and laws.

5.5.16 Employees shall not idle City Vehicles in contravention of the City of Windsor Anti-idling by-law.

5.5.17 Employees will be personally responsible for any and all traffic/parking violations or other fines incurred while using a City Vehicle. This requirement applies regardless of whether the charge or fine is imposed upon the City or the Employee. In circumstances where the City is charged or fined as a result of an Employee using a City Vehicle, the City will

comply with all legislative requirements pertaining thereto, but will seek reimbursement for its costs from the Employee.

5.5.18 In addition to the foregoing, if a suspension of an employee's driver's license occurs while driving a City Vehicle, and if the City Vehicle is impounded or towed, any costs incurred to obtain the release of the City Vehicle and any associated legal costs are the responsibility of the employee.

5.5.19 Employees who are issued citations for any offence while using a City Vehicle must notify their supervisor immediately if practical, otherwise within 24 hours at the maximum.

5.5.20 Smoking is not allowed in City Vehicles pursuant to the Smoking in the Workplace By-law.

5.5.21 No modifications are permitted to a City Vehicle without the approval of the Fleet Review Committee.

5.5.22 Keys are not to be left in City Vehicles when unattended and not in a secure municipal yard.

5.5.23 City Vehicles may be equipped by the Fleet Division with Global Positioning System/Automatic Vehicle Locating devices as approved by operating departments.

5.6 Accidents

5.6.1 The Ontario Highway Traffic Act (HTA) sets out criteria for motor vehicle collision reporting in Ontario. Accidents must be reported to the nearest police officer if the accident results in personal injuries or in damage to property apparently exceeding $2,000.

5.6.2 If directed by an officer to report the accident at a specified location, employees must attend the specified location (e.g. Collision Reporting Centre) and report the accident there.

5.6.3 In the event of an accident involving a City Vehicle, all employees are responsible to adhere to the City's Accident/Incident Reporting Procedure.

5.6.4 Departments are responsible to have vehicle assessed by the Fleet Division to ensure vehicle is safe for continued use.

5.7 Commercial Motor Vehicles

5.7.1 All commercial motor vehicles are equipped with a first aid kit and fire extinguisher. Employees shall ensure supplies are replenished from the Fleet Division stockroom as they are used.

5.7.2 All drivers of commercial motor vehicles must comply with the Commercial Vehicle Pre-Trip Inspection Procedure.

5.7.3 All drivers of commercial motor vehicles must comply with the Hours of Service Procedure.

5.8 Vehicles for Out of Town Use

5.8.1 Marked City Vehicles may be used for business purposes out of town.

5.8.2 In addition to City Vehicles, a contract exists to utilize a third party for vehicle rental purposes on an as-needed basis.

5.8.3 Use of City Vehicles for out of town business travel is strongly encouraged as the first choice to avoid third party costs including mileage

reimbursement to staff, while cars are available and unused. Use of alternative means of transportation must be justified within the travel and expense advance approval form, giving regard to the most economical means of transportation.

5.9 Parking of City Vehicles

5.9.1 When finished with the City Vehicle, it must be returned to the appropriate and safe location as approved by the Commissioner of the department. Vehicles must be locked and keys are not to be left in the vehicle.

5.10 Take Home Privileges

5.10.1 Vehicles are not to be taken home without the permission of the immediate supervisor. Permission shall only be granted for urgent circumstances.

5.10.2 After working hours, City Vehicles shall be used only to respond to situations within the scope of the employee's duties and for no other purpose.

5.10.3 City Vehicles are not to be used for personal matters. The personal driving of a City of Windsor vehicle for purposes not related to his or her employment is a taxable benefit for the employee. This includes personal use during an employee's vacation, driving to conduct personal activities and travel between home and work (even if the employee is directed to drive the vehicle home). Travel from home to a point of call (such as responding to a call after hours) is not considered personal driving. The taxable benefit shall be calculated as outlined by the Canadian Revenue Agency (CRA) subject to amendment by CRA from time to time.

5.11 Car Allowance

5.11.1 For employees entitled to a car allowance (whether paid monthly, quarterly, annually, or on any other basis) this is a taxable benefit as per the Income Tax Act and included as remuneration.

5.12 Fuelling of City Vehicles and Equipment (Unleaded, Premium, Diesel, Coloured Diesel)

5.12.1 Employees who use a City Vehicle are responsible for ensuring that the vehicle has an adequate supply of fuel.

5.12.2 Employees are to fuel City Vehicles at one of the City's fuel sites operated by the Fleet Division except in extraordinary and/or emergency situations. In the event of an emergency, employees may contact their supervisor for

direction. Fuel may be purchased from one of the local service stations approved by the Fleet Division.

5.12.3 Employees are to follow the fuelling procedures posted at the fuel site.

5.12.4 Employees who use a City Vehicle must complete a one-time fuel training session administered by Corporate Health & Safety and a fuel refresher training session every 5 years.

5.12.5 Employees who have not completed the appropriate fuel training session will not have access to dispense fuel at a city fuel site.

5.12.6 Employees must provide the correct vehicle mileage or number of equipment hours at the time of fuelling. Entering incorrect or inaccurate meter readings may result in discipline up to and including dismissal.

5.12.7 Employee and vehicle HID cards are required for fuelling a City Vehicle at a city fuel site operated by the Fleet Division.

5.12.8 Employees must notify their supervisor immediately if an HID employee/vehicle card is lost or stolen. New or replacement cards are subject to a fee.

5.12.9 Propane equipment must be refuelled externally.

5.12.10 Employees fuelling at an authorized external site must provide unit number, employee name (printed and signed), employee id and mileage on the fuel slip.

5.12.11 Coloured fuel is available for off road equipment only. The use of coloured fuel in a licensed motor vehicle is prohibited and the driver may be liable to penalties and fines under the Provincial Offences Act or the Fuel Tax Act.

5.13 Electric Vehicles

5.13.1 Corporate charging stations will be provided and assigned to charge City Vehicles.

5.13.2 Corporate charging stations are for City Vehicles only.

6. RECORDS, FORMS AND ATTACHMENTS

6.1 Schedule A - City Vehicle Assignment Methods
6.2 Schedule B - Definitions
6.3 Schedule C - Break Even Point for Assignment of a City Vehicle
6.4 Schedule D – Defensive Driving Standards
6.5 Schedule E – Regulations for and Authorization for Replacement Vehicle ID Card

City Vehicles are assigned in one of three ways:

1) Dedicated
2) Assignment of a Pool Vehicle (Infrequent Use)

1) Dedicated Vehicle

Dedicated vehicles are assigned to a department on an annual basis. They are assigned on a day-to-day basis by the immediate supervisor based upon job description and will be consistent with departmental workload and employee function.

2) Assignment of a Pool Vehicle

Pool vehicles are vehicles assigned for use on a request basis as needed. The Fleet Division maintains a pool of vehicles to supplement dedicated vehicles on a seasonal basis, for casual use when vehicles are in for service or on an as-needed basis.

A pool vehicle is also assigned to City Hall and is available through the City Engineer's office at City Hall.

Seasonal

- User departments provide their seasonal requirements in advance and in writing to the Fleet Division.
- Fleet Division will assign vehicles from the pool and charge a monthly rental rate to the user department.
- If there is not a seasonal unit available, the Fleet Division will make arrangements for an external rental. The monthly rental cost will be charged to the user department.

Casual Use

- User requests a pool vehicle prior to or when required from the Fleet Division or the City Engineer's office.
- For the Fleet Division's pool vehicles, the user provides the Fleet Division with a chart field for billing of vehicle usage based on hours of use. The user will be charged the hourly rental rate associated with that class of vehicle until it is returned by the user.
- If available, loaner vehicles are provided free of charge to users who require replacements for vehicles brought in for service.

"Accident" –an incident whereby a City owned vehicle/equipment has come into contact with another vehicle/equipment, person or object regardless of damage or injury, or an incident with or without contact that results in injury to a person, property, vehicle or equipment.

"Actual Cost Billing" – a billing method whereby the user department is charged by the Fleet Division for the actual costs incurred to maintain non-dedicated equipment.

"City Vehicle" – any licensed or unlicensed automobiles, trucks, vans, or other self-propelled equipment owned, rented, or leased by the City of Windsor.

"**Car Allowance**" – payment that employees receive from an employer for using their own vehicle in connection with or in the course of their office or employment without having to account for its use. An allowance is a taxable benefit unless it is based on a reasonable per-kilometre rate.

"**Commercial Motor Vehicle**" – a commercial motor vehicle includes:

- Trucks that have a registered gross weight of over 4,500 kilograms
- Buses that can carry ten or more passengers
- Trailers that have a registered gross weight greater than 2,800 kilograms, when pulled by a truck that is less than 4,500 kilograms and the overall weight is greater than 4,500 kilograms.

A commercial motor vehicle does not include fire apparatus.

"Commercial Vehicle Operator Registration" – registration system for operators of commercial motor vehicles (trucks, trailers and buses) as per the Highway Traffic Act.

"Corporate Driver Management Program" – program maintained by Human Resources Health and Safety Division that outlines all driver related policies and training programs.

"Dedicated Vehicle" – a vehicle assigned to a department or division on an annual basis. Dedicated vehicles are included on the corporate fleet replacement plan.

"Distracted Driving" – Drivers in Ontario are prohibited from using hand-held cell phones and other hand-held electronic entertainment or communications devices while driving. The use of hands-free devices is permitted. Emergency calls, such as calls to 911, are not affected.

"**Licensed motor vehicle**" – any motor vehicle to which a number plate is attached as required under the Highway Traffic Act.

"Pool Vehicle" – a general purpose City Vehicle supplied by the City of Windsor which can be used on a request basis as needed. Pool vehicles are not included on the corporate fleet replacement plan.

"Preventable Collision" – a collision that could have been prevented, regardless of whether the employee is at fault in accordance with fault determination rules, and as determined by the immediate supervisor following an accident/incident or by the Collision Review Committee.

"Valid Driver's License" – (a) appropriate to the vehicles being driven; or (b) specified by the department.

Individual mileage claims will be reported on to the Chief Administration Officer on an annual basis by the Finance Department.

Once an individual's annual reimbursement exceeds the annual charge out rate for a rental vehicle (based on the Class of vehicle used), an assessment of whether or not a dedicated vehicle should be provided to the employee will take place.

Consideration will also be given to other individuals in the department to see if vehicles can be rationalized and shared amongst employees/positions.

The analysis will involve comparing annual mileage paid at the current Corporate Travel Policy rate (based on CRA guidelines) against the annual vehicle rental rate charged by the Fleet Division for the Class of vehicle being used on a 'cost per km' basis.

If the cost of providing a dedicated unit is lower than payment of individual mileage over the course of a year, the individual's Manager, will bring forward a Fleet Addition request through the Fleet Manager to the Fleet Review Committee for inclusion in the annual Fleet Additions and Upgrades capital budget. Furthermore, the individual's Manager will submit an operating budget request for the addition of a dedicated fleet unit.

Drive to avoid collisions in spite of the incorrect actions of others and adverse driving conditions.

Make allowances for the lack of skill or improper driving practices of the other driver.

Adjust driving to compensate for unusual weather, road and traffic conditions and is not involved in a collision due to the unsafe actions of pedestrians and other drivers.

Be alert to collision inducing situations to recognize the need for preventable action in advance and take the necessary precaution to prevent a collision.

Know when it is necessary to slow down, stop or yield the right of way to avoid a collision.

Conduct circle checks thoroughly and notify supervisors if any anomalies occur while operating a motor vehicle.

Use a guide to help back out of a difficult area and survey your exit plan before entering the vehicle.

Avoid parking spaces near driveways or other areas that are susceptible to collisions.

Leave room to account for stopping distances between their vehicle and the one in front. Leave more space if visibility or speed of the vehicle is an issue.

Be mindful of vehicles tailgating you and change lanes to let them pass.

Always give advanced warning of your driving intentions.

Remove distractions and always be mindful of surroundings and traffic.

Obey all traffic signs.

Enter traffic in a way that will avoid obstructing the flow of traffic.

Always be attentive and prepared to stop in the event a pedestrian/cyclist crosses your path.

Drive in a safe manner that would never endanger the safety of a passenger.

Use appropriate load securement procedures to secure cargo.

Do not utilize hand-held devices while driving as per the Corporate Cell Phone/Wirele4ss Device Safe Use Policy.

Be aware of the safe use of your vehicle and/or related equipment.

The Corporation of the City of Windsor
Regulations for and Authorization for Replacement Vehicle ID Card
(Please read carefully and complete all applicable areas.)

1. VEHICLE INFORMATION
Unit #:

2. EMPLOYEE INFORMATION			
Last Name:		First Name:	Middle Name:
Emp. #	Position Title:	Service Area/Division:	Date of Notification of New/Lost Card:

3. REGULATIONS

1. This vehicle ID card is the property of the City of Windsor and must be available for fuelling at a fuel site operated by the Fleet Division.
2. If this card is lost or stolen, I will notify my supervisor immediately.
3. I understand that there is replacement cost for Vehicle ID Cards.
4. I understand that this vehicle ID card is for Corporate and fuel use only.
5. This vehicle ID card must be kept on the vehicle key chain or secured by the department if multiple employees are utilizing the same vehicle.

4. ACKNOWLEDGEMENT OF REGULATIONS AND AUTHORIZATION

Consistent with the Fleet Use Policy and Procedures and the Vehicle ID Card Regulations form (both available on Dashboard), and as authorized by City Council, replacement cards are subject to a $10.00 fee. The fee is to be paid by the department. This form authorizes the Fleet Division to charge for the replacement card(s).

Number of Replacement Cards requested: _____ x $10.00

Total Charge: $_____

Chartfield: _____

Department Signature:	Date:
Fleet Representatives Signature:	Date:

The following section is for use by Fleet Division only.		
Distribution	**Initials of Processor**	**Date**
Fleet Card File		
Journal ID		

THE CITY OF WINDSOR
ONTARIO, CANADA

Fleet Review Committee

Charter

DRAFT
2022

TABLE OF CONTENTS

Approved by City Council: ***October 17, 2011 – CR258/2011***

Revision Approved By Fleet Review Committee: April 4, 2022

City of Windsor
Fleet Review Committee Charter

1. FLEET REVIEW COMMITTEE

1.1 Mandate

The Committee shall be responsible for reviewing and making recommendations to City Council through the Chief Administrative Officer or to the Chief Administrative Officer through a Delegation of Authority on all fleet equipment acquisitions, including replacements, additions and upgrades as well as the appropriate means for financing.

The Committee shall be responsible for ensuring the ongoing financial sustainability of the Corporate Fleet Replacement Reserve, Parks Off Road Fleet Replacement Reserve and Fire Major Equipment Reserve, ensuring that appropriate reserve funds are available for future acquisitions.

1.2 Membership

The permanent Chairperson is the Executive Director of Operations.

The Committee shall consist of members or a designate as follows:

Executive Director of Parks
Chief Financial Officer & City Treasurer
Fire Chief
Executive Director as appointed by the Chairperson

In addition, the following departments will be resource members to the Committee:

Recording Secretary, Fleet Manager
Fleet Division
Finance
Purchasing
Clerical Support as required

1.3 Role of Chairperson

The **Chairperson** shall:

- Call meetings:

  i) based on requests from users;
  ii) for budget review purposes;
  iii) on information supplied by the Fleet Manager; or
  iv) as the Chairperson may deem necessary

- Conduct meetings in an orderly fashion.
- Coordinate and participate in the equipment review process and formulation of recommendations.
- Ensure agendas and minutes are compiled and distributed.
- Action Committee direction.

1.4 Role of Committee Members

The **Committee members** shall:

- Review with users the need for replacement/additional equipment.
- Present impartial views on requests.
- Participate in formulating recommendations as to use of reserve funds.
- Establish guidelines regarding seasonal/supplemental vehicles.
- Recommend approval for fleet replacements/additions with due consideration to reserve fund balances and annual projections.
- Provide expertise in own subject area.
- Establish and review standard equipment features.
- Approve all markings on City vehicles.
- Establishes methods related to calculation of depreciation charges.
- Ensure sufficient funding available within reserve funds and continued financial sustainability of funds.
- Ensure adequacy of repayment to the reserve fund relative to equipment purchased.
- Research and make recommendations emerging technology and trends (e.g. greening the fleet) in the industry.

1.5 Role of Fleet Manager

- Prepare and distribute agendas, minutes and other correspondence related to the Committee's activities.
- Provide background information on equipment, such as performance, cost or other statistical data.

- Provide recommendations based on sound, historical cost or technical information.
- Recommend fleet replacements/additions to the Committee for consideration.
- Provide projections for future fleet reserve fund requirements including projections of revenues/expenditures with consideration of inflationary factors.
- Report on fleet status, accidents, purchases, progress, repairs or other fleet information that may be pertinent or requested either by Council or the users.
- Monitor the Fleet Replacement Reserve Fund, Parks Off road Fleet Replacement Reserve and the Fire Major Equipment Reserve.
- Monitor fleet capital projects including equipment purchased with grant funds.
- Review and recommend changes to fleet life cycles.
- Report annually to the Committee on financial matters related to the operation of the City fleet (i.e. shop door rate).

1.6 Procedures

The Committee shall undertake its duties as follows:

- Decisions shall be arrived at by consensus of the members, based on facts presented, sound background information and policy as may be established by the Committee, Chief Administrative Officer, City Council or other authority. If consensus is not reached by Committee members, the Chairperson will break any ties.
- Decisions by the Chairperson may be appealed to the corporate leadership team.
- When an agenda item is not recommended by the Committee an explanation of the non-recommendation shall be provided to the requesting user.

1.7 User Requests

User requests shall comply with the following process:

- The Fleet Manager will advise users regarding the replacement of depreciated equipment as deemed appropriate given the condition and life cycle of the equipment, and users may request replacement through the Fleet Manager accordingly.
- Capital fleet replacement budget funds approved by City Council annually are to replace existing units with a like unit. If an upgrade or a different unit is

requested, departments must follow the process for additional equipment requests.

- Users may request through the Fleet Manager the replacement of depreciated fleet equipment when one of the following factors occurs before the end of the life cycle:

  i) Equipment becomes obsolete and cannot perform its intended function in an efficient manner.

  ii) Equipment no longer meets the safety criteria, provincial standards, etc., and is not economical to modify it to meet the necessary criteria.

  iii) Equipment is too large or too small and is not economically efficient.

  iv) The normal function of the equipment has undergone technological change that requires a new type of equipment.

  v) An employee's documented medical condition requires modified equipment to carry out a job requiring a vehicle.

  vi) The cost of maintenance of the equipment has become cost prohibitive.

- These requests will be reviewed on an individual business case by the Committee.

- Users may request through the Fleet Manager additional equipment in the following manner:

  i. Information shall be provided for inclusion on the agenda using the attached form "*Fleet Addition or Upgrade Request Form*".

  ii. Background data is to be forwarded giving such information as productivity, payback and work programs planned.

  iii. Users requesting replacement or additional equipment shall appear before the Committee to present, explain and answer questions concerning requests.

  iv. All unfavorable recommendations by the Committee may be appealed by users in writing to the Chief Administrative Officer with copies to the Chairperson, which shall include all background data as necessary to support the appeal.

- The Fleet Division will retain a limited number of vehicles that have been replaced or otherwise deemed surplus to supplement the fleet on a seasonal basis (referred to as seasonal units), for casual use when vehicles are in for service (referred to as pool units) or on an as-needed basis. Seasonal units may supplement user fleet requirements as necessary. Seasonal equipment is intended for a short term timeframe and typically used for increased staffing levels to a maximum of 6 months. If insufficient vehicles are available to

supplement the dedicated fleet as needed, the Fleet Division will attempt to rent vehicles from a third party.

2. FLEET POLICIES

2.1 Replacement Planning

A target life cycle is established for all vehicles based on industry standards. Each year the Fleet Manager assesses the vehicles nearing the end of their life cycle to determine whether they can be extended and identifies vehicles for potential replacement. The analysis includes a number of factors including:

- age
- utilization (mileage, hours, single/double shifting)
- repair history
- expected maintenance and repairs
- departmental operational requirements including consideration for mobile offices
- availability of parts
- condition ratings
- idle time
- technological requirements
- ergonomics
- safety
- replenishment of the pool
- green alternatives

2.2 Specifications

Specifications for all fleet equipment shall be prepared by the Fleet Manager or designate in consultation with users and the Purchasing By-law. The Committee may determine specification features on an individual or fleet basis as appropriate. Notwithstanding the foregoing, specifications for certain fleet equipment may be prepared by other agencies or cooperation agreements upon the approval of the Committee.

2.3 Purchase of Off-Lot Vehicles

Users may submit requests to the Committee for fleet equipment to be purchased directly from current inventories of local dealers consistent with the Purchasing By-law. Upon approval of the Committee, the Fleet Manager or designate shall obtain specifications and prices of available equipment from various dealers and purchase in accordance with the Purchasing By-law.

2.4 Purchase of Used Equipment

The Committee may recommend the purchase of used fleet/equipment as may be deemed appropriate in accordance with the sole source purchase section of the Purchasing By-law.

2.5 Equipment Disposal

In accordance with the Purchasing Bylaw, the Committee shall have the responsibility for disposal of equipment under its mandate. The Fleet Manager or designate is authorized to dispose of obsolete equipment and report any disposal to the Fleet Review Committee and the Manager of Purchasing and Risk Management on an annual basis. Sale proceeds will be returned to the appropriate reserve fund.

2.6 Equipment Retention

The Committee may recommend that units replaced or otherwise deemed surplus to the fleet be retained to supplement the fleet during peak usage periods. The Fleet Manager shall hold units so designated in storage, insured and unlicensed until required by a user. The Fleet Manager or designate is authorized to dispose of a unit if sufficient hours are not recovered or if it is not effective to continue maintaining the unit.

Vehicles planned for disposal may be purchased by departments for the current market value. Purchases are funded from the department's operating budget and the department is responsible for all actual costs incurred for their use.

2.7 Valuation

The Committee shall review all fleet equipment requests for items having an individual or combined minimum value of $10,000.

Equipment purchases of multiple units with a value exceeding $10,000 may be reviewed by the Fleet Review Committee.

Equipment that has a value greater than $10,000 but is not expected to be replaced or purchased only to be utilized for a specific contract are exempt.

2.8 Funding

Fleet replacements for the corporate fleet are funded from the Fleet Replacement Reserve Fund.

Fleet replacements for the Fire fleet are funded from the Fire Major Equipment Reserve Fund.

Fleet replacements for Parks equipment are funded from the Parks Equipment Replacement Reserve.

Fleet additions that are related to growth are funded through the capital budget from the Development Charges Reserve fund or by Pay As you GO (PAYG) funds up to the approved budgeted amount as approved by the Corporate Leadership Team and City Council.

2.9 Fleet Use

Use of the City fleet shall be in accordance with the Council approved Fleet Use Policy.

2.10 Greening the Fleet

Implementation of the initiatives to green the fleet shall be in accordance with the Council approved Green Fleet Plan. The Green Fleet Plan shall be updated as necessary to support the City of Windsor Corporate Climate Action Plan and Sustainable Procurement initiatives.

THE CITY OF WINDSOR
ONTARIO, CANADA

Additional Information: AI 10/2022

Subject: Additional Information Memo to S67/2022 - Fleet Documentation- City Wide

Reference:

Date to Council: July 11, 2022
Author: Angela Marazita, Fleet Manager
519-255-6560 x4244
amarazita@citywindsor.ca

Public Works - Operations
Report Date: July 6, 2022
Clerk's File #: SW2022

To: Mayor and Members of City Council

Additional Information:

This report is to inform Council of minor revisions made to the Fleet Use Policy.

Background:

At the meeting of the Environment, Transportation and Public Safety Standing Committee meeting held on June 22, 2022, the Committee approved the Fleet Documentation report including the Fleet Mandate, Fleet Review Committee Charter and Fleet Use Policy. Minor revisions were made to the Fleet Use Policy and are included with this additional memo.

Discussion:

Minor revisions were identified following approval of the Fleet Use Policy at the Environment, Transportation and Public Safety Standing Committee meeting held on June 22, 2022. Revisions include the level of approval required for taking vehicles home and charging of electric vehicles.

Conclusion:

Administration recommends approving the revised Fleet Use Policy as attached in Appendix A.

Approvals:

Name	Title
Cindy Becker	Financial Planning Administrator – Public Works Operations

Name	Title
Shawna Boakes	Executive Director of Operations
Chris Nepszy	Commissioner, Infrastructure Services
Alex Vucinic	Purchasing Manager
Dan Seguin	On behalf of Commissioner, Corporate Services CFO/City Treasurer
Onorio Colucci	Chief Administrative Officer

Appendices:

Fleet Use Policy

THE CORPORATION OF THE CITY OF WINDSOR

POLICY

Service Area:	Public Works	Policy No.:	**Fleet – General – M246-2013**
Department:	Operations	Approval Date:	
Division:	Fleet Division	Approved By:	**City Council**
		Effective Date:	
Subject:	Fleet Use Policy - DRAFT	Procedure Ref.:	
		Pages:	Replaces: Fleet-General-M246-2013
Prepared By:			Date: June 17, 2013

1. POLICY

1.1 To provide effective and efficient delivery of the City of Windsor fleet services through the delivery of safe, reliable, economical and environmentally sound transportation and related support services that are responsive to the needs of stakeholder divisions, while conserving vehicle value and equipment investment.

2. PURPOSE

2.1 Communicate responsibilities of all employees in the use and safe-guarding of City vehicles and equipment including:

- How vehicles are assigned
- Who can drive a City Vehicle
- Responsibilities and obligations of employees driving City Vehicles.

3. SCOPE

3.1 This Policy covers the use of all City of Windsor supplied vehicles managed by the Operations Department – Fleet Division and used by Divisions with a direct reporting relationship to the Chief Administrative Officer.

4. RESPONSIBILITY

4.1 Chief Administrative Officer and Corporate Leadership Team are responsible to:

4.1.1 Support this policy and ensure compliance and adherence by the City Departments.

4.1.2 Assign City Vehicles to positions based on specific criteria described in this policy.

4.1.3 Review mileage and related financial information provided by Finance yearly and determine continued eligibility for vehicles assigned to a position.

4.1.4 Approve locations where City Vehicles may be parked.

4.2 The Executive Director of Operations (in the role of Chair of the Fleet Review Committee) or designate is responsible to:

4.2.1 Ensure the communication, distribution and availability of this Policy to all City employees.

4.2.2 Review the policy content, effectiveness, and scope periodically and initiate required revisions as legislation changes with a review every 5 years.

4.2.3 Represent the City of Windsor as the Director for the Commercial Vehicle Operator Registration #062-452-600 with the Ministry of Transportation.

4.3 The Fleet Manager is responsible to:

4.3.1 Coordinate and integrate fleet policy and procedures that impact on and support the goals of the Fleet Use Policy.

4.3.2 Control the assignment of City Vehicles and equipment to authorized departments/divisions; (See 'City Vehicle Assignment' attachment to this policy).

4.3.3 Control the recovery of vehicle and equipment charges to user Departments.

4.3.4 Monitor the usage and the rotation of vehicles to maximize vehicle life.

4.3.5 Complete monthly Commercial Vehicle Operator Registration (CVOR) Abstract searches to monitor the City of Windsor's CVOR.

4.3.6 Ensure compliance with the CVOR legislative requirements.

4.3.7 Provide current vehicle listings to Risk Management for the purposes of insuring the corporate fleet.

4.4 The Fleet Division is responsible for:

4.4.1 The acquisition, maintenance, repair, disposal and management of corporate vehicles in a timely, effective and fiscally responsible manner including consideration for alternative service delivery.

4.4.2 Placing appropriate documents in the glove compartment (e.g. ownership, insurance slip, CVOR certificate, etc.)

4.4.3 Ensuring a supply of fuel is available for use at corporate fuel sites with contingency fuelling locations to ensure business continuity.

4.4.4 Prepare information packages to be placed in each vehicle.

4.5 The Executive Directors and their Subordinates are responsible to:

4.5.1 Provide and communicate applicable policy, procedure and protocol pertaining to the use of City Vehicles and equipment to the employees whom they supervise.

4.5.2 Ensure that employees receive appropriate training in the safe use of vehicles and equipment where required and ensure compliance with retraining requirements.

4.5.3 Regularly monitor use of City Vehicles to ensure proper and safe usage.

4.5.4 Issue discipline for misuse of a City Vehicle or for violations of the rules, regulations or conditions of its use.

4.5.5 Advise all staff of the appropriate contacts in the event of an accident.

4.5.6 Complete and submit to Human Resources, Health and Safety and Risk Management all accident/incident reports within 48 hours and comply with all requirements set out in the Accident/Incident Procedure.

4.5.7 Contact the Fleet Division for service in the event of a vehicle/equipment failure.

4.5.8 Budget for pool and seasonal vehicle usage as well as actual cost vehicle billings and damage repairs to external rental vehicles.

4.5.9 Ensure that preventable accidents are addressed with the responsible employee, and that the employee receives retraining where appropriate.

4.5.10 Return both sets of keys and fuel fob with vehicle when vehicle replacements are picked up.

4.6 City of Windsor Employees must:

4.6.1 Abide by all required legislation in relation to the Highway Traffic Act, Commercial Vehicle Operator's Registration (CVOR) regulations, the Income Tax Act and related City of Windsor by-laws, policies and procedures as they relate to the use of City Vehicles.

4.6.2 Employees driving City Vehicles must possess and maintain an appropriate driver's license for the class of vehicle being operated.

4.6.3 Comply with training and retraining requirements as determined by Corporate Health & Safety.

4.6.4 Comply with the Personal Use of City Vehicle - Taxable Benefit Procedure.

4.7 The Human Resources department is responsible to:

4.7.1 Adhere to the Driver's Licence and Abstract procedure to obtain a copy of valid driver's licenses and driver's abstracts, including a CVOR abstract when applicable, of prospective drivers upon hire or transfer to a job that requires a driver's licence for the purpose of completing a Driver's Abstract Report.

4.7.2 Complete quarterly Driver's Abstract searches on all active City drivers to ensure the validity of driver licenses (Corporate Health and Safety division).

4.7.3 Provide commercial and non-commercial defensive driving courses to facilitate compliance with Section 25(2)(h) of the Occupational Health & Safety Act (Corporate Health and Safety Division).

4.7.4 Provide other training courses including driving evaluations relating to the use of City Vehicles to facilitate compliance with legislative requirements.

4.7.5 Update the Corporate Driver Management Program to ensure training programs meet legislative and operational requirements.

4.8 The Risk Management department is responsible to:

4.8.1 Ensure that all vehicles and equipment used in the undertaking of City business activity are appropriately insured.

4.8.2 Investigate and assess all vehicle accidents/incidents as necessary.

4.8.3 Facilitate communication with insurance companies in case of injury and/or property damage and obtain appropriate recoveries.

4.8.4 Respond to staff inquires as they pertain to insurance coverage of City owned/leased vehicles and equipment.

4.8.5 Obtain liability slips from the City's insurance company for all City owned/leased vehicles and equipment and provide to the Fleet Division.

4.8.6 Distribute certificates of insurance as required to third parties for rental of vehicles and equipment.

4.9 The Finance department is responsible to:

4.9.1 Calculate taxable benefits and mileage reimbursements based on information received from user departments and the individual employee.

4.9.2 Annually review the mileage reimbursement of employees and reporting the amount annually to the Chief Administrative Officer.

4.10 The Collision Review Committee is responsible to:

4.10.1 Adhere to the Collision Review Committee Terms of Reference.

4.10.2 Use Defensive Driving guidelines to review vehicle collisions to determine cause, preventability and make recommendations for avoidance of future incidents.

5. GOVERNING RULES, STATUTES AND REGULATIONS

5.1 This policy is in accordance with the *Highway Traffic Act, Occupational Health and Safety Act, Insurance Act, Income Tax Act, Provincial Offences Act, Fuel Tax Act* and any other applicable legislative requirements including Regulations under the applicable Acts, City of Windsor By-laws, policies and procedures.

5.1.1 Employees will be personally responsible for any and all traffic/parking violations or other fines incurred while using a City Vehicle. This requirement applies regardless of whether the charge or fine is imposed upon the City or the Employee. In circumstances where the City is charged or fined as a result of an Employee using a City Vehicle, the City will comply with all legislative requirements pertaining thereto, but will seek reimbursement for its costs from the Employee.

5.2 Accident/Incident Reporting Policy;

5.3 Driver's License and Driver's Abstract Procedure.

5.4 Assignment of a City Vehicle to a Department

5.4.1 Assignment of City Vehicles is subject to review by the corporate Fleet Review Committee and the budgetary process. In the event a department exceeds 5 preventable accidents per year, it will need to bring forward to the Fleet Review Committee a proposal to address accident prevention, and this will be considered prior to City Vehicle assignment.

5.4.2 As part of the annual review of fleet requirements, departments shall rationalize their assigned vehicles for possible consolidation or elimination.

5.4.3 Any changes or upgrades being requested for existing vehicles being considered for replacement MUST be submitted to the Fleet Review Committee for consideration and approval.

5.4.4 The Fleet Division maintains a pool of marked City Vehicles to supplement departments' fleet needs and meet short-term requirements on a seasonal basis. If a vehicle is not available in the pool, the Fleet Division will rent

seasonal units from a third party. The user department will be billed for the full cost of damages that must be repaired prior to returning external rentals.

5.5 City Vehicle Use

5.5.1 City Vehicles are for municipal business during working hours.

5.5.2 Only City employees who have completed required training are authorized to operate City Vehicles unless approval is received from Risk Management and Fleet.

5.5.3 City Vehicles are not permitted outside the limits of the City of Windsor without prior authorization from the employee's immediate supervisor or council approved service level or initiative as applicable.

5.5.4 City Vehicles are not to be used for personal matters.

5.5.5 Under normal circumstances, the City Vehicle shall not be used for the transportation of any persons other than City of Windsor employees or persons engaged in City of Windsor business without prior authorization from the employee's Executive Director or designate. Only in exceptional or emergency situations will passage in a City Vehicle by non-employees be permitted.

5.5.6 City Vehicles should contain only those items for which the vehicle is designed.

5.5.7 Employees are to keep the interior of City Vehicles clean and ensure projectile items are secured.

5.5.8 Employees shall report any malfunction or damage to their supervisor immediately.

5.5.9 All Employees must wear seatbelts during the operation of the City Vehicle, whether a driver or a passenger.

5.5.10 Employees must not, under any circumstance, operate City Vehicles under the influence of alcohol, illegal or recreational drugs, or prescription drugs or medications which may interfere with effective and safe operation.

5.5.11 Employees using a City Vehicle must ensure that any materials or equipment being transported in a City Vehicle is secure at all times. Employees can request covers, ties or other restraining devices from their supervisor as required.

5.5.12 Employees using a City Vehicle are responsible to remove ice and snow build-up that may fly from the top of a City Vehicle prior to its use to ensure the safety of other motorists and the general public.

5.5.13 Employees are to adhere to the Defensive Driving Standards as outlined in Schedule D to ensure they take every precaution to avoid a collision when driving a City Vehicle.

5.5.14 Employees must ensure the City vehicle is left in a safe position and secured to avoid damages or theft.

5.5.15 Employees driving City Vehicles shall obey all applicable traffic and parking regulations, ordinances and laws.

5.5.16 Employees shall not idle City Vehicles in contravention of the City of Windsor Anti-idling by-law.

5.5.17 Employees will be personally responsible for any and all traffic/parking violations or other fines incurred while using a City Vehicle. This requirement applies regardless of whether the charge or fine is imposed upon the City or the Employee. In circumstances where the City is charged

or fined as a result of an Employee using a City Vehicle, the City will comply with all legislative requirements pertaining thereto, but will seek reimbursement for its costs from the Employee.

5.5.18 In addition to the foregoing, if a suspension of an employee's driver's license occurs while driving a City Vehicle, and if the City Vehicle is impounded or towed, any costs incurred to obtain the release of the City Vehicle and any associated legal costs are the responsibility of the employee.

5.5.19 Employees who are issued citations for any offence while using a City Vehicle must notify their supervisor immediately if practical, otherwise within 24 hours at the maximum.

5.5.20 Smoking is not allowed in City Vehicles pursuant to the Smoking in the Workplace By-law.

5.5.21 No modifications are permitted to a City Vehicle without the approval of the Fleet Review Committee.

5.5.22 Keys are not to be left in City Vehicles when unattended and not in a secure municipal yard.

5.5.23 City Vehicles may be equipped by the Fleet Division with Global Positioning System/Automatic Vehicle Locating devices as approved by operating departments.

5.6 Accidents

5.6.1 The Ontario Highway Traffic Act (HTA) sets out criteria for motor vehicle collision reporting in Ontario. Accidents must be reported to the nearest police officer if the accident results in personal injuries or in damage to property apparently exceeding $2,000.

5.6.2 If directed by an officer to report the accident at a specified location, employees must attend the specified location (e.g. Collision Reporting Centre) and report the accident there.

5.6.3 In the event of an accident involving a City Vehicle, all employees are responsible to adhere to the City's Accident/Incident Reporting Procedure.

5.6.4 Departments are responsible to have vehicle assessed by the Fleet Division to ensure vehicle is safe for continued use.

5.6.5 Departments may be responsible for damages not covered by the rental rate.

5.7 Commercial Motor Vehicles

5.7.1 All commercial motor vehicles are equipped with a first aid kit and fire extinguisher. Employees shall ensure supplies are replenished from the Fleet Division stockroom as they are used.

5.7.2 All drivers of commercial motor vehicles must comply with the Commercial Vehicle Pre-Trip Inspection Procedure.

5.7.3 All drivers of commercial motor vehicles must comply with the Hours of Service Procedure.

5.7.4 Employees may place a request through their supervisor to use a City Vehicle for the purposes of upgrading their driver's license to drive a commercial motor vehicle if required for their current position.

5.8 Vehicles for Out of Town Use

5.8.1 Marked City Vehicles may be used for business purposes out of town.

5.8.2 In addition to City Vehicles, a contract exists to utilize a third party for vehicle rental purposes on an as-needed basis.

5.8.3 Use of City Vehicles for out of town business travel is strongly encouraged as the first choice to avoid third party costs including mileage reimbursement to staff, while cars are available and unused. Use of alternative means of transportation must be justified within the travel and expense advance approval form, giving regard to the most economical means of transportation.

5.9 Parking of City Vehicles

5.9.1 When finished with the City Vehicle, it must be returned to the appropriate and safe location as approved by the Commissioner of the department. Vehicles must be locked and keys are not to be left in the vehicle.

5.10 Take Home Privileges

5.10.1 Vehicles are not to be taken home without the permission of the Executive Director. Permission shall only be granted for urgent circumstances or for employees on call.

5.10.2 After working hours, City Vehicles shall be used only to respond to situations within the scope of the employee's duties and for no other purpose.

5.10.3 City Vehicles are not to be used for personal matters. The personal driving of a City of Windsor vehicle for purposes not related to his or her employment is a taxable benefit for the employee. This includes personal use during an employee's vacation, driving to conduct personal activities and travel between home and work (even if the employee is directed to drive the vehicle home). Travel from home to a point of call (such as responding to a call after hours) is not considered personal driving. The taxable benefit shall be calculated as outlined by the Canadian Revenue Agency (CRA) subject to amendment by CRA from time to time.

5.11 Car Allowance

5.11.1 For employees entitled to a car allowance (whether paid monthly, quarterly, annually, or on any other basis) this is a taxable benefit as per the Income Tax Act and included as remuneration.

5.12 Fuelling of City Vehicles and Equipment (Unleaded, Premium, Diesel, Coloured Diesel)

5.12.1 Employees who use a City Vehicle are responsible for ensuring that the vehicle has an adequate supply of fuel.

5.12.2 Employees are to fuel City Vehicles at one of the City's fuel sites operated by the Fleet Division except in extraordinary and/or emergency situations. In the event of an emergency, employees may contact their supervisor for

direction. Fuel may be purchased from one of the local service stations approved by the Fleet Division.

5.12.3 Employees are to follow the fuelling procedures posted at the fuel site.

5.12.4 Employees who use a City Vehicle must complete a one-time fuel training session administered by Corporate Health & Safety and a fuel refresher training session every 5 years.

5.12.5 Employees who have not completed the appropriate fuel training session will not have access to dispense fuel at a city fuel site.

5.12.6 Employees must provide the correct vehicle mileage or number of equipment hours at the time of fuelling. Entering incorrect or inaccurate meter readings may result in discipline up to and including dismissal.

5.12.7 Employee and vehicle HID cards are required for fuelling a City Vehicle at a city fuel site operated by the Fleet Division.

5.12.8 Employees must notify their supervisor immediately if an HID employee/vehicle card is lost or stolen. New or replacement cards are subject to a fee.

5.12.9 Propane equipment must be refuelled externally.

5.12.10 Employees fuelling at an authorized external site must provide unit number, employee name (printed and signed), employee id and mileage on the fuel slip.

5.12.11 Coloured fuel is available for off road equipment only. The use of coloured fuel in a licensed motor vehicle is prohibited and the driver may be liable to penalties and fines under the Provincial Offences Act or the Fuel Tax Act.

5.13 Electric Vehicles

5.13.1 Corporate charging stations will be provided and assigned to charge City Vehicles.

5.13.2 Corporate charging stations are for City Vehicles only.

5.13.3 Charging stations are keyed alike for shared use among employees.

5.13.4 City Vehicles are not to be charged at public charging sites during daily operational use except for out of town business travel.

5.13.5 Electric vehicles are licensed with a green license plate.

6. RECORDS, FORMS AND ATTACHMENTS

6.1 Schedule A - City Vehicle Assignment Methods

6.2 Schedule B - Definitions

6.3 Schedule C - Break Even Point for Assignment of a City Vehicle

6.4 Schedule D – Defensive Driving Standards

6.5 Schedule E – Regulations for and Authorization for Replacement Vehicle ID Card

City Vehicles are assigned in one of three ways:

1) Dedicated
2) Assignment of a Pool Vehicle (Infrequent Use)

1) Dedicated Vehicle

Dedicated vehicles are assigned to a department on an annual basis. They are assigned on a day-to-day basis by the immediate supervisor based upon job description and will be consistent with departmental workload and employee function.

2) Assignment of a Pool Vehicle

Pool vehicles are vehicles assigned for use on a request basis as needed. The Fleet Division maintains a pool of vehicles to supplement dedicated vehicles on a seasonal basis, for casual use when vehicles are in for service or on an as-needed basis.

A pool vehicle is also assigned to City Hall and is available through the City Engineer's office at City Hall.

Seasonal

- User departments provide their seasonal requirements in advance and in writing to the Fleet Division.
- Fleet Division will assign vehicles from the pool and charge a monthly rental rate to the user department.
- If there is not a seasonal unit available, the Fleet Division will make arrangements for an external rental. The monthly rental cost will be charged to the user department.

Casual Use

- User requests a pool vehicle prior to or when required from the Fleet Division or the City Engineer's office.
- For the Fleet Division's pool vehicles, the user provides the Fleet Division with a chart field for billing of vehicle usage based on hours of use. The user will be charged the hourly rental rate associated with that class of vehicle until it is returned by the user.
- If available, loaner vehicles are provided free of charge to users who require replacements for vehicles brought in for service.
- For the City Hall Pool vehicle, the user departments cost share the annual rental rate associated with the class of vehicle.

"Accident" –an incident whereby a City owned vehicle/equipment has come into contact with another vehicle/equipment, person or object regardless of damage or injury, or an incident with or without contact that results in injury to a person, property, vehicle or equipment.

"Actual Cost Billing" – a billing method whereby the user department is charged by the Fleet Division for the actual costs incurred to maintain non-dedicated equipment.

"City Vehicle" – any licensed or unlicensed automobiles, trucks, vans, or other self-propelled equipment owned, rented, or leased by the City of Windsor.

"**Car Allowance**" – payment that employees receive from an employer for using their own vehicle in connection with or in the course of their office or employment without having to account for its use. An allowance is a taxable benefit unless it is based on a reasonable per-kilometre rate.

"**Commercial Motor Vehicle**" – a commercial motor vehicle includes:

- Trucks that have a registered gross weight of over 4,500 kilograms
- Buses that can carry ten or more passengers
- Trailers that have a registered gross weight greater than 2,800 kilograms, when pulled by a truck that is less than 4,500 kilograms and the overall weight is greater than 4,500 kilograms.

A commercial motor vehicle does not include fire apparatus.

"Commercial Vehicle Operator Registration" – registration system for operators of commercial motor vehicles (trucks, trailers and buses) as per the Highway Traffic Act.

"Corporate Driver Management Program" – program maintained by Human Resources Health and Safety Division that outlines all driver related policies and training programs.

"Dedicated Vehicle" – a vehicle assigned to a department or division on an annual basis. Dedicated vehicles are included on the corporate fleet replacement plan.

"Distracted Driving" – Drivers in Ontario are prohibited from using hand-held cell phones and other hand-held electronic entertainment or communications devices while driving. The use of hands-free devices is permitted. Emergency calls, such as calls to 911, are not affected.

"**Licensed motor vehicle**" – any motor vehicle to which a number plate is attached as required under the Highway Traffic Act.

"Pool Vehicle" – a general purpose City Vehicle supplied by the City of Windsor which can be used on a request basis as needed. Pool vehicles are not included on the corporate fleet replacement plan.

"Preventable Collision" – a collision that could have been prevented, regardless of whether the employee is at fault in accordance with fault determination rules, and as determined by the immediate supervisor following an accident/incident or by the Collision Review Committee.

"Valid Driver's License" – (a) appropriate to the vehicles being driven; or (b) specified by the department.

Individual mileage claims will be reported on to the Chief Administration Officer on an annual basis by the Finance Department.

Once an individual’s annual reimbursement exceeds the annual charge out rate for a rental vehicle (based on the Class of vehicle used), an assessment of whether or not a dedicated vehicle should be provided to the employee will take place.

Consideration will also be given to other individuals in the department to see if vehicles can be rationalized and shared amongst employees/positions.

The analysis will involve comparing annual mileage paid at the current Corporate Travel Policy rate (based on CRA guidelines) against the annual vehicle rental rate charged by the Fleet Division for the Class of vehicle being used on a ‘cost per km’ basis.

If the cost of providing a dedicated unit is lower than payment of individual mileage over the course of a year, the individual’s Manager, will bring forward a Fleet Addition request through the Fleet Manager to the Fleet Review Committee for inclusion in the annual Fleet Additions and Upgrades capital budget. Furthermore, the individual’s Manager will submit an operating budget request for the addition of a dedicated fleet unit.

Drive to avoid collisions in spite of the incorrect actions of others and adverse driving conditions.

Make allowances for the lack of skill or improper driving practices of the other driver.

Adjust driving to compensate for unusual weather, road and traffic conditions and is not involved in a collision due to the unsafe actions of pedestrians and other drivers.

Be alert to collision inducing situations to recognize the need for preventable action in advance and take the necessary precaution to prevent a collision.

Know when it is necessary to slow down, stop or yield the right of way to avoid a collision.

Conduct circle checks thoroughly and notify supervisors if any anomalies occur while operating a motor vehicle.

Use a guide to help back out of a difficult area and survey your exit plan before entering the vehicle.

Avoid parking spaces near driveways or other areas that are susceptible to collisions.

Leave room to account for stopping distances between their vehicle and the one in front. Leave more space if visibility or speed of the vehicle is an issue.

Be mindful of vehicles tailgating you and change lanes to let them pass.

Always give advanced warning of your driving intentions.

Remove distractions and always be mindful of surroundings and traffic.

Obey all traffic signs.

Enter traffic in a way that will avoid obstructing the flow of traffic.

Always be attentive and prepared to stop in the event a pedestrian/cyclist crosses your path.

Drive in a safe manner that would never endanger the safety of a passenger.

Use appropriate load securement procedures to secure cargo.

Do not utilize hand-held devices while driving as per the Corporate Cell Phone/Wirele4ss Device Safe Use Policy.

Be aware of the safe use of your vehicle and/or related equipment.

The Corporation of the City of Windsor
Regulations for and Authorization for Replacement Vehicle ID Card
(Please read carefully and complete all applicable areas.)

1. VEHICLE INFORMATION
Unit #:

2. EMPLOYEE INFORMATION			
Last Name:		First Name:	Middle Name:
Emp. #	Position Title:	Service Area/Division:	Date of Notification of New/Lost Card:

3. REGULATIONS

1. This vehicle ID card is the property of the City of Windsor and must be available for fuelling at a fuel site operated by the Fleet Division.
2. If this card is lost or stolen, I will notify my supervisor immediately.
3. I understand that there is replacement cost for Vehicle ID Cards.
4. I understand that this vehicle ID card is for Corporate and fuel use only.
5. This vehicle ID card must be kept on the vehicle key chain or secured by the department if multiple employees are utilizing the same vehicle.

4. ACKNOWLEDGEMENT OF REGULATIONS AND AUTHORIZATION

Consistent with the Fleet Use Policy and Procedures and the Vehicle ID Card Regulations form (both available on Dashboard), and as authorized by City Council, replacement cards are subject to a $10.00 fee. The fee is to be paid by the department. This form authorizes the Fleet Division to charge for the replacement card(s).

Number of Replacement Cards requested: _____ x $10.00

Total Charge: $_____

Chartfield: _____

Department Signature:	Date:
Fleet Representatives Signature:	Date:

The following section is for use by Fleet Division only.		
Distribution	**Initials of Processor**	**Date**
Fleet Card File		
Journal ID		

Transit Windsor Route Infrastructure Planning & Design Guidelines

THE CITY OF WINDSOR
ONTARIO, CANADA

transit windsor

TRANSIT WINDSOR

May 1, 2022

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Executive Summary

These route infrastructure planning and design guidelines use industry best practices and serve as a blueprint for Transit Windsor. Road design is often updated with the City of Windsor and this tool will allow for consistency among transit infrastructure throughout the City. All new bus stops are to be developed to these standards while existing bus stops are to be upgraded as the opportunity arises.

In order to maintain the consistency of bus stops, a number of items need to be assessed to ensure the correct bus stop placement. These guidelines discuss a range of industry best practices that are broken down into six sections:

- Spacing of Bus Stops
- Placement of Bus Stops
- Bus Stop Configuration
- Physical Design for Safe Passenger Access and Amenities
- Transit Priority Measures
- Transit Road Design

Transit stops are more than just a place to wait. Investing in transit stops is an opportunity to improve transit reliability and enhance the street with green infrastructure and public spaces.

A transit system fits into a geometric puzzle involving transit vehicles and intersection operations. While the location of a stop determines to a large extent how transit passengers gain access to transit service, the design and configuration of stops and stations impacts how everyone on the street interacts with the transit system. When designed with transit quality as the priority, transit infrastructure and design influences the interactions that occur at transit stops, including bus-bike and bus-turning vehicle interactions and road design.

Section 1 Spacing of Bus Stops

To determine the number and location of bus stops, one has to consider the following:

- The relative spacing between subsequent stops
- Locating bus stops that correspond to passenger demand
- Providing physical facilities that promote safe and efficient interaction of transit vehicles, transit passengers and other road users

This section contains discussions related to the relative spacing between subsequent stops and land use areas in relation to ridership. Passenger access and amenities are discussed in Section 4.

1.1 Stop Spacing Guidelines

The recommended bus stop spacing range for different land use areas is included in Table 1. In general, bus stops are spaced closer in central business districts and urban areas where activities are more concentrated. It is noted that there may be special circumstances that require the spacing to deviate from the spacing ranges. Nevertheless, bus stop spacing should be optimized as much as possible to correspond to passenger demand.

Table 1 Recommended Bus Stop Spacing

Area	Typical Spacing (m)	Spacing Range (m)
Central Business Districts	200	200-300
Urban Areas	230	200-365
Suburban Areas	300	200-760
Rural Areas	380	200-800

Transit users are generally willing to walk 400 m (metres) to a local stop or 800 m to a rapid transit station / express bus stop. The placement of local stops between 200 m and 250 m apart supports an average 400 m walking distance to local stops within an interconnected network of streets and blocks. For express or rapid transit services supported by a network of feeder transit routes, spacing stops greater than 250 m apart is often appropriate to limit stops, reduce travel times, and maintain route efficiency. No bus stops should be placed closer than 150 m together.

An over abundance of bus stops on a route will reduce the route efficiency, slow down the bus service, and impact the level of customer riding comfort. A lack of bus stops, will increase customer walking distance and therefore limit bus stop accessibility. To satisfy accessibility and efficiency, the following three factors are considered when determining the locations of bus stops:

1. Network - based stop spacing guidelines
2. Passenger demand
3. Other traffic considerations

1.2 Dwell Time of Bus Stops

Dwell time refers to the amount of time a bus is stopped at a bus stop. The following values can be used to estimate dwell times at bus stops:

- 60 seconds at a downtown stop, transit centre, major on-line transfer point, or major park-and-ride stop
- 30 seconds at a major outlying stop
- 15 seconds at a typical outlying stop

1.3 Land Use

It is best to locate transit stops next to uses that generate high transit use, such as senior residences, hospitals, social services, large employers, retail and entertainment venues. Bus stops may be spaced closer together in these areas to correspond to passenger demand. Locate transit stops in highly visible locations along well-travelled routes and support their function through the design of adjacent development.

To maximize pedestrian access and minimize walking distances, locate transit stops at points where local roads intersect with collectors and arterials. Ensure that bus stops have direct and safe connections, with the minimum provision of a sidewalk. Stops without sidewalks are discouraged.

The spacing between subsequent bus stops in rural areas may vary according to population and development density.

Design stops and stations as introductions to the transit system, paying special attention to how transit space interacts with the sidewalk and adjoining buildings. Comfortable stops with shade trees, shelter, places to sit or lean, and nearby business activity can anchor an improved local pedestrian realm and improve rider perceptions of transit service.

Transit stops involve interactions among nearly everyone on the street and the type and location of transit stops affect reliability and travel time. Stop location and design can support prompt transit and safe crossings by accounting for intersection operations, transfers to other routes and local destinations. Cluster stops with bike share stations, car share and for-hire-vehicle zones to create neighborhood mobility hubs, making the best use of station and sidewalk investments.

Section 2 Placement of Bus Stops

2.1 Far-Side, Near-Side and Mid-block Configuration

At Transit Windsor, each bus stop is evaluated individually in terms of its environment. Bus stops are to be located on the near or far-side of intersections or mid-block as appropriate. Bus stops should be evaluated to be at the near or far-side of intersections before middle block (mid-block) as shown in Figure 1, dimensions of the configurations are shown in Table 2:

- Locate stops on the near-side of the intersection to accommodate pedestrians near a cross walk and to provide the bus driver more control of the bus as they make the stop and then proceed through the intersection
- Locate stops on the far-side of the intersection to reduce interference where there is a high volume of turning vehicles and bus service is frequent. Far-side stops allow the bus to proceed through a green signal and make it easier for buses to re-enter traffic
- Mid-block stops are located at a minimum of 60 m from intersections. Mid-block stops are applicable where large destinations justify high-volume access

Once a bus stop is established, stops should not be relocated unless transit service to the affected stop is removed or road re-construction/environmental changes require a change in stop location. Requests by residents, businesses, city staff or councillors to move established stops should be resisted. However, if a request is made and Transit Windsor deems it to be an acceptable move, the cost of moving the stop (sign, database, etc.) should be billed to the individual(s) requesting it. This cost will be determined on an individual basis, based on the conditions of the move as some moves may cost more than others.

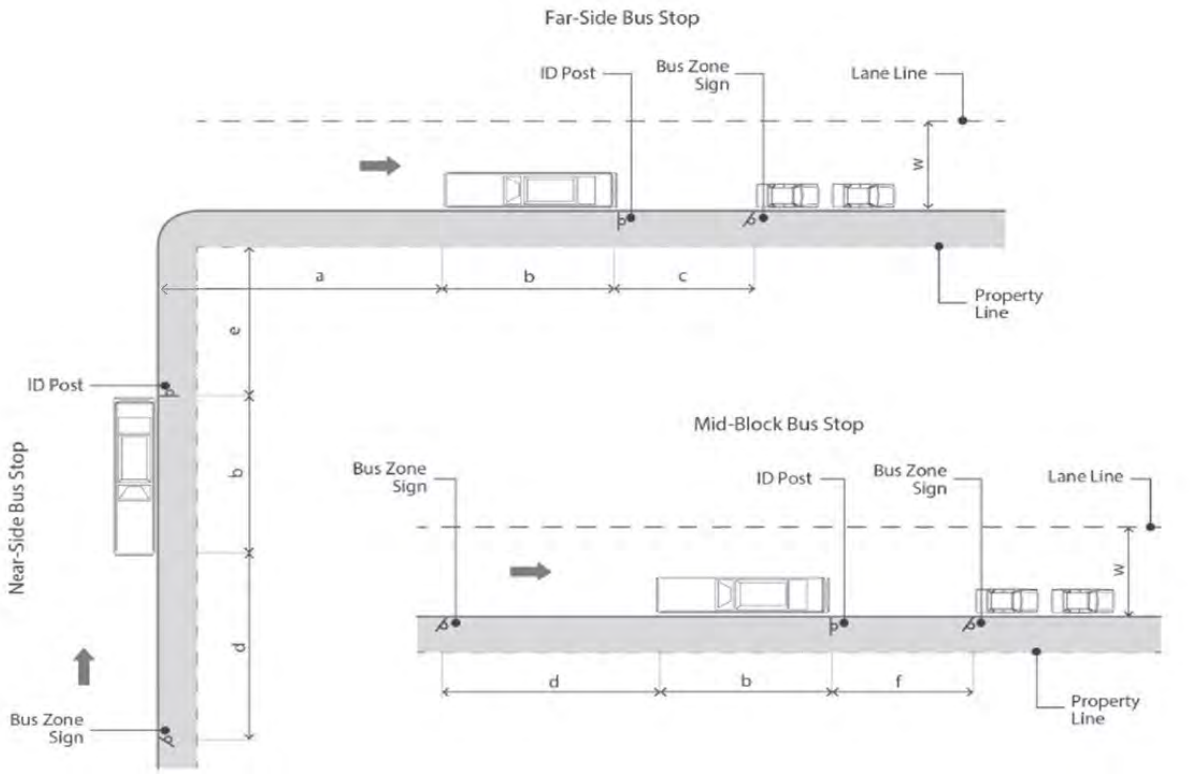


Figure 1 Far-Side, Near-Side and Mid-Block Configurations

Table 2 Far-Side, Near-Side and Mid-Block Bus Stop Dimensions from Figure 1

Type of Bus	Bus Length (b) (m/ft)	Far-Side Stop			Near-Side Stop		Mid-Block Stop		Width (w) (m/ft)
		Approach Movement	Corner Clearance (a) (m/ft)	Pull Out (c) (m/ft)	Pull In (d) (m/ft)	Corner Clearance (e) (m/ft)	Pull In (d) (m/ft)	Pull Out (f) (m/ft)	
Standard Bus	12.4 / 40	Right Left Through	12.3 / 40 15.9 / 52 6 / 20	7.7 / 25	18 / 59	Minimum 6 / 20	18 / 59	7.7 / 25	Minimum 6 / 20 Preferred 7 / 23
Articulated Bus	18.5 / 60				21 / 69		21 / 69		

Notes:

1. A minimum clearance of 6 m (20 ft) between the stopped bus and a crosswalk, a flashing beacon, stop sign, traffic control signal located at the side of a roadway for near side stops.
2. The clearance distance between the crosswalk edge and the rear of the bus is to be 6 m (20 ft) for a bus making the through movement and 14 m (46 ft) for a bus making the left - turn or right - turn movement.
3. For bus bays, an extra 3 m (10 ft) should be included at the stop for a standard/articulated bus to straighten out
4. Upstream from Pedestrian Crossover (PXO): at least 15 m (49 ft) (required) / 30 m (98 ft) (desirable)
5. Downstream from PXO: at least 10 m (33 ft) (required) / 15 m (49 ft) (desirable)

2.1.1 Far-Side Bus Stop

Far-side bus stops have buses parked on the far-side of an intersection. This positioning can minimize the potential for buses to limit the view of intersection controls, (i.e., a STOP sign or traffic signal heads) and pedestrians for traffic traveling in the same direction. Figure 2 and Figure 3 show the configuration of a far-side bus stop.

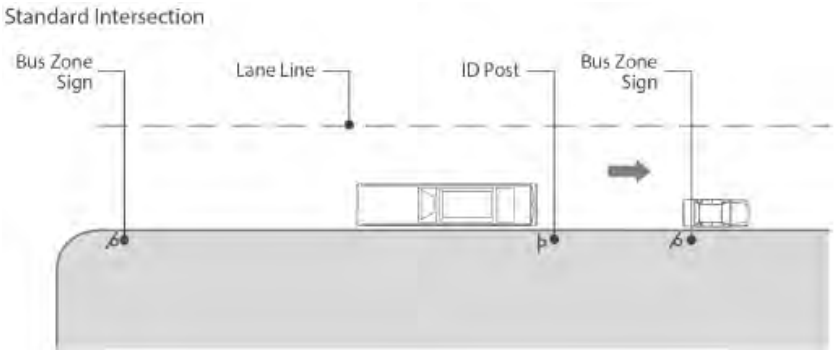


Figure 2 Far-Side Bus Stop Configuration (40 ft standard bus)

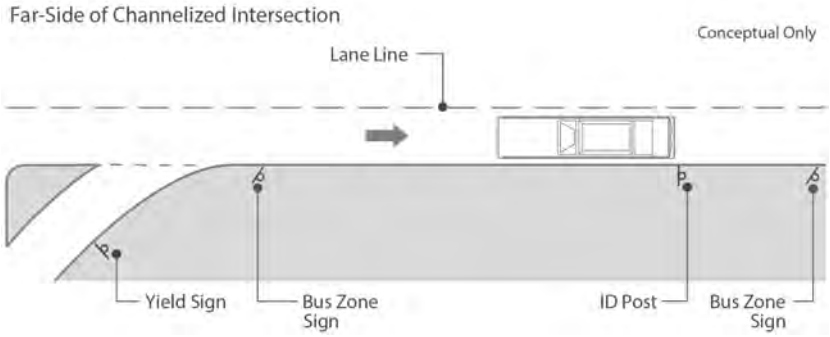


Figure 3 Far-Side Bus Stop Configuration at Channelized Intersection

Advantages of the far-side configuration include:

- Traffic on the curb lane has minimal interference with buses pulling-in to the bus stop, as opposed to a near-side configuration where bus operation may be affected by delays and queues on the approach to a traffic signal or STOP sign
- At signalized intersections, far-side stops allow buses to clear the intersection before stopping
- Bus movements would have minimal interference with right-turn vehicles
- There is reduced risk of bus passengers stepping in front of the bus to cross the street
- The bus stop can also be used by approaching buses from the intersecting street after making a turn onto the street where the stop is located
- Stopped buses would not obstruct the view of pedestrians that wish to cross the street for other traffic in the same travel direction. Pedestrians are more likely to cross behind the bus at the intersection than in front of the bus
- Far-side stops support the use of a broad array of active transit signal priority treatments with relatively simple infrastructure, since transit vehicle approaches can be anticipated based on typical approach speeds
- At intersections where transit vehicles turn, use far-side stops to simplify transit turns and allow pedestrians to better anticipate turning movements
- Buses re-entering traffic flow do not experience as much delay
- On-street parking loss is reduced
- Waiting customers accumulate at less crowded sections of sidewalk rather than close to the intersection

Disadvantages of the far-side configuration include (shown in Figure 4):

- Reduced through traffic capacity if the volume of boarding and/or alighting is high resulting in long dwell time
- Increased walking distance to the intersection crosswalk for bus passengers
- Bus operators have restricted view of passengers approaching from the intersection
- For a far-side stop sited beyond a channelization island or in an acceleration lane, special consideration should be given to eliminating the potential weaving conflicts between buses approaching the stop area and right-turn traffic from the intersecting street
- On single-lane streets where in-lane stops are most needed, far-side in-lane stops in mixed traffic may result in traffic behind the bus spilling back into the crosswalk and intersection. At these locations, provide a longer far-side stop that accommodates queued vehicles behind the stopped transit vehicle, or activate an early red phase after the transit vehicle clears the intersection
- Far-side stops may require further consideration of street lighting

An example of a far-side bus stop in Windsor is shown in Figure 5.

This diagram illustrates a potential disadvantage of a far-side bus stop where boarding and alighting activities results in long dwell time at an on-line bus stop. Vehicles traveling on the curb lane (lane closest to the sidewalk) queue behind the bus and need to make a lane change to avoid delays.

Figure 4 Far-Side Bus Stop Disadvantage

Figure 5 Example of a Far-Side Bus Stop

2.1.1.1 Far-Side, In-Lane Bus Stop

In-lane stops at the far-side of an intersection confer the highest priority to transit operations at most signalized intersections. Far-side, in-lane stops are generally the preferred stop configuration where transit lanes are present as shown in Figure 6. Figure 7 is an example of a far-side in-lane bus stop in Windsor.

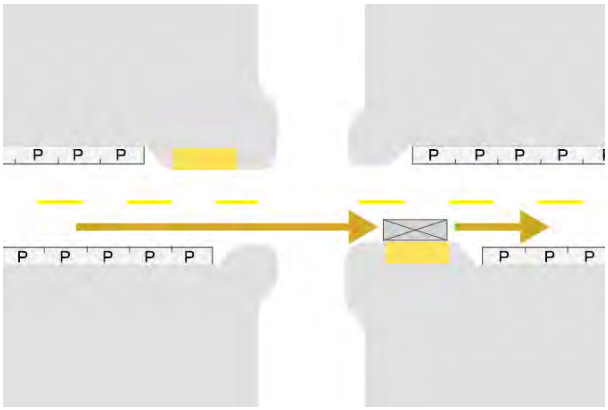


Figure 6 Far-Side, In-Lane Bus Stop

Figure 7 Example of Far-Side, In-Lane Bus Stop

Advantages of Far-Side, In-Lane Stops:

- In-lane stops reduce wear on transit vehicles and street infrastructure by avoiding lane shifts during braking
- By allowing buses to move in a straight line, in-lane stops eliminate both pull-out time and traffic re-entry time, a source of delay and unreliable service
- In-lane stops are especially valuable on streets operating at or near vehicle capacity, or on streets with long signal cycles, in which transit vehicles may experience long re-entry delays while waiting for traffic to clear

2.1.1.2 Far-Side, Pull-Out Bus Stop

Far-side pull-out stops use intersection space efficiently, with little impact on general traffic if they are wide enough for a bus to pull completely out of traffic. Among pull-out configurations, far-side stops are preferred as shown in Figure 8. Figure 9 is an example of a far-side pull-out bus stop in Windsor.

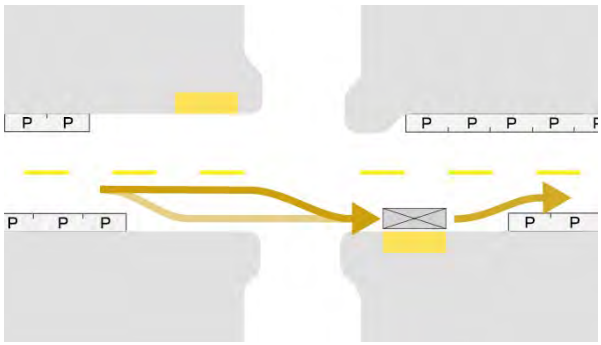


Figure 8 Far-Side Pull,-Out Bus Stop

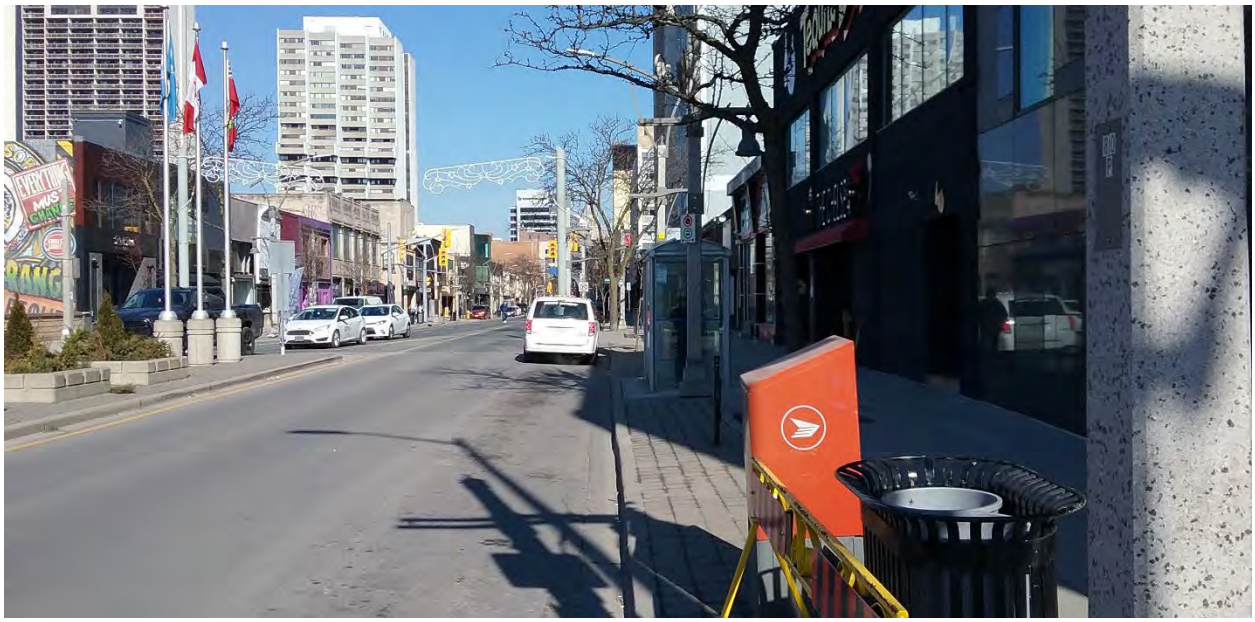


Figure 9 Example of a Far-Side, Pull-Out Bus Stop

Advantages of Far-Side, Pull-Out Stops:

- A periodic pull-out stop on streets with primarily in-lane stops allows vehicles to pass while a bus is stopped
- A far-side pull-out configuration shortens the transition distance needed along the stop platform. Buses can shift to the right while crossing the intersection
- Pull-out stops can be used for local stops adjacent to offset or curbside transit lanes to allow rapid services to pass local services
- Pull-out stops create additional space to receive left-turning transit vehicles

Far-side, pull-out stops work well with queue jumps designed as bus-only approach lanes or shared right-turn lanes that advance transit vehicles into the stop.

Disadvantage of Far-Side, Pull-Out Stops:

- Buses may be significantly delayed in re-entering the travel lane on high-volume streets

2.1.2 Near-Side Bus Stop

Near-side stops may be considered in the context of facilitating passenger transfers between bus stops on two intersecting streets. Near-side bus stops are located before an intersection. A near-side stop may be considered on the intersecting street in the same quadrant as the far-side street bus stop to minimize the need for passengers to cross the intersection. Figure 10 shows the near-side stop configuration.

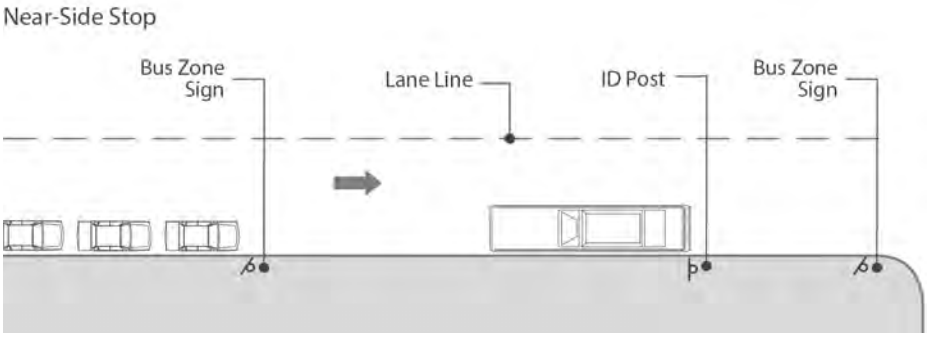


Figure 10 Near-Side Bus Stop Configuration (Standard 40ft Bus)

Advantages of the near-side configuration include:

- Improved passenger transfers between a near-side stop and a far-side stop on the cross street, if these are in the same quadrant
- Bus operators have a better view of approaching passengers, particularly those from the across street
- Where a high volume of vehicles turn onto the transit street, locating a stop near-side keeps the far-side of the intersection clear to receive turns
- Near-side stops at the approach to an intersection can facilitate in-lane stops in mixed-traffic lanes, where turning movements and queued vehicles behind transit vehicles do not block the intersection
- Street lighting is generally better near the crosswalk

Disadvantages of the near-side configuration include (shown in Figure 11 and Figure 12):

- Potential conflicts with vehicles making right turns
- Stopped bus may obscure STOP signs, traffic signals or pedestrians crossing in front of the bus
- Conflicts associated with buses pulling-out of the stop and the risk of rear-end collisions related to approaching traffic slowing or stopping for the merging buses may be introduced
- Near-side stops present challenges at intersections with transit route turns. If buses are required to turn right from the curbside, provide a signal phase for the transit movement or design the cross street to accommodate a vehicle sweeping across the second lane or the oncoming lane
- Operational efficiency of the intersection may be reduced, especially at congested signalized intersections
- When there is no receiving lane on the far-side of the intersection, buses moving to the travel lane maybe delayed or may have to change lanes in the intersection
- A near-side bus stop usually occupies longer curb space than a far-side bus stop (since the pull-in distance is along the curb rather than as part of the intersection), resulting in possible loss of on street parking spaces

Figure 13 is an example of a near-side bus stop in Windsor.

This diagram illustrates a potential disadvantage of a near-side bus stop where queuing on the approach to an intersection may delay buses from reaching the bus stop

Figure 11 Near-Side Bus Stop Queuing Disadvantage

This diagram illustrates a potential disadvantage of a near-side bus stop where there is high volume of right turn vehicles at an intersection and a bus with high boarding and alighting activities results in long dwell time, which forces the right turn traffic to make a lane change to bypass the stopped bus.

Figure 12 Near-Side Bus Stop Right Turn Traffic Disadvantage

Figure 13 Example of a Near-Side Bus Stop

2.1.2.1 Near-Side, In-Lane Bus Stop

Near-side stops at the approach to an intersection can facilitate in-lane stops in mixed-traffic lanes, where turning movements and queued vehicles behind transit vehicles do not block the intersection as shown in Figure 14.

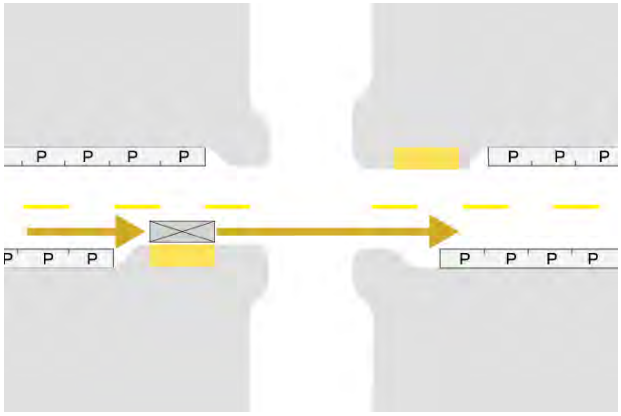


Figure 14 Near-Side, In-Lane Bus Stop

At stop-controlled locations with only one travel lane in each direction, near-side, in-lane stops eliminate “double-stopping”.

Figure 15 is example of a near-side in-lane bus stop in Windsor.

Figure 15 Example of a Near-Side, In-Lane Bus Stop

2.1.2.2 Near-Side, Pull-Out Bus Stop

Near-side, pull-out stops favour motor vehicle traffic flow and confer limited benefits to transit operations as shown in Figure 16. At high traffic volume locations, the near-side stop functions as a right-turn lane when buses are not present.

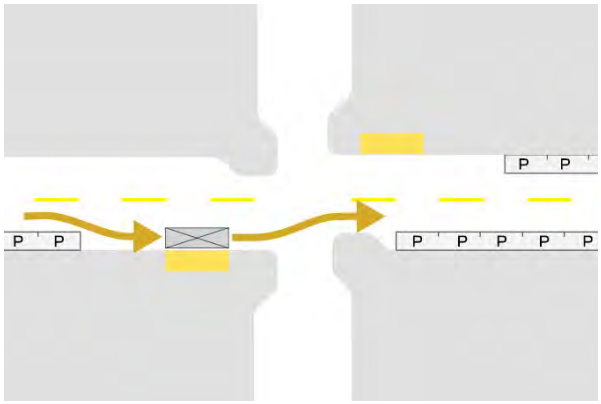


Figure 16 Near-Side, Pull-Out Stop

Except for transfer points, near-side pull-out stops are not preferred on multi-lane streets, but may be applied if a major near-side destination exists or if problematic conditions such as driveways or missing sidewalks exist at the far-side location.

Figure 17 shows an example of a near-side pull-out bus stop in Windsor.

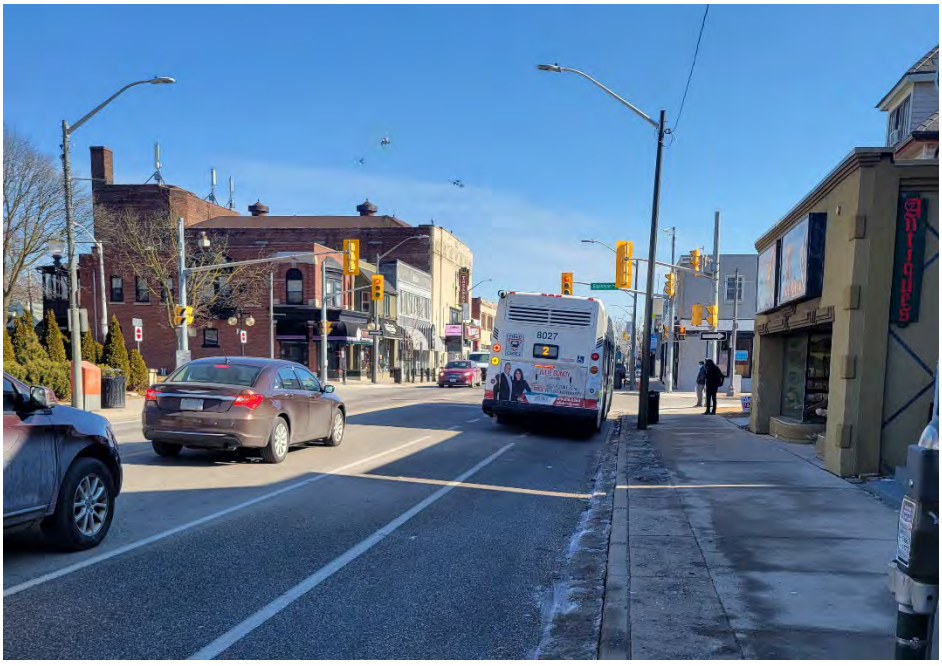


Figure 17 Example of a Near-Side, Pull-Out Bus Stop

2.1.3 Mid-Block Bus Stop

Mid-block bus stops may be considered when physical or environmental conditions prohibit near-side or far-side stops. They may also be considered on longer blocks where passenger demand exists in between adjacent intersections. A far-side stop may have multiple routes that frequent it therefore a longer loading area is needed, the far-side stop may be located further away from the intersection and operate more effectively as a mid-block stop. Figure 18 shows the mid-block configuration.

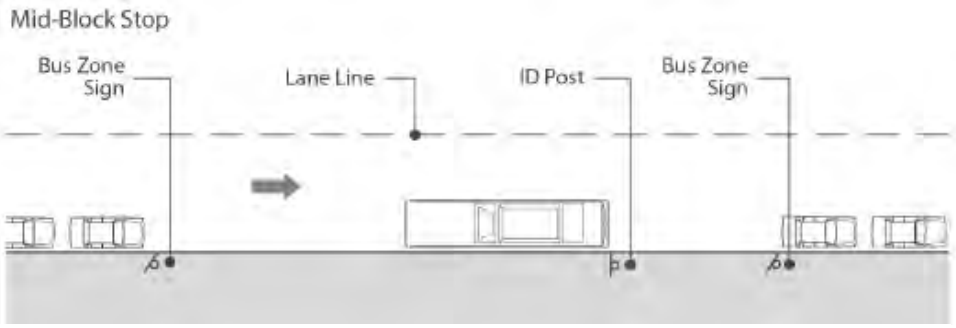


Figure 18 Mid-Block Bus Stop Configuration (Standard 40ft Bus)

Advantages of the mid-block configuration include:

- More space is available on the sidewalk at a midblock location to accommodate waiting passengers, as opposed to near an intersection where the sidewalk may be shared with passengers accessing the intersection crosswalks
- The stop location can correspond to particular ridership generator(s) in between adjacent intersections
- Use mid-block stops where traffic conditions at intersections would create safety issues for stopping buses or riders

Disadvantages of the mid-block configuration include:

- Jaywalking may be introduced if there is demand to cross the street near the bus stop and a mid-block crossing is not provided. Where safe pedestrian crossings cannot be provided, mid-block stops are a last resort
- Limited passenger transfer efficiency if the connecting bus route is provided at the adjacent intersection rather than at the mid-block. Walking distance is increased for passengers making transfers
- Sightline obstructions to/from vehicles exiting adjacent driveways
- Possible need to remove a greater number of curb parking spaces compared to far-side stop configuration

Figure 19 shows an example of a mid-block bus stop in Windsor.

Figure 19 Example of a Mid-Block Bus Stop

2.1.3.1 Mid-Block In-Lane Bus Stop

In-lane mid-block configurations use significantly less curb length than mid-block pull-out stops, as shown in Figure 20.

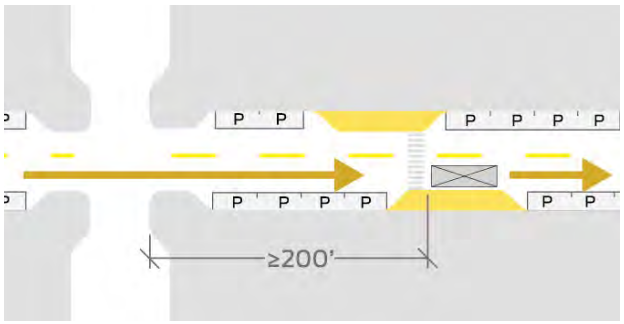


Figure 20 Mid-Block In-Lane Bus Stop

Figure 21 shows an example of a mid-block in-lane bus stop.

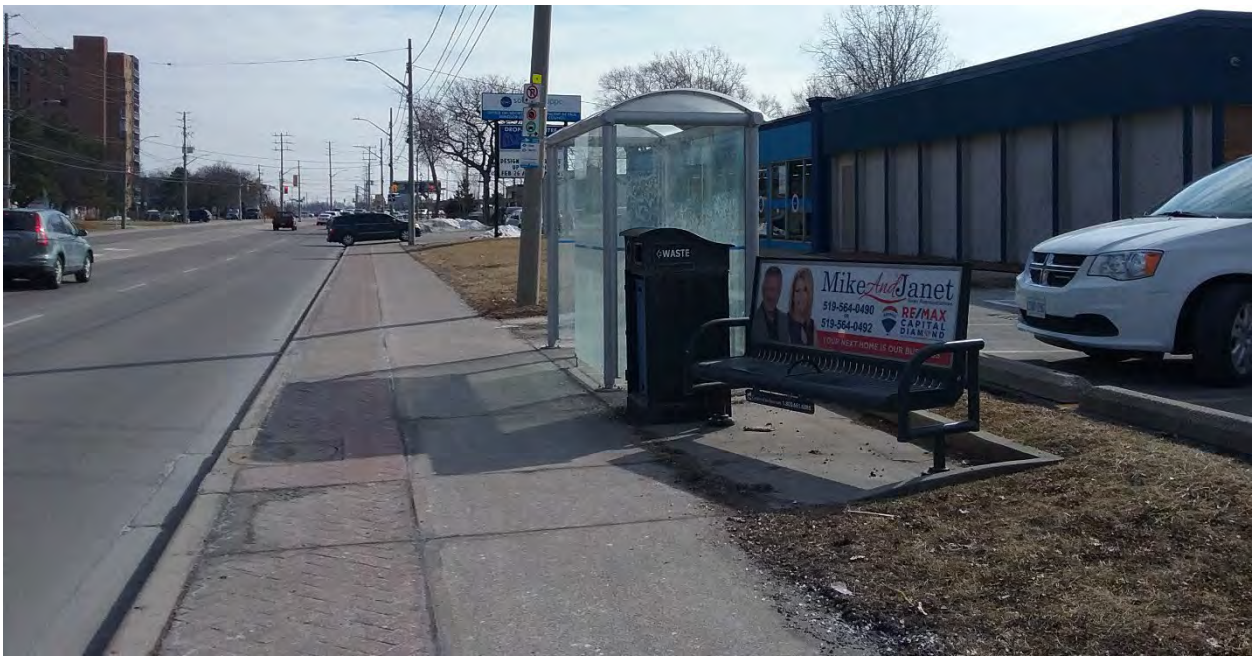


Figure 21 Example of a Mid-Block, In-Lane Bus Stop

2.1.3.2 Mid-Block, Pull-Out Bus Stop

Mid-block, pull-out stops may be applicable at heavy intermodal transfer points, or transit vehicle layover points as shown in Figure 22. Ensure that adequate curbside space exists to maneuver buses in and out of stops.

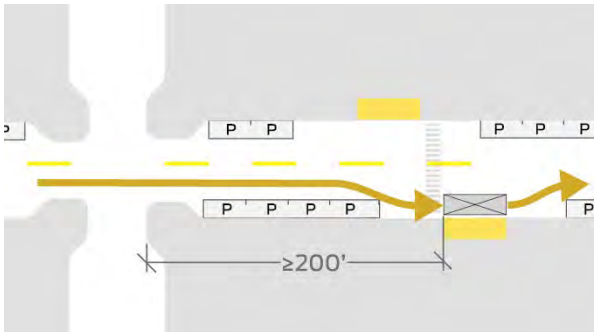


Figure 22 Mid-Block, Pull-Out Bus Stop

2.3 Route Transfer

Consideration should be given to coordinating bus stop placement with passenger transfer movements. As described earlier in Section 2.1.2, a near-side stop may be considered in the context of facilitating passenger transfers between bus stops on two intersecting streets.

On roads with two way direction of bus routes, pedestrian connectivity may be enhanced by placing stops across from each other as much as possible. The provision of a signed and marked crosswalk may be considered to enhance guidance and safety for passengers needing to access from one bus stop to another. Figure 23 shows configurations of passenger transfers.

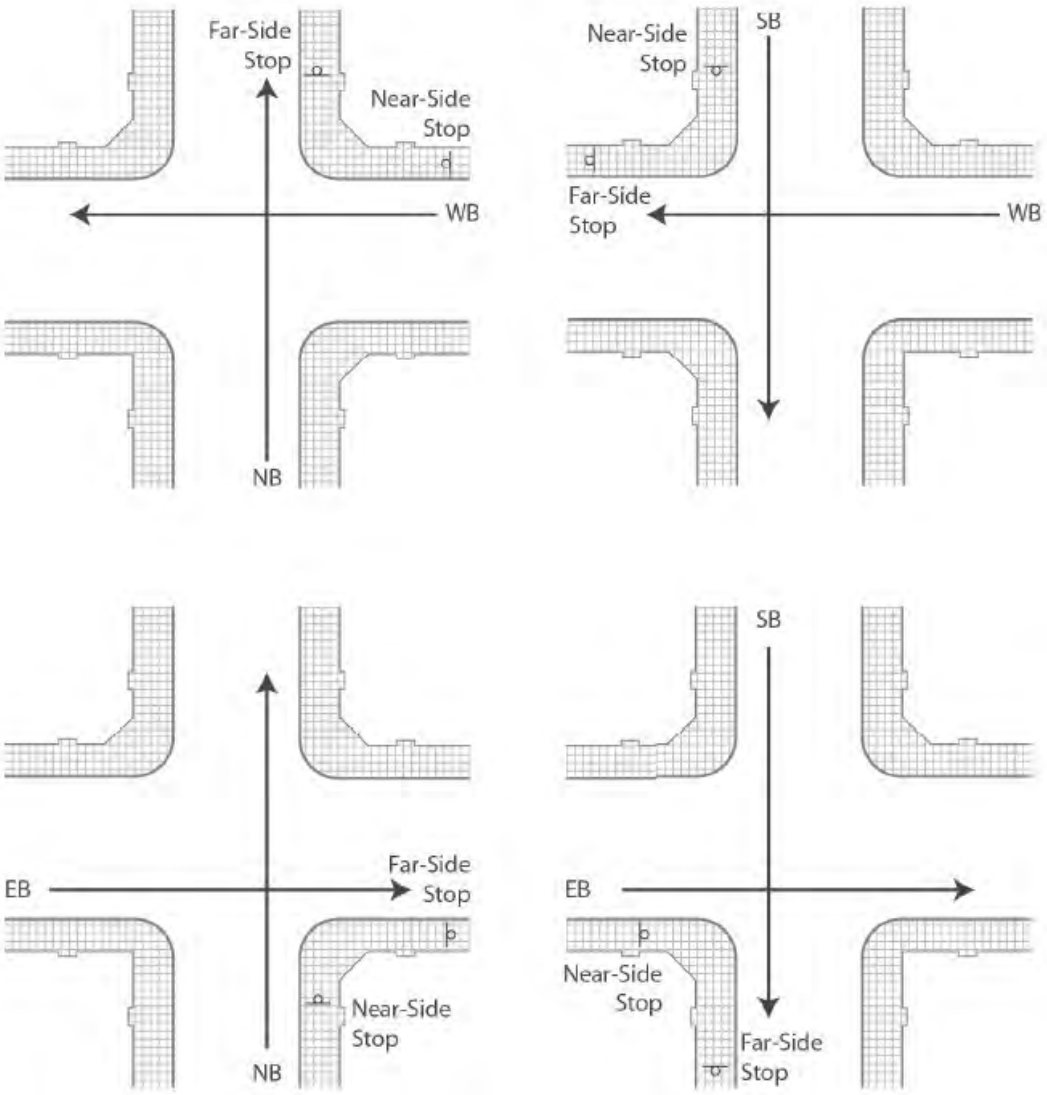


Figure 23 Passenger Transfers

2.4 Bus Stop Access Between Driveways

Bus stops should be located away from driveways wherever possible to minimize conflicts between buses and vehicles using the driveways of adjacent properties. At locations where this cannot be avoided, the minimum requirements for the placement of a bus stop between two driveways can be found in Figure 24. The placement of a bus stop between access driveways is to be examined on a case-by-case basis. When locating a bus stop near a driveway the following should be considered:

- Type and spacing of access driveways near the bus stop
- Peak volume of traffic entering/exiting the access driveways
- Expected service level and customer boarding/alighting volumes at the bus stop
- Peak time of bus stop usage vs. the peak time of driveway traffic
- Adequacy of passenger waiting area at the bus stop
- Sight line requirements between customers walking to/from bus stop and drivers at the access
- Possibility that traffic queued at the driveway will affect the efficient operation of the bus stop
- Availability of alternative bus stop locations

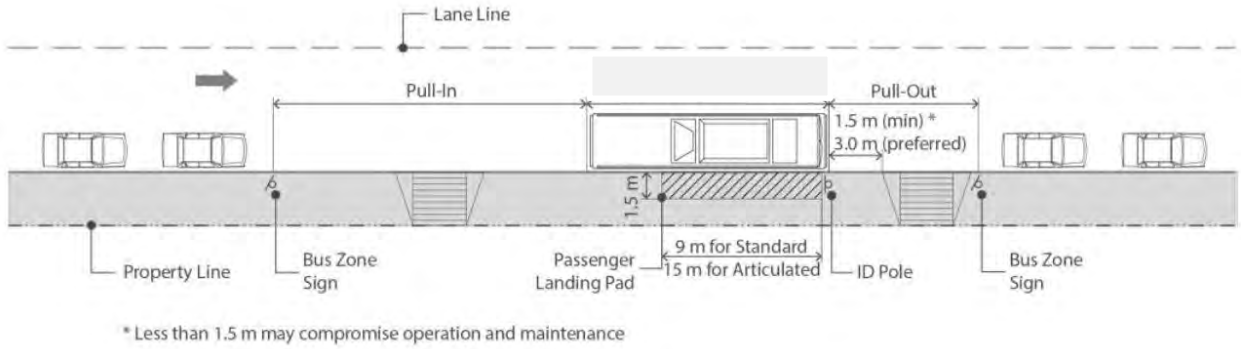


Figure 24 Bus Stop Minimum Requirements Between Access Driveways

If a bus stop is placed at the near-side of an access driveway there should be at minimum 1.5 m (5 ft) from the bus stop sign to the driveway. An example of a bus stop adjacent to an access driveway is shown in Figure 25.

Figure 25 Example of a Bus Stop Between Access Driveways

2.5 Bus Stop Locations Near Roundabouts

When placing a bus stop in the vicinity of a roundabout, placing it on the near-side provides the advantage of being in a potentially slower speed environment where vehicles are slowing to enter the roundabout, where as a far-side location vehicles may be accelerating as they exit the roundabout.

When locating a bus stop near a roundabout the following should be considered:

- A bus stopped at a nearside stop should not obstruct sightlines to and from pedestrians crossing in a crosswalk
- Near-side stops should be far enough away from the splitter island so that a vehicle overtaking a stationary bus does not strike the splitter island, especially as the bus starts to pull away from the stop
- Far-side stops should be located beyond the crosswalk so they do not obstruct the view of crossing pedestrians
- At the approaches to multilane roundabouts, a nearside bus stop can be included in the travel lane (a bus bulb−out design) as long as it is set back at least 20 m (66 ft) from the crosswalk
- At multilane roundabouts in slow−speed urban environments, a bus stop without a bus pullout may be located immediately beyond the crosswalk, as exiting traffic can pass the waiting bus
- Bus pull-outs can reduce the risk of vehicles queuing into the crosswalk or roundabout behind a stopped bus, but may limit sightlines for bus drivers attempting to merge into traffic
- In a traffic-calmed environment or close to a school, it may be appropriate to locate the bus stop so that other vehicles cannot pass the bus while it is stopped

Figure 26 is an example of a bus stop located near a roundabout.

Figure 26 Example of a Bus Stop Near a Roundabout

Section 3 Bus Stop Configurations

Bus stops provide the interface between customers and buses, they are one of the critical components in transit infrastructure design. The physical configuration of the bus stop, will allow customers to board, alight, and make transfers in a safe and efficient manner, and will minimize bus conflicts with other traffic (for example, bicycle traffic).

When configuring bus stops, there are various considerations to be made:

- Curb-side design around a bus stop, different bus stop types require different curb-side design
- Bus stop type will dictate how the curb-side is designed. Different bus stop types are:
    - In-lane (on the curb travel lane or as a bus bulge) where the transit vehicles stays in the lane of traffic
    - Pull- out (bus bay or out of the lane of travel) where the transit vehicles exit the lane of traffic
- Bus concrete pads may be considered at high transit traffic locations such as on street terminals, bus bays and bus layover locations to reduce maintenance costs
- Multi-position bus stops may be considered at locations serviced by high frequency routes or more than one bus route. Two or more buses may arrive at the same time requiring a multi-position stop layout
- Bike lanes need to be considered as they are commonly provided on the right-hand side of the pavement where bus stops are also frequently located
- Terminals are designed to optimize the needs of all users including the requirements of transit operations and customers, and the terminals impacts to the adjacent road network and adjacent developments needs to be considered

Appendix A shows the bus stop evaluation used to ensure new and current Transit Windsor bus stops adhere to these planning and design guidelines.

3.1 Curb-side Considerations

The curb-side area around a bus stop needs to be properly designed in order to ensure that bus movements can be as smooth and efficient as possible. Figure 27 shows examples of bus stop design elements, specific considerations are as follows:

- For an in-lane bus stop, the curb lane should be regularly maintained to ensure no potholes are present and gutter and drains should be flush with the road surface
- In an urban location, the curb should have a minimum height of 150mm
- Adequate overhead clearance should be provided
- Bus stop length, including pull-in and pull-out zones, should be clearly delineated
- The door openings of the bus should be as far away as possible from drainage grates and utility covers

Figure 27 Examples of Bus Stop Design Elements

3.2 Types of Bus Stops

Bus stops can be either in-lane (on the curb travel lane or as a bus bulge) or a pull-out stop (bus bay or out of the lane of travel). The considerations associated with each bus stop type are described below.

3.2.1 Bus Stop on the Curb Travel Lane

The most typical bus stop layout is to provide the stop on the curb of the travel lane of a roadway, an example is shown in Figure 28. This type is considered when:

- Roadway is multi-lane or the travel lane has adequate width for approaching vehicles to bypass a stopped bus

It is critical for a bus stop zone to be at a minimum 6 m (20 ft) clear of the crosswalk or curb return whether near or far-side. The stop length must equal the length of the bus, and curbside boarding area should include both the front and rear doors.

Advantages of this type include:

- Less cost of implementation compared to the bus bulge and bus bay options
- Bus is able to re-enter traffic more easily

Disadvantages of this type may include:

- Increased risk of collisions associated with vehicles making lane changes to avoid a stopped bus
- Depending on the stop configuration (far-side, near-side or midblock), there is potential to reduce visibility of traffic controls and the supply of on-street parking spaces and/or loading areas may be affected
- Where transit is not provided with a dedicated lane making stops may cause traffic following the transit vehicle to queue behind it

Figure 28 Example of a Bus Stop in the Curb Lane

3.2.2 Boarding Bulb Stop (Bus Bulges)

Boarding bulb stops use curb extensions that align the transit stop with the parking lane, creating an in-lane stop. Figure 29 shows an example and Figure 30 shows a diagram of a bus bulge configuration and Table 3 provides dimensions. Boarding bulbs can be installed at near-side, far-side and mid-block stops, at both signalized and unsignalized locations. Figure 31 details some specifics about boarding bulbs.

Boarding bulbs are considered when:

- It is desirable to provide high visibility for transit along a corridor
- On-street parking is provided along a corridor
- Use where transit passenger volumes require a larger dedicated waiting area than is available on the sidewalk

Advantages of this type include:

- Relatively smooth transition associated with buses pulling-in and pulling-out of the stop, resulting in better passenger comfort
- Boarding bulb stops can become a focal point for improved public space along the street, creating space for waiting passengers, furnishings, bike parking, and other pedestrian amenities and community facilities without encroaching on the pedestrian through zone
- Boarding bulbs improve speed and reliability, decreasing the amount of time lost when merging in and out of traffic
- When placed at intersections, boarding bulb stops also act as curb extensions to shorten pedestrian crossings
- In-lane stops can reduce bus and pavement wear and tear reducing maintenance costs
- If the bus pull-out area is frequently blocked by vehicles stopped illegally at a bus stop, a boarding bulb will eliminate the problem

Disadvantages of this type may include:

- Increased risk of collisions associated with vehicles making lane changes to avoid a stopped bus
- Increased risk of pedestrians crossing at midblock locations, if there is limited guidance that lead passengers from the boarding bulb area to the desired crossing location (for example, a nearby intersection or marked crosswalk

Figure 29 Example of a Boarding Bulb

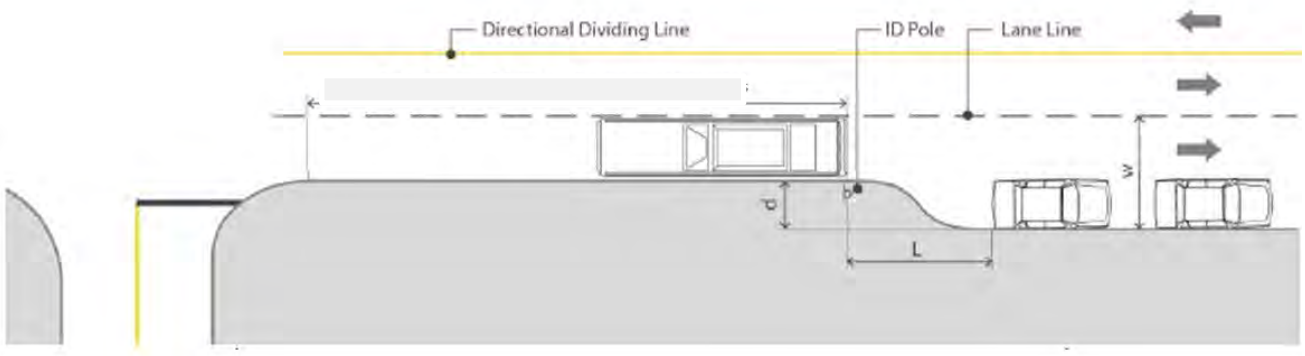


Figure 30 Boarding Bulb Configuration

Table 3 Boarding Bulb Dimension

Width of Curb Lane w (m/ft)	Depth of Boarding Bulb d (m/ft)	Distance between ID Pole and End of Parked Vehicle L (m/ft)
5.6 / 18	1.9 / 6	5 / 16
	2.3 / 7.5	7 / 23
5.7 / 19	1 / 3	5 / 16
	1.9 / 6	7 / 23

1) *At stops adjacent to crosswalks, provide at least 6 m (20 ft) of clear sidewalk space, ahead of transit vehicle at near-side stops and behind the transit vehicle at far-side stops*
2) *If shelters are placed on boarding bulbs, they must be placed clear of front- and back-door boarding areas*
3) *Include green features like bio swales or planters to improve streetscape and storm water recapture*

Figure 31 Diagram of a Boarding Bulb Bus Stop

3.2.2.1 Tiered Boarding Bulb Bus Stop

1) Where local and rapid/limited service serve the same corridor or route, rapid stops may provide a combined pull-out/in-lane stop—where rapid service stops in-lane, local buses pull-out. *shape of the curb*

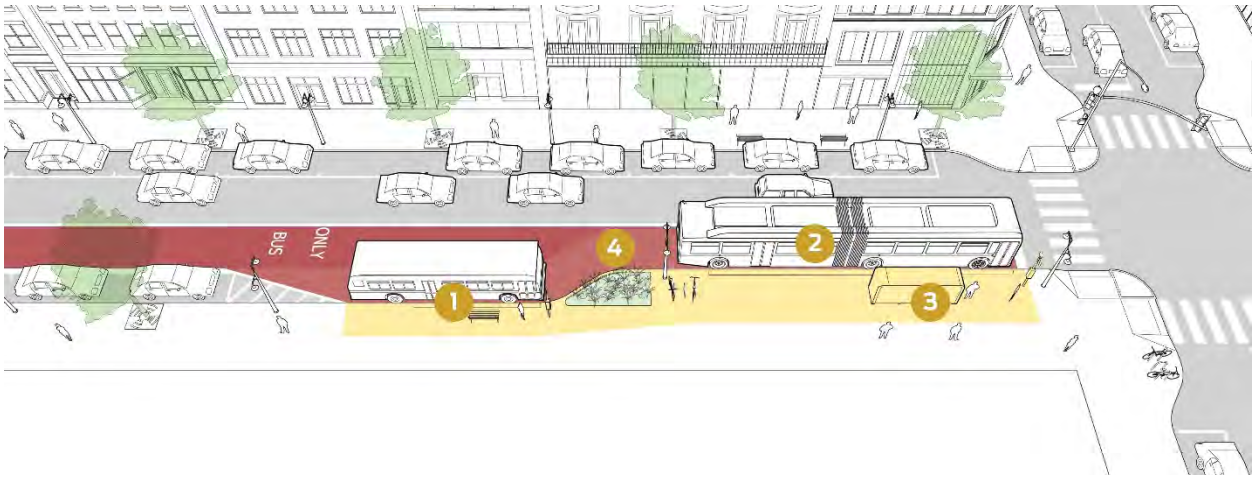


Figure 32 shows this.

2) *Pull-out stop is located before the bulb stop and serves the local service. Each stop should include its own "pole and sign," as well as legible rider and route information. Distinguishing between local and rapid service stop locations is critical for trip planning*
3) *Rapid/limited bus service is accommodated by the boarding bulb. Regardless of arrival order, rapid buses are able to jump local buses in the queue and allow transfer between services. Curb radii at the back of the bulb must be great enough to accommodate the local bus's transition back into the travel lane*
4) *Stop amenities (e.g. shelters, seating, wayfinding, and trash bins) can be placed on the bulb to preserve capacity and throughput of the sidewalk. For rapid service, stop shelter and amenities should be more robustly designed, including expanded capacity and seating, maps and real-time arrival information, and wayfinding*
5) *Concrete bus pads are "S" shaped and continuous through the stop, conforming to the shape of the curb*

Figure 32 Example of a Tiered Boarding Bulb Bus Stop

3.2.3 Curbside Pull-Out Bus Stop

Curbside pull-out bus stops are a pull-over zone, adjacent to the main travel lanes, where buses can stop and pick up passengers without interfering with the regular flow of traffic. The pull-in and pull-out taper ratio requirements for these stops should accommodate those shown in Table 4.

Curbside pull-out bus stops are a low-cost option for bus stops on streets with curbside parking. While bus transition time is longer than for in-lane designs, it is relatively easy to make these stops accessible, provided sidewalks are sufficiently wide.

Curbside pull-out bus stops are considered when:

- The roadway has high traffic volumes
- Where the roadway is a high speed facility, defined as having posted or prevailing speed of 70 kilometres per hour or higher, bus bays should be provided
- The roadway has a single travel lane in each direction where passing sight distance is not available for vehicles approaching a stopped bus
- The bus is scheduled to layover at the stop for an extended period of time
- Bus service frequency is high such that buses occupying the curb lane would impede traffic flow or increase the risks of rear-end and sideswipe collisions associated with approaching vehicles trying to bypass the bus

Advantages of this type include:

- Clear definition of the bus stop zone
- Traffic flow on the mainline is better maintained compared to the curb lane bus stop or boarding bulb options

Disadvantages of this type may include:

- Property and other right-of-way acquisition may be needed
- Reduced bus efficiency as buses are required to pull-off the roadway and re-enter the adjacent travel lane
- When curbside stops are partially blocked by illegal loading or parking, transit vehicles may have insufficient space to transition increasing the likelihood that passengers will be forced to board from street level and that the through-traffic lane will be blocked
- Even when provided with entry and exit tapers, buses may not be able to pull close to curb, making boarding more difficult

Table 4 Pull Out Stop Taper Ratios

Roadway Posted Speed	Pull-in Taper	Pull-out Taper
<=50 km/h	1:6	1:3:3
>=60 km/h	1:8:3	1:8:3

3.2.3.1 Far-Side, Pull-Out Bus Stop

Far-side, pull-out stops are appropriate at intersections with high traffic volumes, where traffic is heavier on the near side, complex intersections with multi-phase signals, or where traffic conditions may cause delays by locating near-side. Figure 33 shows a diagram for a far-side, pull-out bus stop while Figure 34 is an example of this stop type in Windsor. Figure 35 details how a far-side, pull-out bus stop can work with a bike lane.

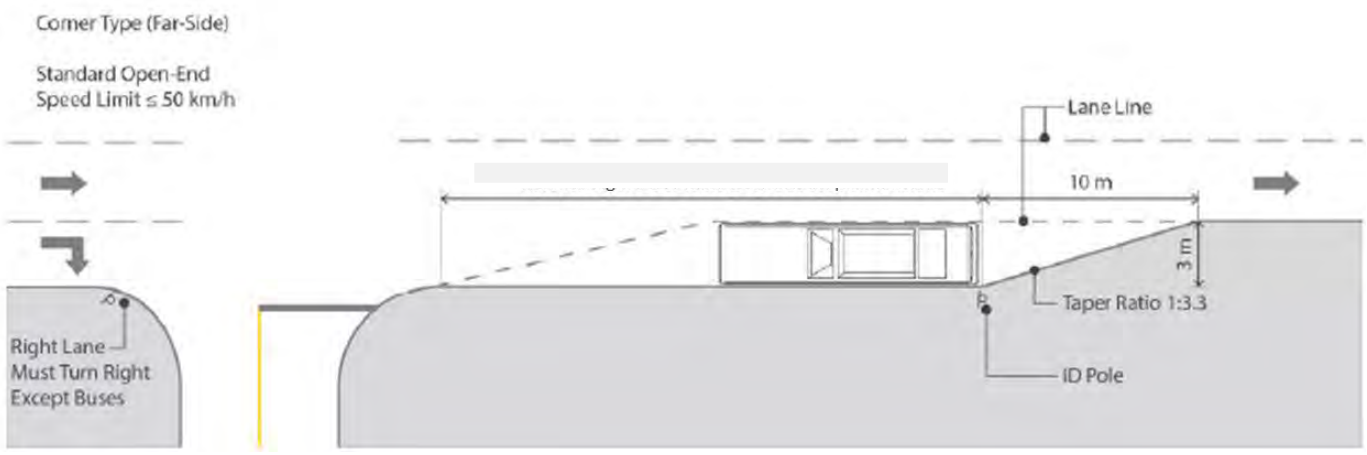
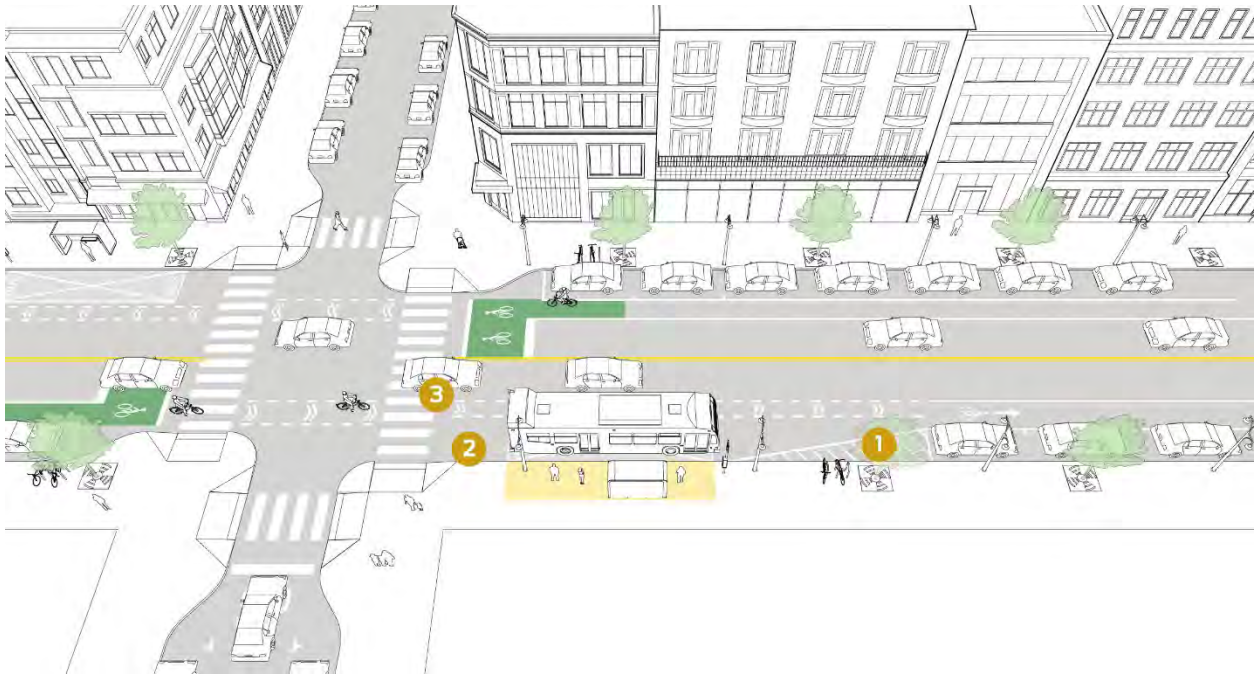


Figure 33 Far-Side Pull-Out Bus Stop Configuration

Figure 34 Example of a Far-Side, Pull-Out Bus Stop



1) *Exit taper is typically 7-9 m (23-29.5 ft). Enforcement should ensure stop areas remain unblocked by parking or loading vehicles*
2) *Platform length includes length of the bus plus 6 m (20 ft) of clearance from back of vehicle to crosswalk*
3) *Use conflict-zone markings to position bicyclists to the left of the bus zone. Mark the bike lane to the left of the bus stop; place the seam of the concrete bus pad to either side of the bike zone, as seams and cracks pose a hazard to bike wheels. The bike zone should be at minimum 1 m (3 ft) wide*

Figure 35 Typical Far-Side, Pull-Out Bus Stop with Bike Lane

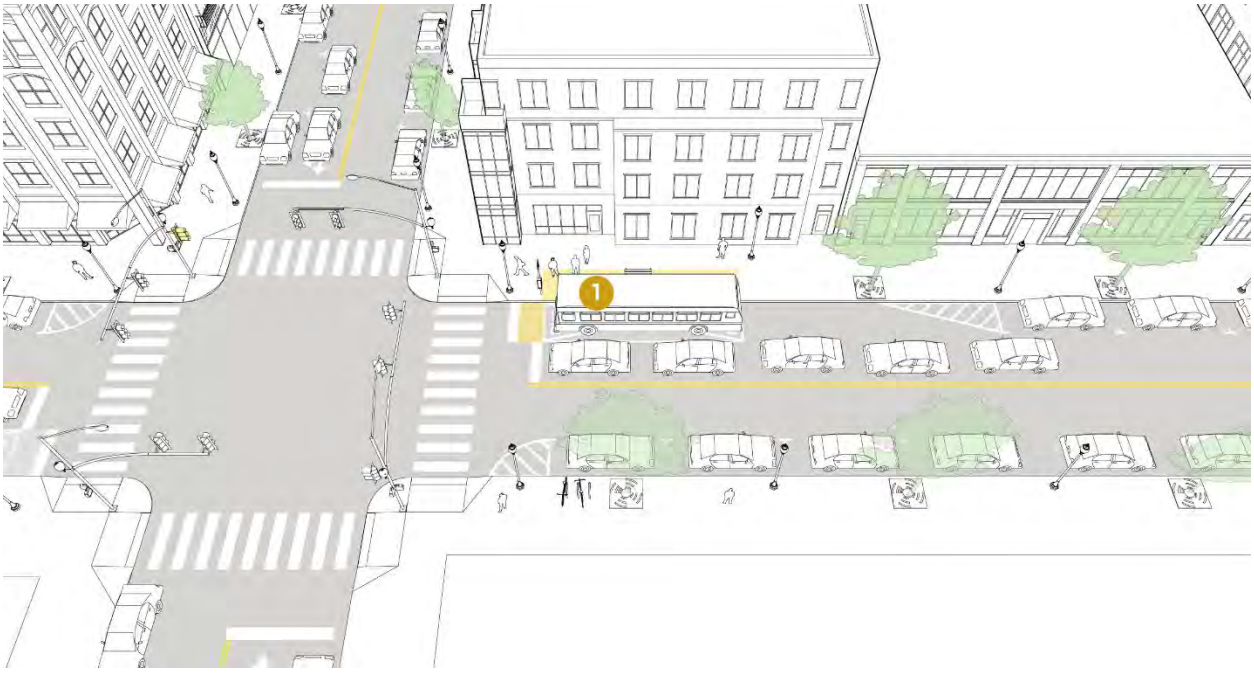
3.2.3.2 Near-Side Pull-Out Bus Stop

The near-side, pull-out bus stop configuration is applicable where a neighborhood street crosses a larger street that may or may not be stop-controlled. If two similarly sized streets intersect with moderate to high traffic volumes, traffic signals with low-speed progressions may confer greater benefit to users.

In stop-controlled configurations, the bus may pull into a near-side stop, allowing traffic behind to pull forward to the stop line and proceed while the bus is dwelling. When the bus completes boarding it pulls forward and proceeds.

Where a small neighborhood street intersects a larger corridor or destination street and high transfer volume between intersecting routes is expected, the near-side stop can be paired with an adjacent far-side stop on the cross-street, facilitating easy and safe transfer.

Locate the bus stop at least 6 m (20 ft) from the crosswalk to ensure pedestrians and drivers have adequate sightlines. Figure 36 is a diagram for a typical near-side pull-out bus stop and Figure 37 shows the typical configuration of this type of stop.



1) *At signal-controlled locations, the near-side pull-out stop may be implemented as a queue jump—the bus pulls into the stop, completes boarding's, and then receives an advance or extended green phase through the intersection, while general traffic is held*

Figure 36 Typical Near-Side, Pull-Out Bus Stop

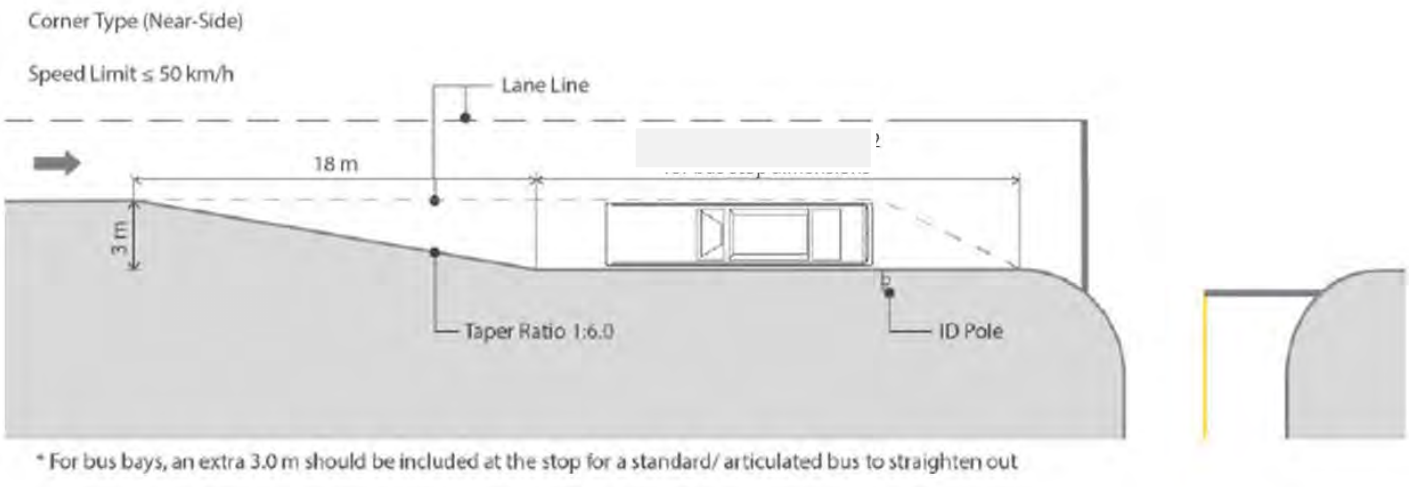


Figure 37 Near-Side, Pull-Out Stop Bus Configuration

3.2.3.3 Full Bus Bays

Surface-water drainage will require special attention in a bus bay. To reduce the risk of customers at a stop being splashed in wet weather, it is preferable that the cross fall of a bus bay be outward from the curb towards the travel lanes, or the catch basins, if any, be installed away from the bus stop.

Figure 38 shows an example of a bus bay with a heavy turn volume while Figure 39-44 show various bus bay configurations.

Figure 38 Example of a Full Bus Bay with Heavy Right Turn Volume

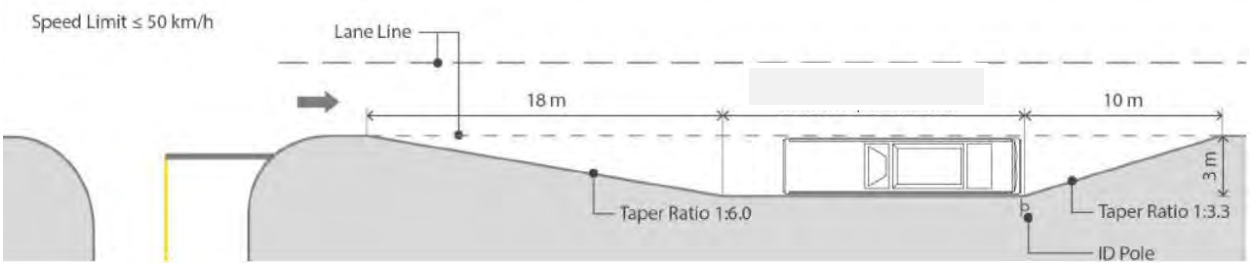


Figure 39 Full Bus Bay Diagram with Heavy Right Turn Volume

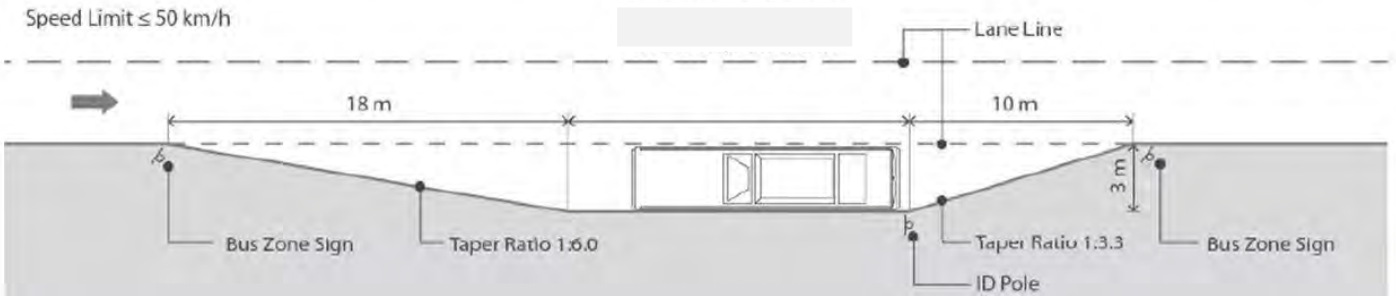
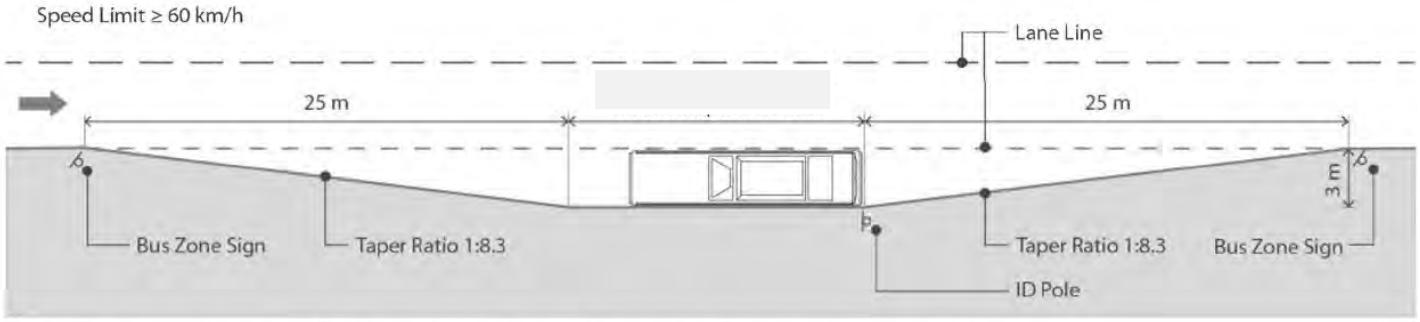


Figure 40 Mid-Block Bus Bay Diagram with Speed Less than or Equal to 50km/h



* For bus bays, an extra 3.0 m should be included at the stop for a standard/ articulated bus to straighten out

Figure 41 Mid-Block Bus Bay Diagram from Speed Greater than or Equal to 60 km/h

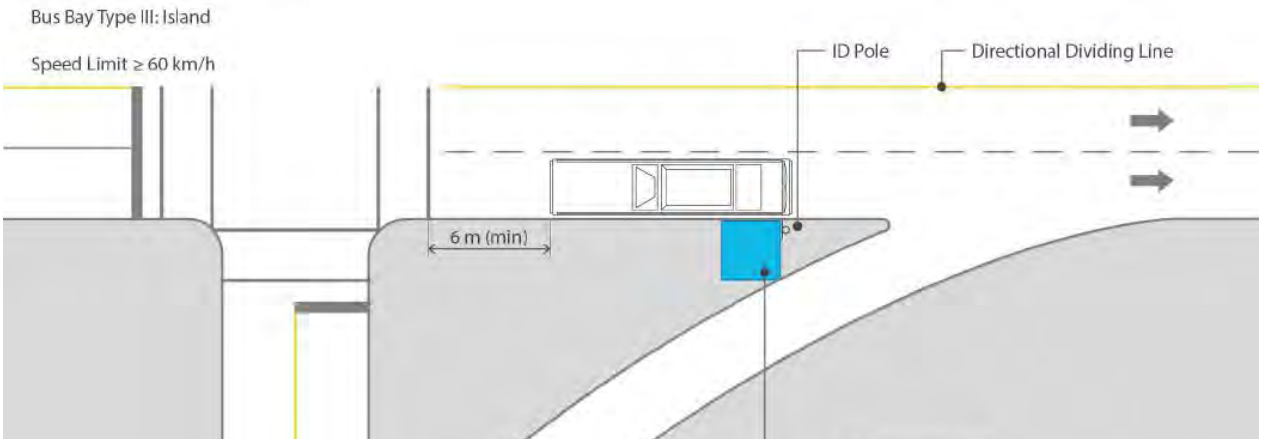


Figure 42 Island Bus Bay Diagram

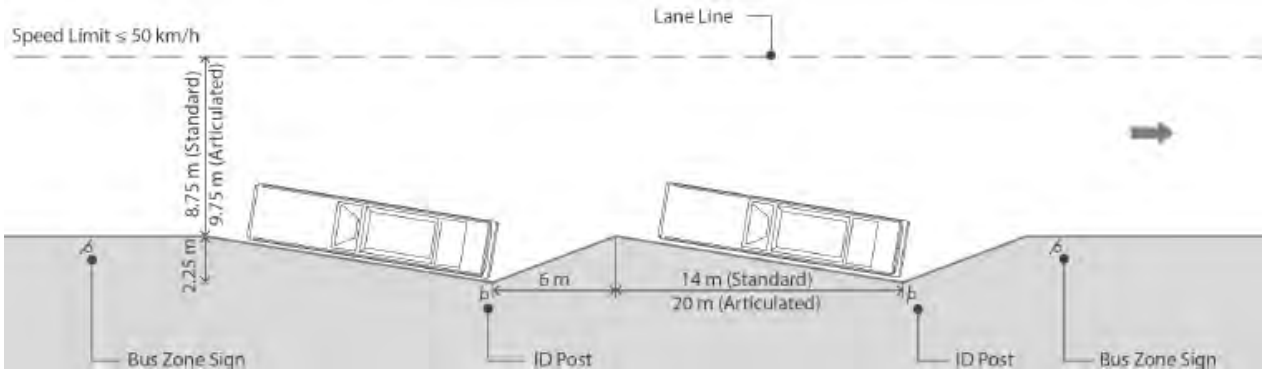


Figure 43 Sawtooth Bus Bay Diagram

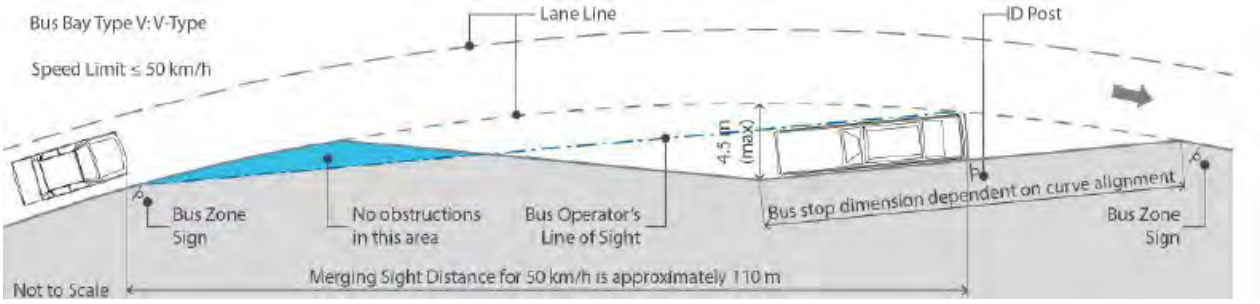


Figure 44 V-Type Bus Bay Diagram

3.3 Bus Concrete Pads

A bus concrete pad is a reinforced concrete slab installed in the pavement of the travel lane at the bus stop, loading/unloading bays at transfer points, and bus layover locations to improve resistance to rutting and petroleum deterioration, thus reducing pavement maintenance costs. Bus concrete pads should be provided at all bus bays to reduce long-term maintenance costs. The width of the pad should be a minimum of 3 m (10 ft), and the length should be long enough to cover the rear wheel of the last bus stopping at the stop. The required length would depend on the number and types of buses stopping at the stop, as well as the operating scenario (e.g. “first-in, first-out”, “first-in, independent-departure”, “independent-arrival, independent-departure”).

Typical bus pad lengths, as determined by the distance from the front bumper to the rear wheel of a bus, are as follows:

- Standard Bus = 10 m (33 ft)
- Articulated Bus = 16 m (52.5 ft)

Full concrete pad coverage should be considered in exchanges with high bus volumes and/or tight turnaround spaces in order to minimize service disruption during the repaving and rehabilitation activities typically required for facilities featuring conventional asphalt pavement. Figure 45 shows an example of an on-street bus bay with red concrete.

Figure 45 Example of an On-Street Bus Bay with Red Concrete

3.4 Multi-Position Bus Stops

For stops serviced by high frequency routes or more than one bus route, two or more buses may arrive at the same time, requiring a multi-position stop layout.

For tandem bus stop operations with a “first-in, first-out” arrangement, the required length for a multi-position stop should be based on the recommended bus stop dimensions as shown in Figure 46 plus extra length to accommodate the second bus (or as many as required) with suitable spacing between two consecutive stop positions. A minimum of 3 m (10 ft) spacing is typically the required clearance for a deployed bicycle rack on the front of the second bus. For tandem bus stop operations with a “first-in, independent-departure” arrangement, longer spacing would be required for independent departure of the buses, as shown in Figure 47. If independent operations (i.e. “independent arrival, independent departure”) are required, Figure 48 illustrates the recommended bus stop dimensions between two consecutive stop positions.

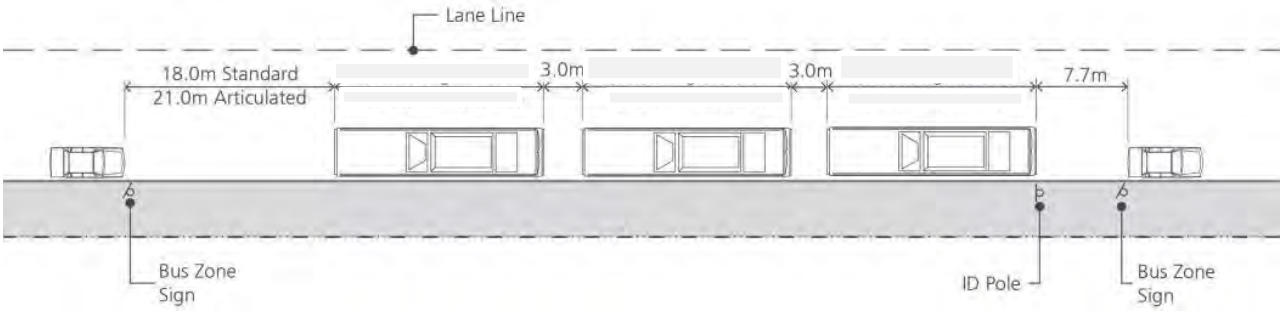


Figure 46 First-In, First-Out Bus Stop Configuration

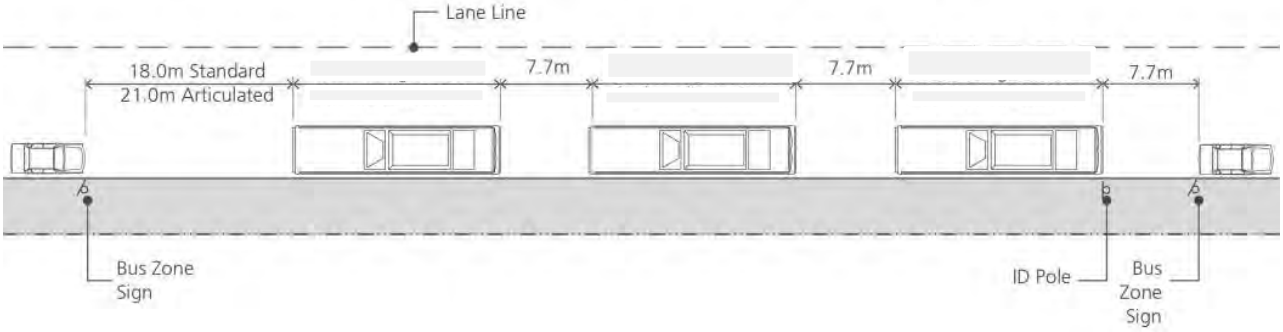


Figure 47 First-In, Independent-Departure Bus Stop Configuration

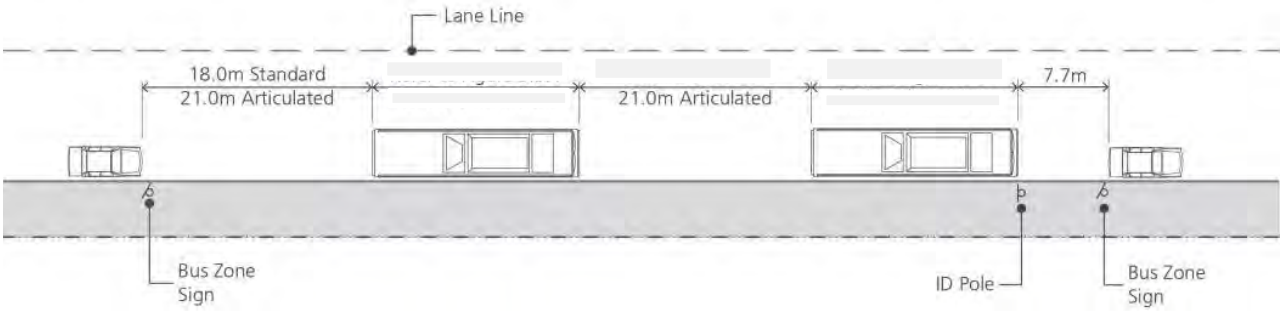


Figure 48 Independent-Arrival, Independent-Departure Bus Stop Configuration

3.5 Bike Lanes

Typically, bike lanes are provided on the right-hand side of the pavement adjacent to the curb or separated from the curb by a parking lane, a bus bay, or a turning lane. Key considerations of this arrangement are:

- A minimum 3 m (10 ft) wide bus stop next to a bike lane is desirable so that a stopped bus does not impact the bike lane
- A bus stop in a bus bay adjacent to a bike lane requires longer pull-in and pull-out distances than a bus bay adjacent to a vehicle travel lane due to the additional bike-lane width that a bus needs to cross to enter or exit the bus stop

Various bus stop configurations with bike lanes are shown in the following sub-sections.

3.5.1 Side Boarding Island Bus Stop

At a location where separated bike path (one-way or two-way) is provided between the travel lane and the sidewalk and where sufficient right of way is available, an “island bus stop” with the separated bike lane between the sidewalk and the bus stop could be considered.

Side boarding islands, like boarding bulbs, are dedicated waiting and boarding areas for passengers that streamline transit service and improve accessibility by enabling in-lane stops. Side boarding islands are separated from the sidewalk by a bike channel, eliminating conflicts between transit vehicles and bikes at stops. Boarding islands allow the creation of accessible in-lane stops with near-level or level boarding as shown in Figure 49.

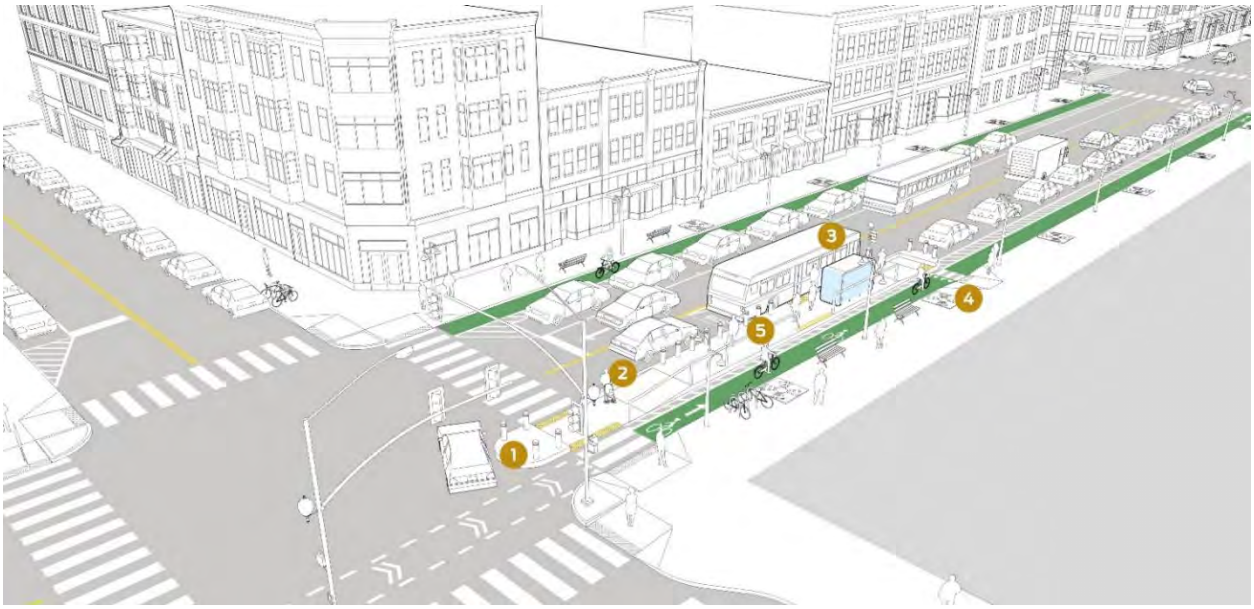
Figure 49 Side-Boarding Island Bus Stop Example

Streets with moderate to high transit frequency, transit ridership, pedestrian volume or bicycling volume can utilize boarding islands to maintain in-lane stops and provide separation to more users. If bicycle facilities exist or are planned, island stops maintain continuity of the bike lanes.

Boarding islands eliminate bus-bike “leapfrogging” conflict at stops, in which buses merge across the bicycle travel path at stops, causing bicycles to merge into general traffic to pass the stopped bus, only to be passed again as the bus accelerates. At boarding islands, both buses and bicycles can move straight at the stop, in their own dedicated space. See Figure 50 for an in-depth look at side-boarding.

Islands provide more space for transit passengers and amenities while maintaining a clear pedestrian path on the sidewalk. Operators are able to deploy ramps, as needed, onto the island without disrupting pedestrian flow. Boarding islands usually require less complex drainage modifications than boarding bulbs.

At high-volume stops, it may be necessary to require people on bikes to yield to people accessing the island directly from the sidewalk. Markings, color, and signage must reinforce appropriate yield behavior.



1) *Use reflective signage or other visible raised element on the leading (back left) corner of the island*
2) *An accessible ramp should be placed at the intersection end of the island entering the crosswalk. If there is no crosswalk at the intersection, install one, with a refuge island tip to protect pedestrians (at least 1.8 m (6 ft) wide)*
3) *Boarding island stops should include shelters, seating, wayfinding, and passenger information when feasible*
4) *Shelters should be located at least 3 m (10 ft) from crosswalks over the bike lane to allow visibility between people on bicycles and people exiting the island. Leaning rails may be located along this gap*
5) *Install leaning rails along the edge of the island along the bike channel on portions of the island without a shelter or accessible boarding area. If leaning rails or fence are installed along the accessible boarding area, the total island width usually must be increased to 2.7 m (9 ft). Boarding islands can be extended to include bike parking, additional seating, parklets, or other community facilities*

Figure 50 Typical Side-Boarding Island Bus Stop

Boarding islands must be designed to permit accessible boarding. An accessible boarding area, typically 2.4 m (8 ft) wide by 1.5 m (5 ft) long, must be provided to permit boarding maneuvers by a person using a wheelchair, see Figure 51.

Where the bike lane or cycle track requires cyclists to yield at a crosswalk from the sidewalk onto the island, the “BIKES YIELD TO PEDESTRIANS” sign and yield triangle markings must be installed.

Platform access ramp may have a maximum slope of 1:12 at a crosswalk or other crossing point, at the sidewalk and onto the platform. Detectable warning strips must be placed on both sides of every crossing over the bike lane.

For mid-block stops, include raised crosswalks across bike channel to encourage people on bikes to yield to people accessing the island. A “YIELD” stencil marking may be marked in the bike channel prior to the crosswalk to reinforce the requirement to yield.

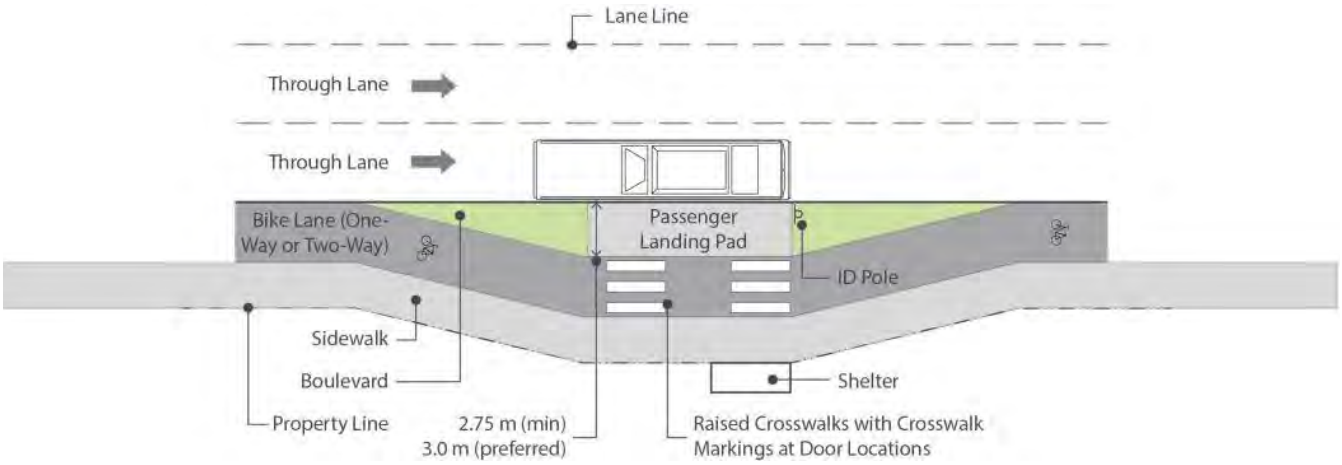
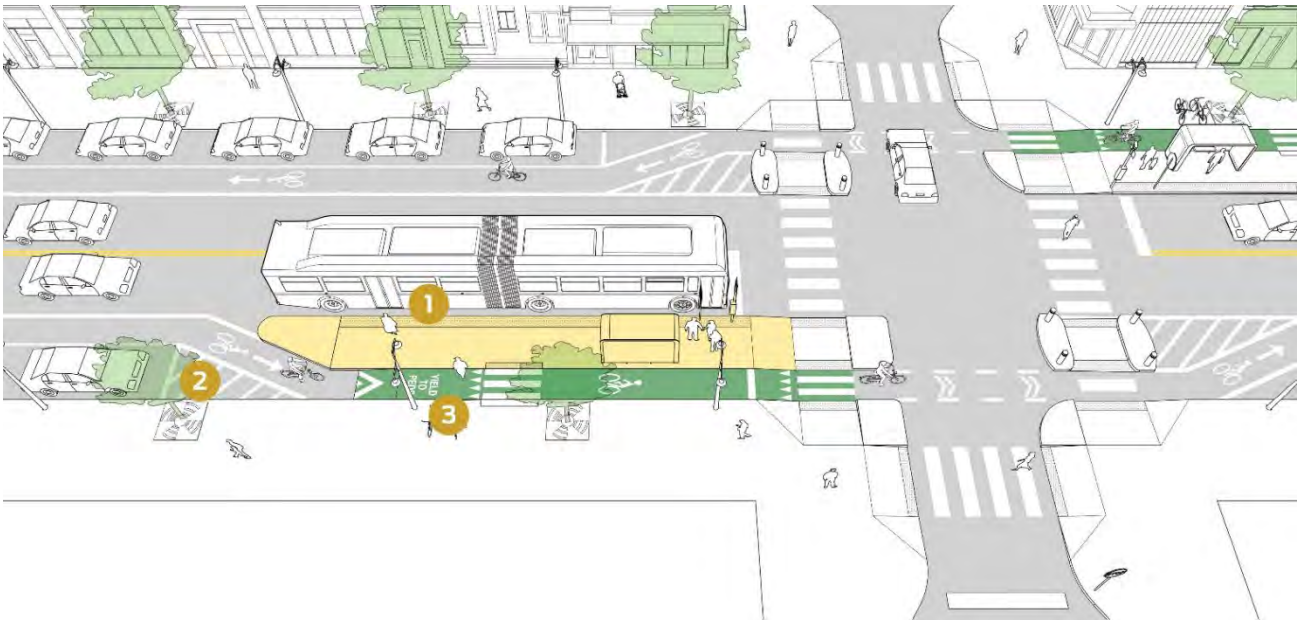


Figure 51 Side-Boarding Island Bus Stop Configuration

3.5.1.1 Near-Side, Side-Boarding Island Bus Stop

The near-side, side-boarding island bus stop is placed on the near-side of an intersection and is separated from the curb by a bicycle lane. This bus stop configuration provides a safe environment for bicycle and transit users by locating the bicycle lane behind the bus boarding island and utilizing crosswalks for safe crossing. This design has the potential for conflict between vehicular traffic and bicycle users by offering on-street parking between the curb and the bicycle lane. The vehicle user has to cross the bike lane to utilize the on-street parking. Refer to Figure 52 for an example of this configuration.



1) *The boarding platform must at minimum span from the front door to the rear door, and may be extended to meet capacity demands*
2) *The bicycle lane behind the floating boarding island can be at street grade or may be raised. Where the bike lane changes grade, bicycle ramps should not exceed a 1:8 slope. If raised, delineate bike and pedestrian realms using colored paint or paving materials*
3) *Mark pedestrian crossings through bike lane. Yield teeth and other markings and signs such as "YIELD" stencils and "BIKES YIELD TO PEDESTRIANS" signs inform bicyclists of the requirement to yield to pedestrians*

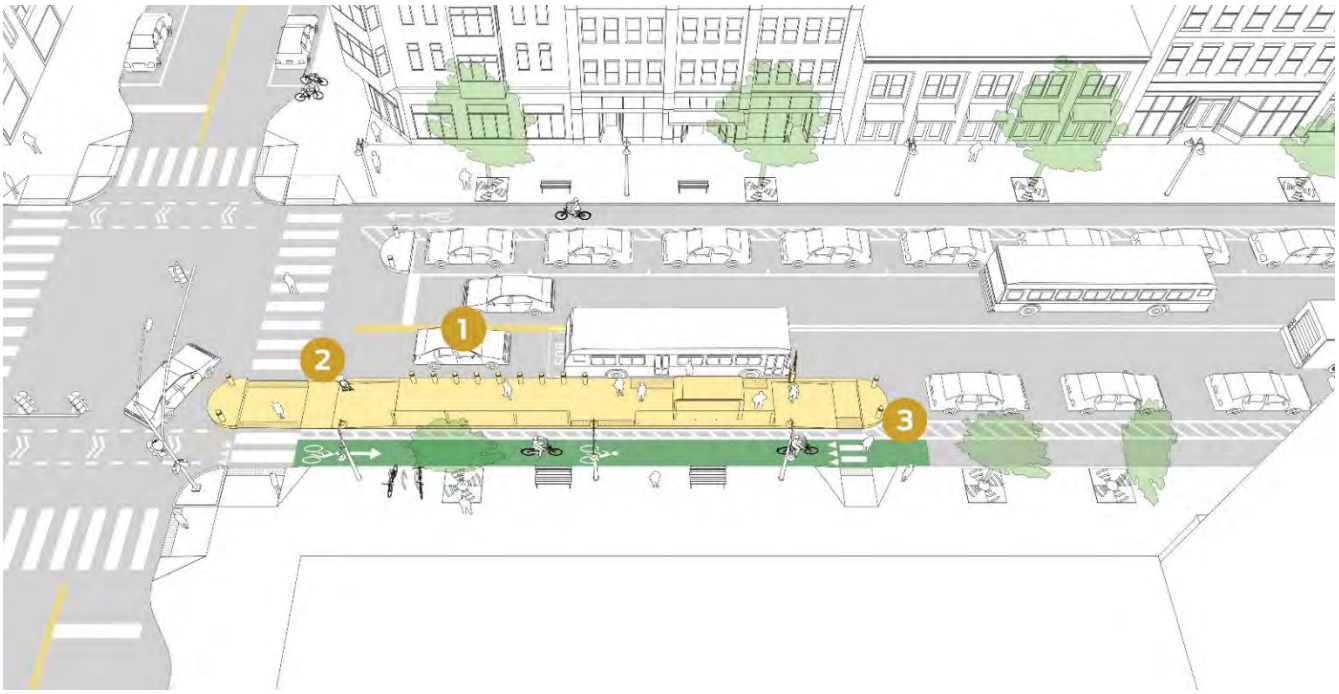
Figure 52 Typical Near-Side Bus Stop with Bike Lane Boarding Island

Bike lanes may be narrowed to slow bicycle traffic and reduce conflicts, with a minimum 1.5 m (5 ft) width.

Where a near-side island is combined with a right-turn restriction, extend the refuge island into the intersection and reduce the curb radius to self-enforce the turn restriction and provide additional pedestrian space. Continuing the bike lane in a protected configuration through the intersection simplifies interactions with pedestrians and provides right-turning vehicles with a place to wait as they approach the conflict zone.

3.5.1.2 Far-Side, Side-Boarding Island Bus Stop

The far-side, side-boarding island bus stop is placed on the far-side of an intersection and is separated from the curb by a bicycle lane. This bus stop configuration provides a safe environment for bicycle and transit users by locating the bicycle lane behind the bus boarding island and utilizing crosswalks for safe crossing. This design also minimizes conflict between vehicular traffic and bicycle users by offering on-street parking in line with the boarding island, between the bicycle lane and the lane of travel. Refer to Figure 53 for an example of this configuration.



1) *If high turn volumes are present, include a rear storage area so cars are less likely to queue into the intersection while the bus dwells. More storage space may be necessary on streets with only one lane per direction*
2) *Accessible ramps should be paired with crosswalks to direct users to safe crossings. If the bike channel stays at street grade, ensure that ramps, landings, and detectable warnings are provided whenever pedestrians cross into another "modal zone" (i.e. bikeway or travel lane)*
3) *At high passenger volumes, channelize pedestrian movements on and off the platform to reduce conflicts*

Figure 53 Typical Far-Side Bus Stop with Bike Lane Boarding Island

If a lean bar or railing is installed continuously along the back of the platform, the island must be at least 2.7 m (9 ft) wide to accommodate the 2.4 m (8 ft) deep accessible landing. If the accessible landing opens directly to an accessible crossing (either flush or raised), the island may be 2.4 m (8 ft) wide.

A crossing over the bike channel may be raised to provide a flush path to the sidewalk. Install yield teeth and "YIELD TO PEDESTRIANS" signs. Bicycle ramps should not exceed a 1:8 slope.

3.5.2 Bus Stops Adjacent to Bike Lanes

Subject to site-specific and right-of-way availability conditions, the following bus stop arrangements next to a bike lane might also be considered:

At a location where the available right-of-way is not sufficient to provide a 3 m (10 ft) wide bus stop next to a bike lane, the stopped bus may partially encroach on the bike lane at the stop. In this situation, the cyclist must either be able to pass the stopped bus safely or be able to make other decisions such as stopping behind the bus or making a deliberate lane change safely. Preferably, a minimum combined width of 4.3 m (14 ft) should be provided for the bus stop and bike lane to provide sufficient clearance for a cyclist to pass a stopped bus safely without the need to enter the adjacent travel lane. If a 4.3 m (14 ft) combined width for the bus stop and bike lane cannot be achieved, a sign advising cyclists to look before passing the bus should be considered. Figure 54-56 display bus stops with bike lanes.

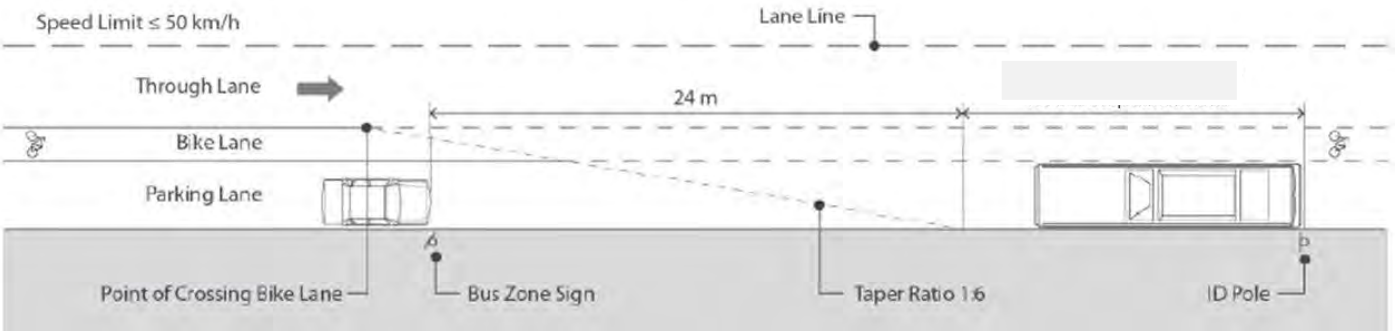


Figure 54 Bus Stop in Parking Lane Configuration

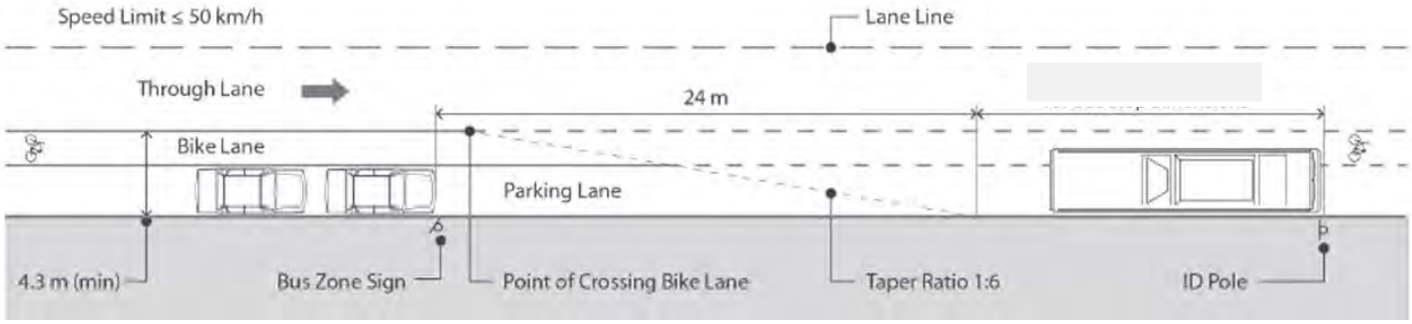


Figure 55 Bus Stop on Narrow Parking Lane Configuration

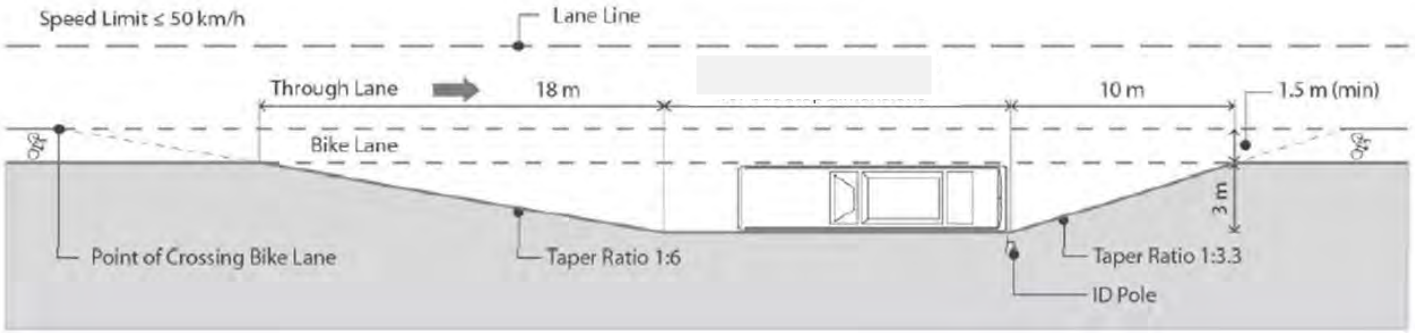


Figure 56 Bus Stop in Bike Lane with Bus Bay Configuration

3.5.3 Shared Cycle Track Bus Stop

Shared cycle track bus stops are an important retrofit option for constrained transit streets with in-lane stops if a boarding island configuration does not fit in either the street or the sidewalk. In shared cycle track stops, a bike lane or protected bike lane rises and runs along the boarding area, along the extended curb, rather than wrapping behind the boarding area, as shown in Figure 57. Bicyclists can ride through the boarding area when no transit vehicles are present, but must yield the space to boarding and alighting passengers when a bus or streetcar stops.

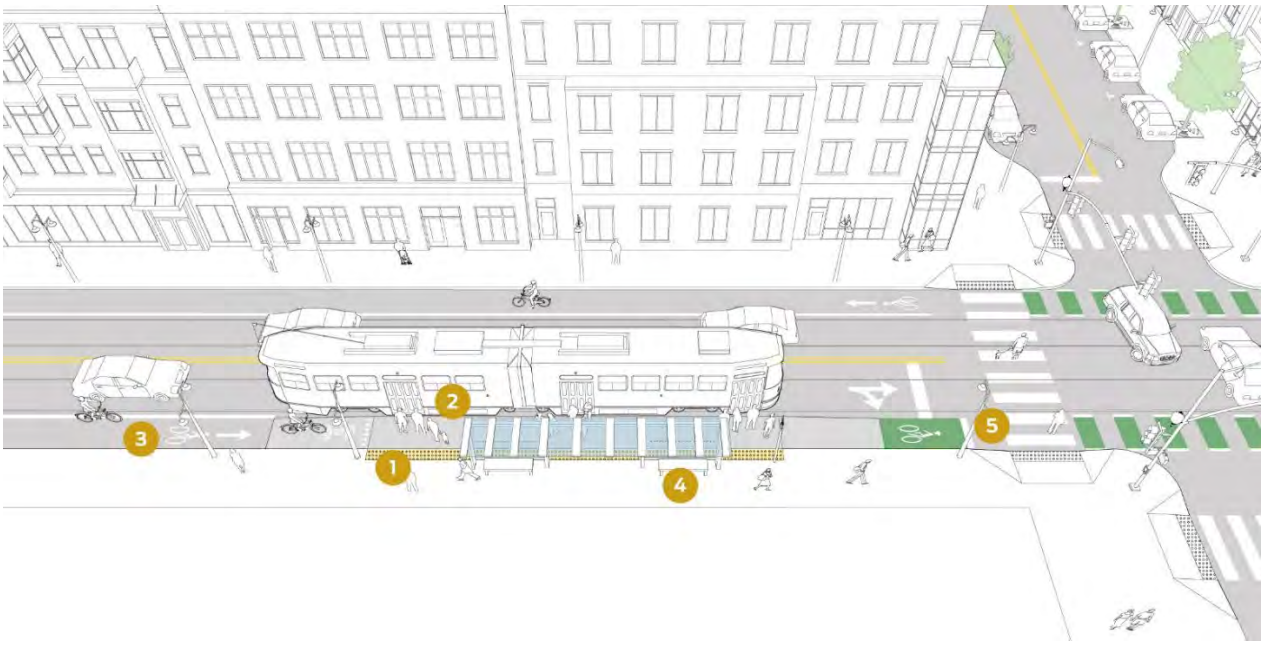
Figure 57 Example of a Shared Cycle Track Bus Stop

Generally occurs in a curbside condition; if street parking exists in the cross section space may be available for a boarding island or bulb. Bicycle lanes ramp up to platform height before the stop, and then ramp down after. Bicyclists should be at street grade at intersections.

Benefits:

- Provides more space for transit passengers and amenities while maintaining a clear pedestrian path on the sidewalk
- Space within bike lane can be used to partially satisfy accessible boarding zone requirements.
- Can facilitate level or near-level boarding

Measures must be taken to ensure bicyclists yield to boarding and alighting transit passengers; compliance is critical to providing safe and comfortable conditions, Figure 58 goes into more detail about this.



1) *Place detectable warning strips along the edge of the sidewalk where passengers step into the shared raised boarding area, and along the boarding area curb where passengers board the transit vehicle. Use shark's teeth yield markings near the top of the bicycle ramp leading to the platform*
2) *The whole width of shared cycle track area can be used as the accessible boarding area for wheelchair lifts. However, wheelchair users must have a waiting area provided that is accessible to allow maneuvers to the space, and must be located outside of conflict areas*
3) *Ensure cycle track is wide enough for compatibility with maintenance equipment (sweepers or plows)*
4) *Where transit shelter is closer than 1 m (3 ft) to bike lane, it should open to the building side to maintain accessible paths and to avoid pedestrian conflicts with passing bicycles*
5) *Ensure bicyclists are well positioned in view of turning traffic. Terminate the boarding platform at least 3 m (10 ft) from the crosswalk to allow bicyclists to queue in front of transit vehicles*

Figure 58 Typical Shared Cycle Track Bus Stop

Considerations:

- Slope of bicycle ramp shall not exceed 1:8
- Shared boarding locations require comprehensive multi-sense information to guide visually disabled passengers. Provide audible announcements that a transit vehicle is arriving, including the route name if multiple routes are present
- Curbside activities that will conflict with bike movements and visibility (such as lay-bys or parking bays) must be prohibited at minimum 6 m (20 ft) from either direction of the bike ramps

3.6 Terminals

At terminals, customers transfer between other modes of transportation and transit or between transit services. Terminals are broadly defined as customer facilities that serve multiple bus routes and provide layover space for buses. Terminals are generally located at activity centers along the route and at the end of bus routes.

In general, terminals have the following basic functions:

- Customer access from non-transit modes, including walking, cycling, park and ride and passenger pick-up/drop-off (kiss and ride)
- Transit information and wayfinding for customers
- Layover spots for bus routes
- Interlining among bus routes
- Operations supervisors and/or service vehicle parking
- Operators' crew room and washrooms

Terminals need to consider the requirements of transit operations and customers, and the terminals impacts to the adjacent road network and adjacent developments. The ultimate design of the terminal should optimize the needs of all users. Terminals should be built to meet the design horizon year, as those that are over or under built will be expensive to retrofit.

The following are some design considerations for terminals:

- Transit operation
    - Vehicle types (standard or articulated bus)
    - Number of bus bay and layover requirements
    - Nature of bus routes (e.g., terminating routes or flow through routes)
    - Bus bay function (e.g., first-in/first-out, independent departure and independent arrival and departure)
    - Bus operating plan (e.g., location and operating procedure for drop-off/layover/pick-up)
    - Bus circulation (eg., access to and from adjacent road network and internal circulation within terminal)
    - Height and ventilation requirements for covered facilities
    - Lighting requirements for terminal access, drive aisles, bus bays, pedestrian crossings and layover area
    - Telecommunications requirements (radio and cellular)
    - Concrete bus pads for bus bays and layover
    - Safe and efficient transit operation (e.g., location of pedestrian crossings within transit exchange, and travel distance between drop-off/layover/pick-up)
    - Location of bus operator washroom and crew room
    - Transit supervisor and service vehicles parking
    - Environmental requirements (i.e. oil-water separator)

- Passenger Space
    - Area for customer queuing, boarding and alighting, and transferring (e.g., passenger circulation)
    - Covered customer waiting area (e.g., shelter) for weather protection at queuing areas
    - Space for customer amenities (e.g., benches, bike parking, lighting, garbage bins, wayfinding maps)
    - Accessibility requirements (e.g., wheelchair landing pad, accessible routes and grades)
- Passenger Access
    - Number and location of pedestrians and cyclists crossings within, and to and from the terminal
    - Safe pedestrians and cyclists crossings within, and to and from terminal (e.g., sightline, lighting, pavement marking and signage)
    - Provision for bike storage (e.g., bike racks, lockers and secure bike parking)

3.6.1 Terminal Types

The selection of a terminal type would generally depend on land availability, operating plan, bus bay requirements and its location in relation to the adjacent road network and adjacent land uses. The following subsections provide a summary and general description of typical transit terminal types.

3.6.1.1 Centre Loading Platform Terminal

A centre loading platform terminal consists of a single customer platform surrounded by a bus drive aisle for clockwise circulation, shown in Figure 59. Generally, the terminal is located off-street and is not accessible to general purpose traffic. Layover, like pick-up and drop-off, may be located in bays adjacent to the customer platform. It may also be accommodated around the perimeter of the bus circulation area or off-site.

Transit Windsor has one type of these terminals located at Hotel-Dieu Grace Healthcare on Prince Road (Figure 60).

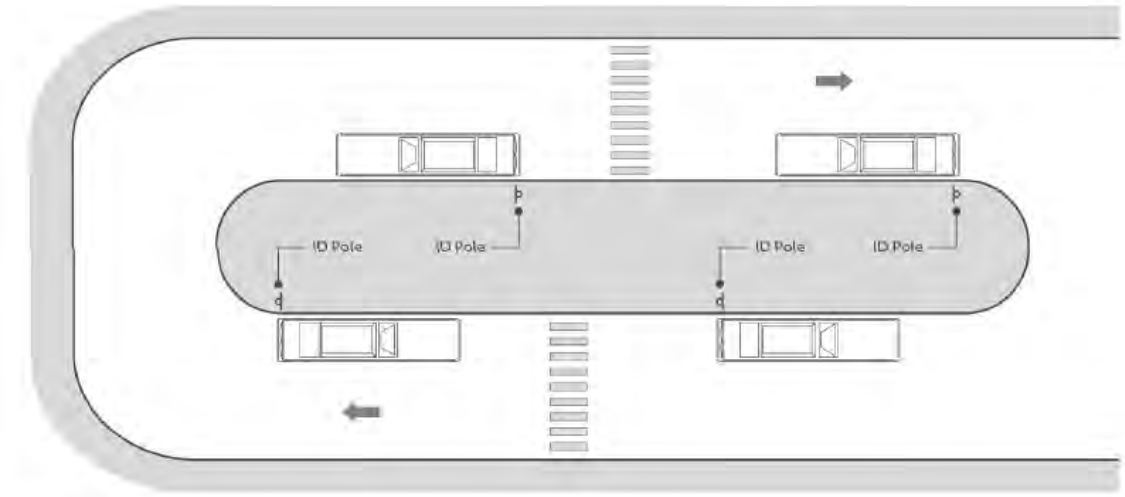


Figure 59 Centre Loading Platform Configuration

Figure 60 Hotel Dieu Grace Healthcare Transit Windsor Terminal

Site characteristics:

- When majority of customers are transferring between buses, customers are not required to cross the drive aisle, therefore reducing bus-pedestrian conflicts
- Customer amenities (e.g. weather protection, seating, and retail kiosks) can typically be accommodated within the platform
- Platform can generally be sized to accommodate large number of bus bays, long customer queues, and high customer transfer volumes

Design recommendations:

- Provide safe pedestrian crossings along desire lines and minimize number of crossings to and from the platform
- Design a compact platform to reduce customer walking distance and minimize land requirement
- Provide adequate weather protection near the bus stop pole, where customers will likely form queues, especially on bus routes that have high chance for pass-ups, long distance, or low customer turnover
- Provide good visibility along platform, for better customer safety and security

3.6.1.2 Multiple Parallel Loading Terminal

This type of terminal consists of multiple parallel platforms that accommodate bus passenger pick-up and drop-off. Generally, multiple parallel loading terminals are located off-street and are not accessible to general purpose traffic, as shown in Figure 61. Layover, like pick-up and drop-off, may be located in bays adjacent to the customer platforms. It may also be accommodated around the perimeter of the bus circulation area or off-site.

Transit Windsor's Windsor International Transit Terminal downtown is this type of terminal (Figure 62).

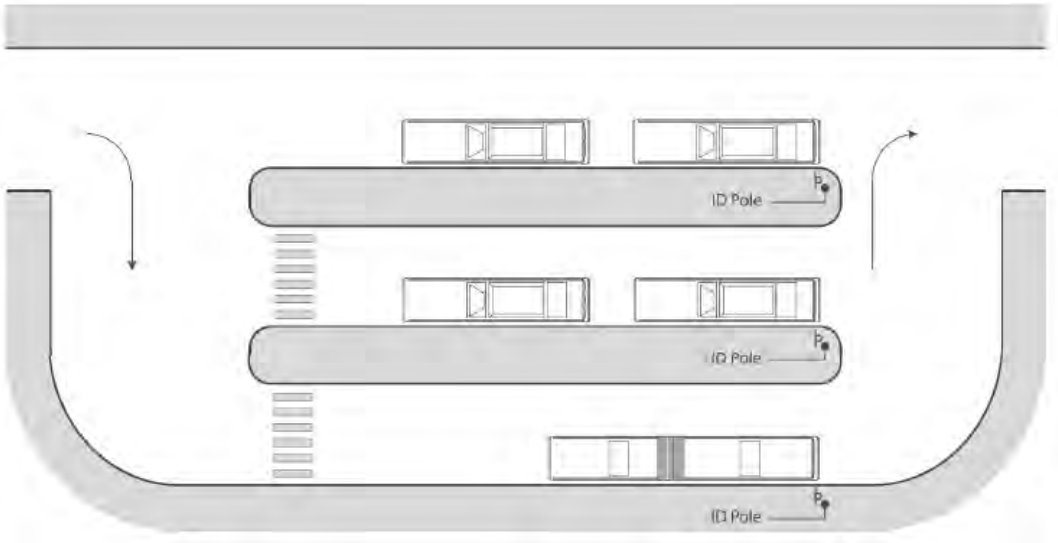


Figure 61 Multiple Parallel Loading Transit Terminal Configuration

Figure 62 Windsor International Transit Terminal

Site characteristics:

- May be more suitable for terminus where transferring customer volumes are relatively low, as fewer customers will be required to cross between drive aisles
- At location where space is constrained, large number of bays can generally be designed in a spatially efficient manner

Design recommendations:

- Provide safe crossings along desired lines and minimize number of crossings within/to-from transit terminal
- Assign bus routes with high customer transfers on the same platform, to optimize customer transfer movement and minimize pedestrian crossings
- Incorporate measures (e.g. landscaping) to discourage customers from jaywalking between drive aisles within the terminal
- Provide sufficient platform space for queuing, boarding/alighting and customer amenities
- Consider various operating plans to optimize number of bus bays and layover required at the terminal

3.6.1.4 Perimeter Terminal

A perimeter terminal consists of a continuous customer platform with pick-up and drop-off bays on a single side or multiple sides-depending on number of bus bays and layovers required, with an adjacent bus drive aisle for circulation, as shown in Figure 63. Layover, like pick-up and drop-off, may be located in bays adjacent to the customer platform. It may also be accommodated around the perimeter of the bus circulation area or off-site.

Transit Windsor has three locations that are this type of terminal; they are the terminals located at Tecumseh Mall (Figure 64), Devonshire Mall (Figure 65) and St. Clair College (Figure 66).

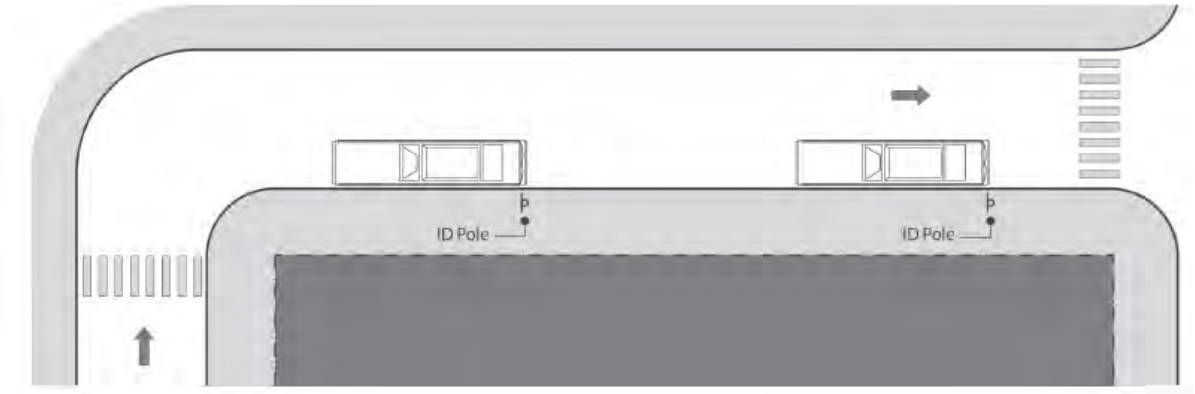


Figure 63 Perimeter Terminal Configuration

Figure 64 Tecumseh Mall Terminal

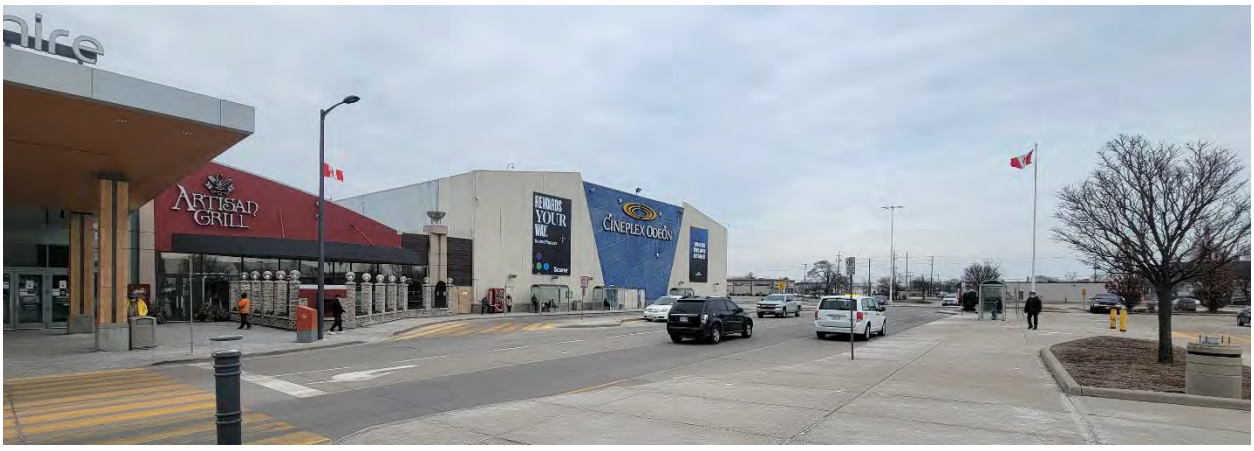


Figure 65 Devonshire Mall Terminal

Figure 66 St. Clair College Terminal

Site characteristics:

- Bus-pedestrian conflicts are reduced if most customers are approaching the terminal from a single direction of the platform
- Customer amenities can typically be accommodated on a single platform

Design Recommendations:

- Provide safe crossings along desired lines and minimize the number of crossings to the transit terminal if pedestrians are expected to access it from other directions other than the platform
- Consider the possibility of increased walking distance for bus to bus transferring customers if the terminal has a large number of bays

3.6.1.5 On-Street Terminal

An on-street transit terminal locates passenger pick-up/drop-off areas on a street that shares the roadway with general purpose traffic, as shown in Figure 67. Layover may be located either curbside or in a separate, off-street area. On-street terminals serving many routes can increase capacity and reduce transit vehicle congestion where multiple routes converge. By grouping routes and spacing stops in a skip-stop configuration, using skip-stop configurations and enhanced boarding platforms for heavy passenger volumes can result in passenger boardings being dispersed

Transit Windsor has one location that is considered this type of terminal and it's located on Ouellette at Wyandotte Southwest Corner (Figure 68).

Site Characteristics:

- When a large number of destinations are distributed around the terminal area, customer desired lines can be accommodated through the urban street network
- A small number of layover bays can be accommodated on street.

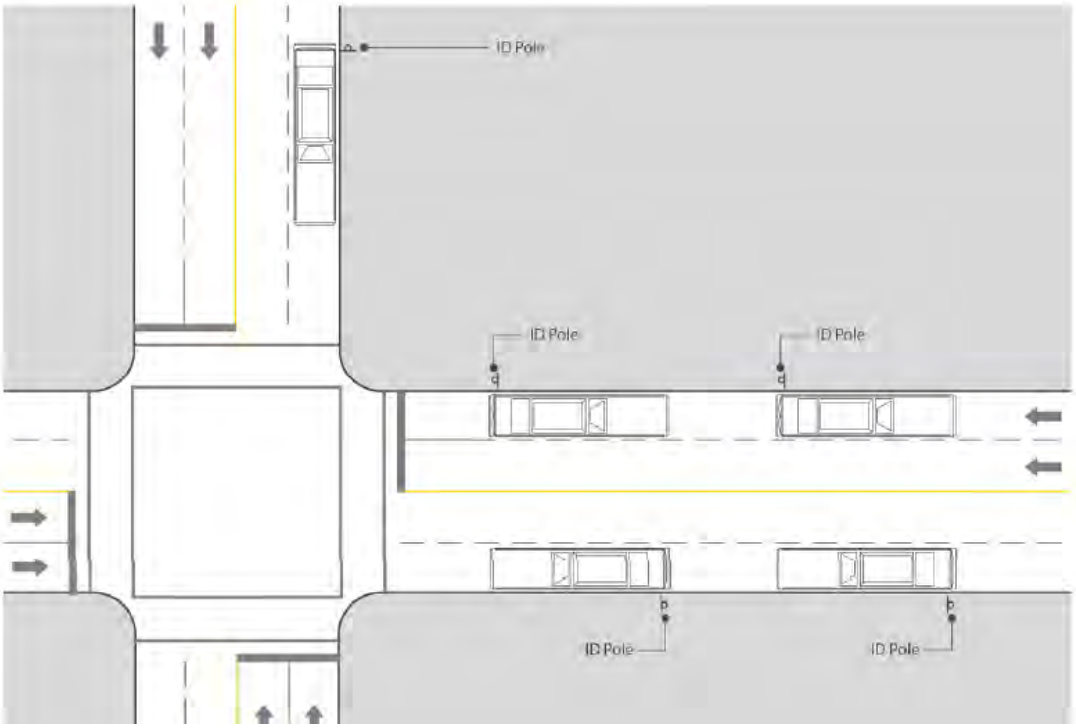
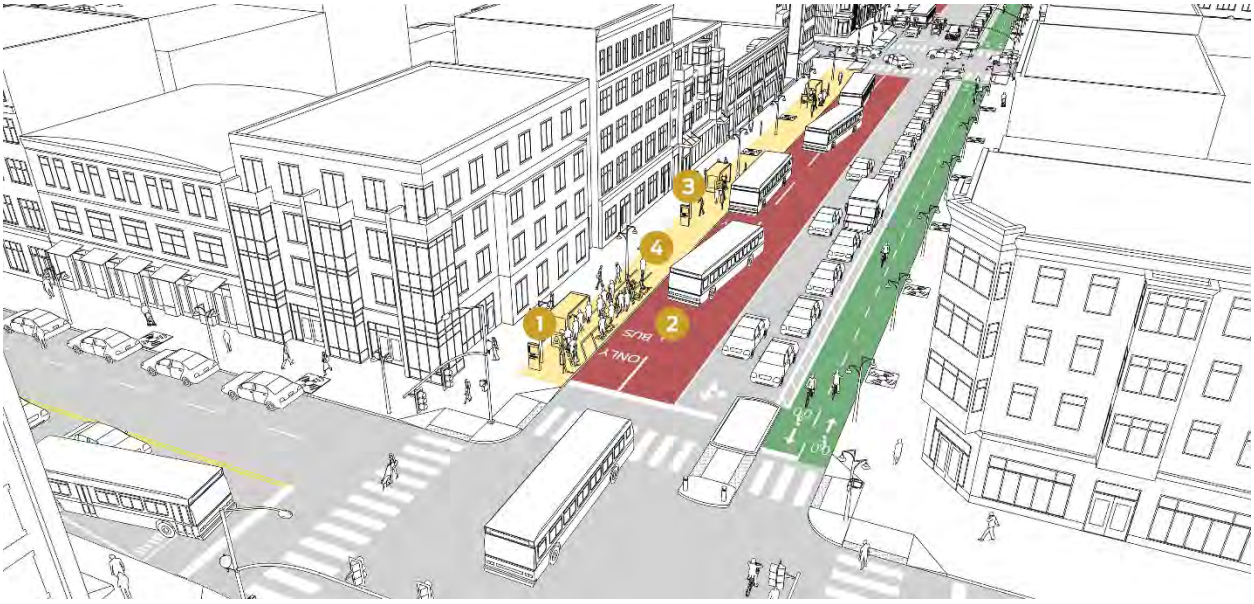


Figure 67 On-Street Terminal Configuration

Figure 68 Transit Windsor On-Street Terminal at Ouellette and Wyandotte

Design Recommendations, as shown in Figure 69:

- Provide sufficient sidewalk space for both customer queues and pedestrians. In high-volume queue locations, line markings or other queueing systems may be required to keep pedestrian through zones free from customer queues
- Design bus bay location that channels customers to use intersection crosswalks
- Incorporate measures (e.g. landscaping) to discourage customers from jaywalking across roadway for bus to bus transfers
- Consider possibility of increased walking distance for bus to bus transferring customers, if the terminal has large number of bays
- Consider combination of off-street and on-street layover if large amounts of layover bays are required
- Consider transit priority measures, such as a bus lane, if buses must circulate on city streets between drop-off, layover, and pick-up
- Provide wayfinding to help customers identify bus bays locations and accessible routes



1) *Transit stop signs must clearly communicate which routes are served at which locations*
2) *The on-street terminal must always operate in the curbside lane; to ensure stops remain unobstructed, all other curbside activities must be prohibited on the terminal side of the street*
3) *Strip maps, system maps, and wayfinding infrastructure should be consistently and prominently displayed to assist riders in finding correct stop locations*
4) *For high-boarding stops with either all-door boarding or multiple lines, managed passenger queues may be implemented at the stop to speed boarding, sort passengers into distinct queues, and maintain a clear pedestrian zone on the sidewalk*

Figure 69 Typical On-Street Terminal Design

3.6.1.6 Hybrid Terminal

A hybrid terminal has on-street bus stops along one or more sides of the terminal and some bus stops located off-street. Figure 70 shows a hybrid terminal diagram while Figure 71 shows a real-world example. The bus layover areas can be placed on the off-street side of the terminal.

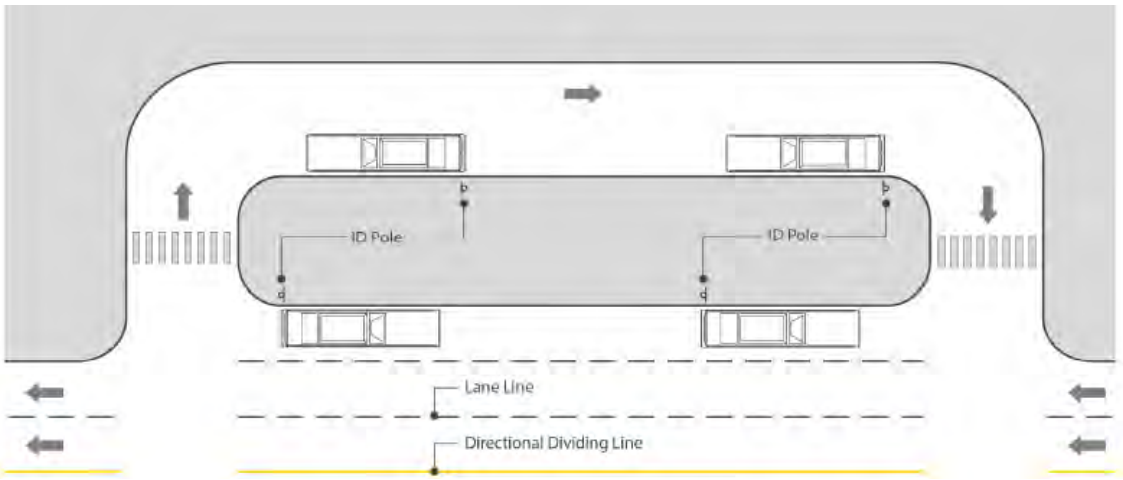


Figure 70 Hybrid Terminal Configuration

Figure 71 Example of a Hybrid Terminal

Site Characteristics:

- When majority of customers are transferring between buses, customers are not required to cross the drive aisle, therefore reducing bus-pedestrian conflicts
- Customer amenities (e.g. weather protection, seating, and retail kiosks) can typically be accommodated on single platform
- Platform can generally be sized to accommodate a large number of bus bays, long customer queues and high customer transfer volumes

Design Recommendations:

- Provide safe crossings along desired lines and minimize number of crossings within/to-from transit terminal
- Design a compact customer waiting platform to reduce customer walking distance and minimize land requirement
- Provide weather protection near bus stop pole, as customers will likely form queue on long distance or low-turnover bus routes
- Size terminal to accommodate future service demand
- Provide good visibility within customer waiting platform for better customer safety and security
- Provide separate washroom facilities and waiting area for bus operators

3.6.2 Bus-Pedestrian-Cyclist Conflicts within a Terminal

The circulation of buses within a terminal should be designed to minimize conflicts with pedestrian and cyclist movements. The locations of bus entry and exit points should be segregated from pedestrian and cyclist traffic wherever possible; otherwise, pedestrian and cyclist traffic should be controlled by traffic management measures such as fences or railings.

To avoid any potential sightline problems within a terminal, wherever possible, pedestrian and cyclist crossings should be placed at locations behind stopped buses, before bus turning maneuver points, or at the end of a bus turning maneuver, as illustrated in Figure 72. There should be sufficient stopping sight distance for a bus operator to see pedestrians and cyclists; otherwise, signals or a stop sign should be installed to ensure that buses stop before a crossing and bus operators can check for pedestrians before proceeding.

The locations where pedestrians step out from the platform should not be located in the visibility impairment zone of the bus operator while the bus is making a turn around the platform. As much as possible, pedestrian and cyclist crossings should be located on pedestrian/cyclist desired lines so that bus operators will know where to expect people crossing, to minimize the number of people crossing where they are not expected and to minimize the need for barriers or fences. If barriers or fences are required to prevent unsafe pedestrian/cyclist crossings, consider altering the design or including aesthetically pleasing custom fences and/or landscaping to improve the pedestrian environment. Pedestrians and cyclists should be oriented so they face oncoming buses when entering a crossing; designs where pedestrians and cyclists have their back to oncoming buses should be avoided.

The “LOOK LEFT (OR RIGHT) FOR BUSES” warning sign, with supplementary tab, is to be used at transit exchanges where buses cross pedestrian crosswalks to alert pedestrians of the direction from which buses will be coming. Warning signs, such as the “CYCLISTS YIELD TO PEDESTRIANS” warning sign can also be used at transit exchanges to alert cyclists of pedestrian and bus traffic.

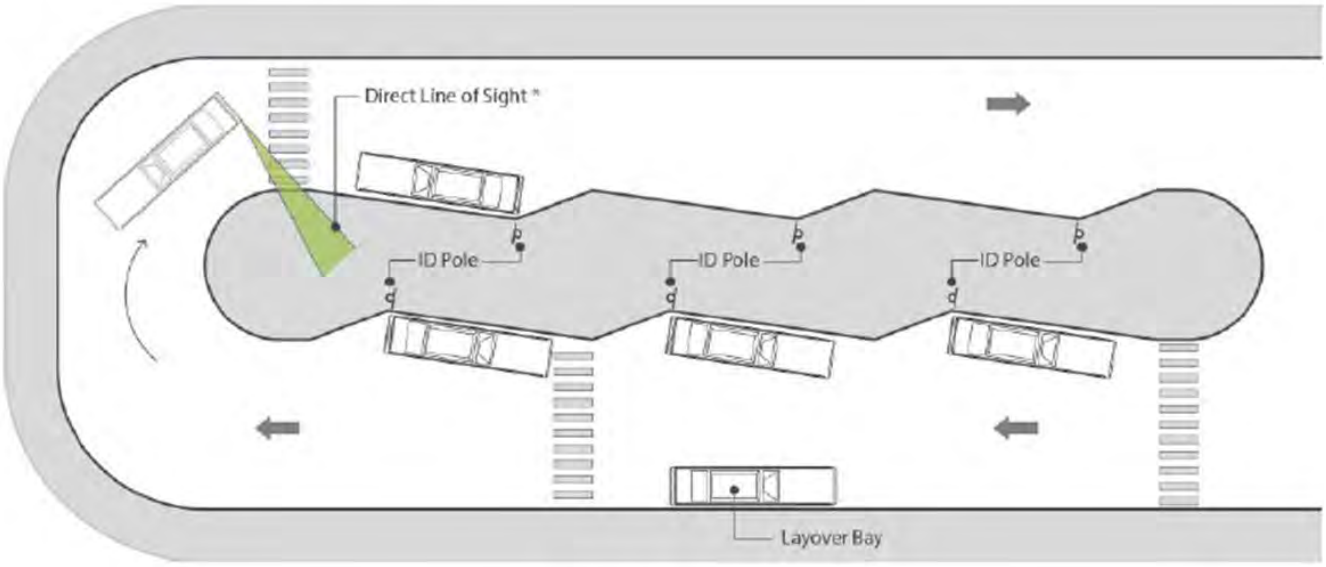


Figure 72 Pedestrian and Cycling Crossing within a Terminal

Section 4 Physical Design for Safe Passenger Access & Amenities

After the selection of the bus stop configuration, the physical design should be considered in promoting safe and efficient operation for the interaction of transit vehicles, transit passengers and other road users. The physical design involves various elements:

- Bus stop visibility
- Passenger access
- Passenger amenities
- Universal access

Appendix B is a maintenance checklist for the elements that are involved, including the suggested frequency of on-site checking for bus stops.

Design that promotes minimal “perceived barriers” by the general public, particularly vulnerable road users (including the young and the elderly) is fundamental to the design of all transit infrastructure. This must be considered in all design elements.

4.1 Bus Stop Visibility

The primary tool for communicating to passengers about the bus stop location is the bus stop sign. The bus stop sign also alerts the transit operator to the area where the bus should be stopped.

Bus stop sign considerations:

- Sign should be positioned at a minimum approximately 0.6 m (2 ft) from face of curb to avoid conflict with bus mirrors
- Sign should be clearly visible to passengers and the driver, and not obscured by other objects (i.e. streetlights, trees, other street signs, etc)
- Sign should be easily distinguishable as a bus stop, this may require a bus symbol on the bus stop sign or on the pole or text on the sign indicating bus stop
- When installed behind sidewalk, sign should be positioned at a 45 degree angle to the street to ensure the sign is visible to transit operators. When installed between the road and the sidewalk, the sign should be positioned perpendicular to the street to ensure the sign is visible to pedestrians using the sidewalk
- Sign should be securely mounted on its own post
- Sign should provide basic information, such as routes served, direction and bus stop number
- Sign should also provide information regarding the type of routes servicing the stop (i.e. BRT (Bus Rapid Transit), on-demand, express, etc.) and the service level (i.e. night route, no Sunday or holiday service, weekday service only, etc.). This could be displayed through text, symbols and/or colors
- Sign should be designed with those with visual impairments in mind. This includes using high contrast colours and adequate text size

Figure 73 Transit Windsor Bus Stop Sign

4.1.1 Detours

Buses are prohibited from boarding or dropping off passengers at bus stops in construction zones. Detouring a bus route is necessary during construction, road closures, special events, etc. The following should be considered when detouring a bus route:

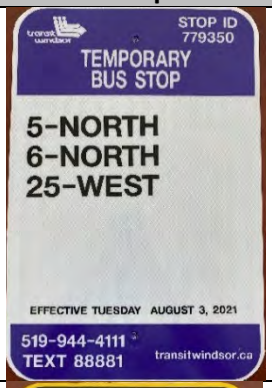
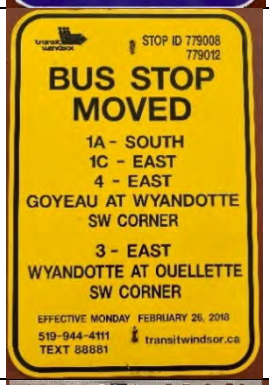
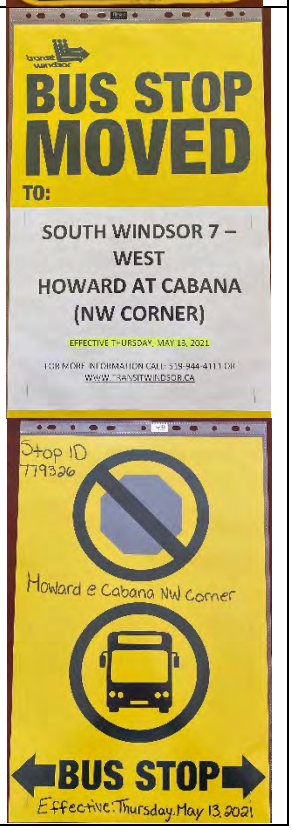
- Road width; roads with a width of less than 6.4 m (21 ft) should not be considered. Refer to section 6 for more information regarding road design
- Minimize the amount of deviation from the regular bus route
- Locations to place temporary bus stops
- Traffic & road design; i.e. Left turns on high traffic roads
- Curb Radii: curb radii as intersections must be large enough to allow buses to turn. Refer to section 6 for more information regarding road design

Temporary bus stops along detour routes are used to continue servicing passengers while the route is on detour. The following should be considered when choosing a location for temporary bus stops:

- Minimize increases to walking distance from bus stops on the regular route
- Bus stop spacing requirements identified in section 1, taking into consideration existing bus stops. Consider using existing bus stops before creating temporary bus stops
- Follow requirements set out in sections 1 and 2
- Ensure that temporary bus stops are clearly visible to passengers and operators

Table 5 below outlines the three different types of temporary signage Transit Windsor uses for detours.

Table 5 Temporary Signage used for Detours

SignType	Purpose	Details	Example
Purple Metal Sign	• Used to indicate a temporary bus stop • Used when construction project is over 1 week in duration (long term)	• Installed & made by City of Windsor Traffic department • Details for sign creation & installation provided by Transit Windsor Planning department • Installed at temporary bus stop locations	
Yellow Metal Sign	• Used to indicate that the bus stop is not being serviced due to a detour • Used when construction project is over 1 week in duration (long term)	• Installed & made by City of Windsor Traffic department • Details for sign creation & installation provided by Transit Windsor Planning department • Installed at existing bus stops that will not be serviced due to the detour	
Yellow Paper Sign	• Temporary signs used as a bus stop moved sign & as a temporary bus stop sign • Used when construction project is less than 1 week in duration (short term) or for special events	• Made by Transit Windsor Planning department • Installed by Transit Windsor Planning department or Operations Supervisors • Paper signs are placed in clear plastic protectors and installed on stanchions or hydro poles using zip ties	

Notices, maps and a summary table of bus stops closed and temporary bus stops are created and posted on the Transit Windsor website and on internal detour boards to communicate up to date service disruptions to the public and the operators. The detour notice should portray the following details:

- Detour route
- Route and direction being impacted
- Road closure limits
- Closed bus stops
- Temporary bus stops
- Durations

The Transit Windsor Prediction Portal is also used to update the public with real time information regarding detours, closed bus stops, temporary bus stops, service disruptions, etc.

Automatic Vehicle Location (AVL) is another way that we communicate detours to operators, this allows planners to input the detour, including closed bus stops and temporary bus stops into a software that shows this information to operators on the bus.

4.2 Passenger Access

Having optimal conditions for pedestrian access to the bus stop are key in promoting transit use. These conditions can be classified into several areas:

- Physical characteristics of the routes
- Personal security

4.2.1 Physical Characteristics of Pedestrian Routes Used by Passengers

For convenience, the point of origin and destination to and from the bus stop should be as direct as possible. The path may be along the public right-of-way (for example, a sidewalk next to a major street) or private right-of-way (for example, a short-cut walking route through a residential development). Optimal conditions involve the path being clear of physical obstacles (for example, fences and barriers) and the ground clear of slippery or unstable materials, such as mud and water puddles. Where obstacles do exist, they should be marked by warning strips.

Snow removal in winter months is prioritized in the City of Windsor, including all streets that have bus routes on them. Transit Windsor has a priority list that is given to Public Works for snow removal at priority bus stops.

Extreme vertical grades and stairs, which may make access difficult for all users should be avoided. Where stairs or extreme grades exist, barrier-free alternative routes should be provided. Both lateral and overhead clearance should be adequate to avoid obstructed travel.

Curb ramps and other travel paths should be designed to prevent the accumulation of water and snow. Ramps may not have a slope exceeding 1:12. Ramps must have a landing for each 0.8 m (2.5 ft) of rise. Inclines and cross slopes of the street may impact other surfaces and should be accounted for in curb heights, sidewalks and boarding platforms, and drainage infrastructure. A 1% to 2% slope is often needed for proper drainage of sidewalks.

4.2.2 Personal Security

Aspects of the built environment can be improved to enhance personal security. Crime Prevention through Environmental Design (CPTED) is an approach to planning and design that reduces opportunities for crime. The physical environment can be designed to reduce the risk of crime and nuisance behaviour associated with public spaces.

Well-cared-for transit facilities improve their desirability. Locations that offer natural surveillance by adjacent land use are desired, such as where neighbouring houses look on to the facility or commercial businesses open late.

With regards to lighting, adequate lighting that illuminates on waiting and surrounding areas is desired. Coordination with existing lighting, such as street lighting or lighting with adjacent land uses should be considered to maximize visibility of the transit facility. Where existing lighting is not available, installation of new lighting or the use of bus shelter lights by solar panels can be considered to ensure visibility at night-time. Lighting requirements at bus stops should be no less than the lighting design requirements for the adjacent roadway.

Pedestrian-scale lighting, typically including lamps less than 8 ft (25 ft) high, increases comfort and safety around stops. Higher illumination around transit stops should be gradual rather than sudden to avoid creation of virtual shadows as driver and bicyclist eyes adjust.

To provide a safe waiting environment during night-time at rural or remote bus stops, the use of lighted bus shelters by solar panels is an important consideration to ensure that light can be provided without access to the electricity supply grid, as shown in Figure 74.

Figure 74 Transit Windsor Bus Shelter with Ad panel at Night

With regards to landscaping, low shrubbery or canopied trees should be considered as opposed to taller bushes or evergreen trees that promote hidden areas.

Incorporate landscape treatments that preserve views but improve the environment for waiting passengers by providing shade from the sun and shelter from the wind, as shown in Figure 75. This can enhance the user experience, environmental performance, and the image of the system.

Regular maintenance of the facility area can prevent a “run-down” appearance and the landscaping from overgrowing and allow observation of the environment conditions for signs of unwanted activities.

Figure 75 Example of a Bus Stop with Shade Provided by Trees

4.3 Passenger Amenities

The amenities to be provided for passengers include an adequate waiting and queuing area, as well as shelter and benches where warranted.

It is important for passengers to have sufficient room to queue for the bus without blocking other pedestrians or interfering with other sidewalk activities. The passenger zone typically consists of the following:

- A bus stop pole and sign
- Lighting
- A passenger landing pad
- A wheelchair pad and curb letdown

The extent of passenger amenities to be provided at each bus stop also depends on the local context. Typical layouts of the passenger amenities provided in an urban area versus a rural area are illustrated in Figure 76.

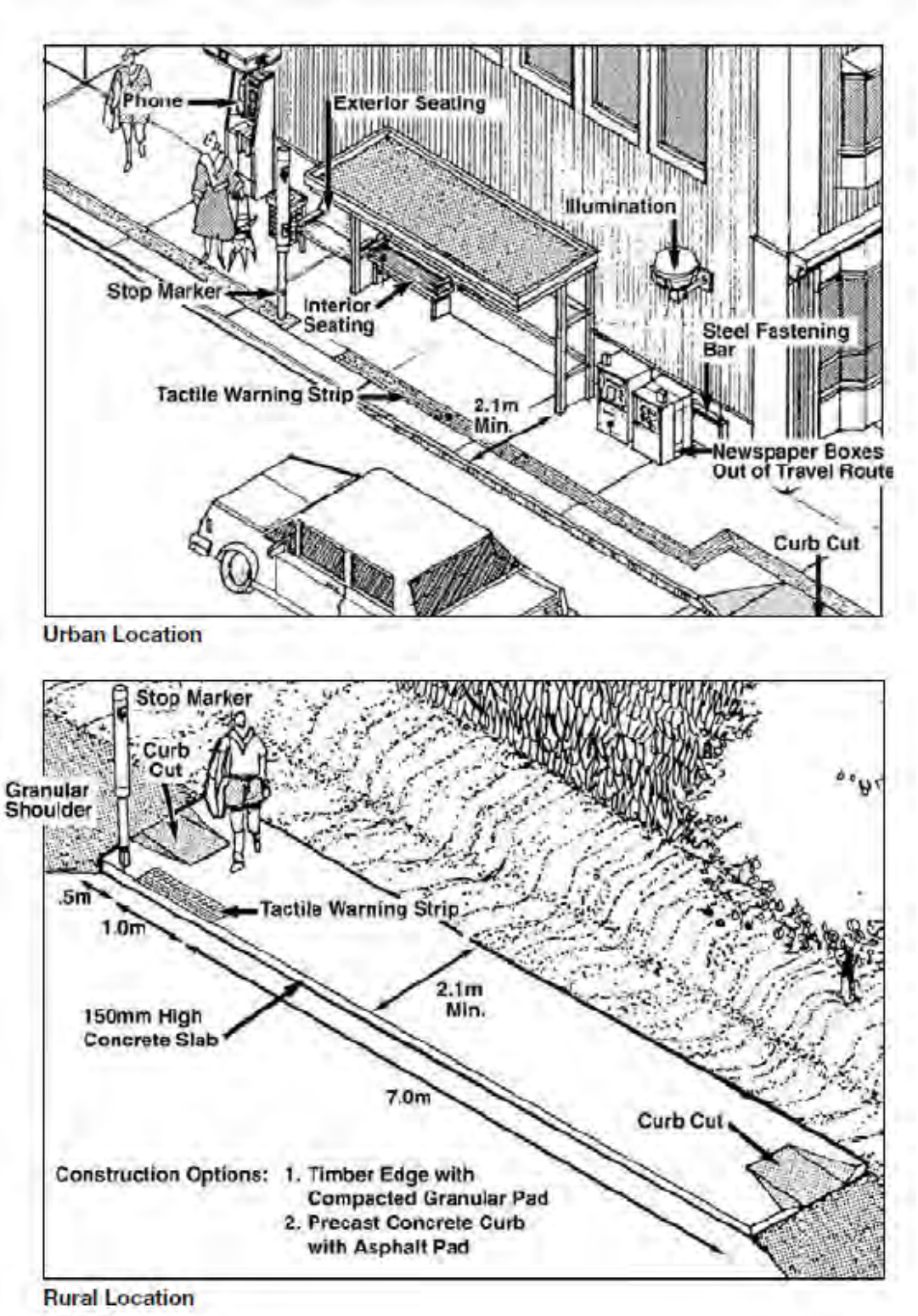


Figure 76 Passenger Amenities

When available, provide a range of pedestrian amenities to enhance pedestrian comfort and safety, including:

- trees to provide shade during hot summer months and contribute to an attractive pedestrian environment
- furnishings such as benches and waste bins
- attractive pedestrian-oriented lighting

Coordinate the provision of pedestrian amenities with patterns of usage, concentrating amenities along key streets leading to and from stop or station areas or between key destinations. Street-related buildings can contribute to pedestrian amenity through the provision of canopies or elements designed to mitigate the impacts of wind or weather conditions. Incorporate curb cuts at all pedestrian crossings to assist people with strollers, carts or mobility issues. All curb cuts should be equipped with tactile warning strips to enhance safety and accessibility at transit stops.

Sidewalks on principal pedestrian routes within nodes and corridors should provide for broad pedestrian through zones, particularly in pedestrian districts. An additional furnishing zone to accommodate bus shelters and waiting areas, street trees, planters and the potential for retail or commercial spill-out space may also be required. Different street zones are shown in Figure 77.

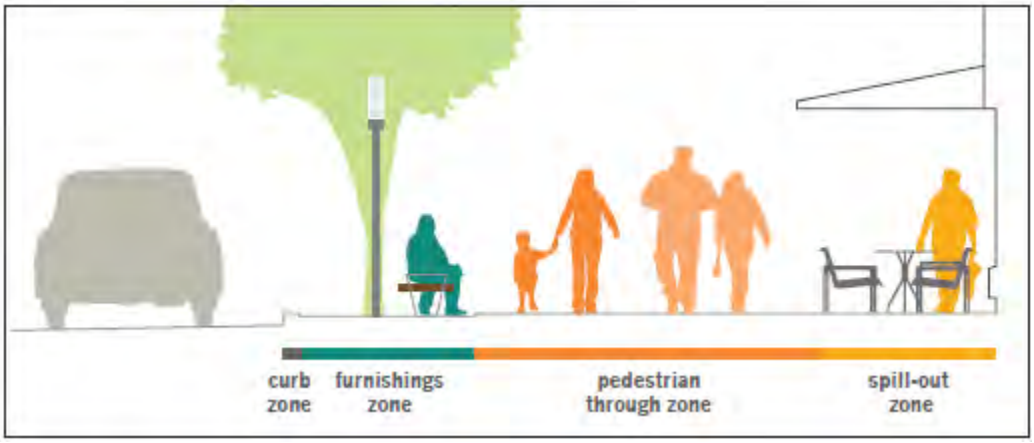


Figure 77 Street Zones

Figure 78 illustrates two potential transit stop configurations. The configuration shown as the first stop configuration creates a waiting area away from the street. The second configuration has the area adjacent to the street. Stops should be located adjacent to a street only where there is low traffic volume.

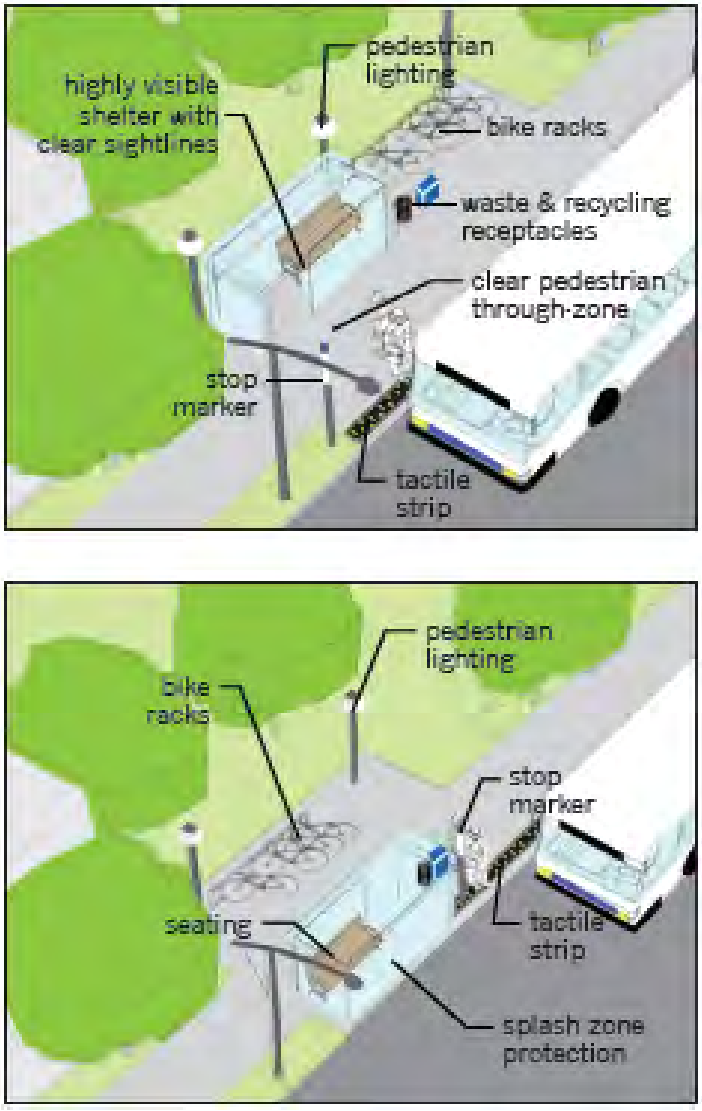


Figure 78 Bus Stop Configuration with Amenities

Table 6 summarizes the type of amenities that are considered mandatory and those that are considered desirable or to be provided where warranted.

Table 6 Bus Stop Amenities

Amenities	Criteria for Provision		
	Regular Stop	Enhanced Transit Stop	Terminals
Bus Stop pole/stanchion	Mandatory	Mandatory	Mandatory
Bus stop sign	Mandatory	Mandatory	Mandatory
Route/Schedule information holder	Desirable	Mandatory	Mandatory
Lighting	Desirable	Mandatory	Mandatory
Passenger landing pad	Mandatory	Mandatory	Mandatory
Wheelchair pad	Desirable	Mandatory	Mandatory
Garbage Receptacles	Desirable	Mandatory	Mandatory
Seating	Desirable	Mandatory	Mandatory
Bus shelter	Desirable	Mandatory	Mandatory
Real-time information	If Warranted	Desirable	Mandatory
Bicycle storage	If Warranted	Desirable	Mandatory

There are some regular stops that may have elements of an enhanced bus stop, such as seating and/or shelters depending on the specific circumstances. Any new stop that is put into place will be evaluated and determined if it will be a regular stop or an enhanced stop based on a number of factors including ridership and site location. Existing stops will also be evaluated using the same criteria. All bus stops on a BRT (Bus Rapid Transit) route will be considered enhanced transit stops, making many of the above amenities mandatory.

It is desirable for the passenger zone to be made of a slip resistant, impervious and well drained surface. The passenger zone should be large enough to accommodate users that are either boarding, alighting, or waiting for a different bus (if multiple routes share a common stop). Depending on the width of sidewalk, the passenger zone may be bound by the adjacent property line or the boulevard before the property line, the curb face, and lateral limits upstream and downstream of the stop marker.

The required space at a passenger zone depends largely on the expected maximum number of waiting passengers at the bus stop. This may be estimated by the number of passengers on- and off-loading, the volume of transfer passengers and the scheduled bus frequencies at the stop.

4.3.1 Passenger Landing Pad

The passenger landing pad is a surface provided at a bus stop for passenger waiting and loading/unloading activity. Passenger landing pads should be connected to sidewalks that lead to the adjacent intersections, wherever feasible. In areas where a sidewalk does not exist, the passenger landing pad should be raised with connecting ramps on each end to the road shoulder.

Landing pad height affects ease of boarding; raised pads enable easier, more accessible passenger boarding and alighting by decreasing step-down distance and gap between vehicle floor and landing pad. Level and near-level landing pad stops can also increase route efficiency, allowing vehicles to enter and exit stops more quickly.

All bus stops should have a firm, even, and slip resistant surface for passengers to step on/off the bus. A passenger landing pad length of 9 m (29.5 ft) is recommended in order to span both sets of doors on a standard 40 foot bus. A passenger landing pad length of 15 m (49 ft) is recommended in order to span both sets of doors on an articulated 60 foot bus. Passenger landing pads are recommended to have a cross slope of less than 1%. The passenger landing area must be connected to an accessible sidewalk by a hard even-surface, free of obstructions with a minimum 1.5 m (5ft) width.

Passenger landing pads may contain amenities such as shelters or benches, but these must not act as obstacles preventing riders from accessing the bus doors. Furthermore, to comply with accessibility standards, a clear minimum width of 2.1 m (7 ft) is necessary to accommodate wheelchair ramp deployment from the bus and allow for wheelchair movement after clearing the ramp.

In urban areas, the sidewalk may extend all the way to the curb. In this case, the sidewalk already acts as a passenger landing pad, and no major modifications are necessary. The passenger landing pad should be at least 3 m (10 ft) wide, if possible, unless a property line or a building prevents it from being extended this far. If any further amenities, such as bus shelters are to be added, a minimum sidewalk width of 1.5 m (5 ft) should still be maintained. Cross slopes on most sidewalks should be between 0.5% and 2% to achieve both good drainage and accessibility.

In more suburban areas, there will likely be a sidewalk, but it will be separated from the curb or edge of road by a grass boulevard. In this case, the grass boulevard should be replaced with a landing pad that extends from the curb or edge of road to the sidewalk. An example of this configuration is shown in Figure 79. If the grass boulevard is wider than 3 m (10 ft) (the required width of the landing pad), then a 1.5 m (5 ft) wide pathway may be installed to provide a connecting path between the passenger landing pad and the sidewalk.

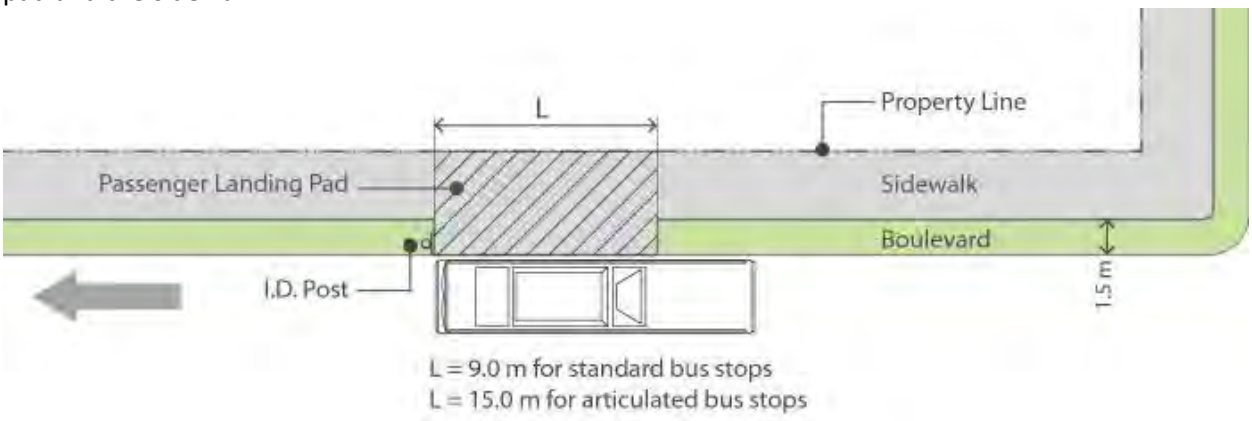


Figure 79 Passenger Landing Pad Configuration

In more rural areas, bus stops may be placed on a road that features a gravel shoulder, rather than a sidewalk. In this case, a passenger landing pad should be provided at the site of the bus stop, instead of having passengers queue on the road shoulder. It is preferred that the bus stop (curb) be built at an elevation of 150 mm above the road surface, to minimize the “step-up” distances required for passengers to board or alight from the bus. A ramp (maximum slope of 8%) should be provided at each end of the pad for access to a safe location away from the travel lane(s).

In rural areas, site-specific reviews may be warranted to identify amenities such as crosswalks, pedestrian pathways, lighting and roadside treatments for enhancing the safety and convenience of pedestrian access to/from a bus stop.

4.3.2 Wheelchair Pad

A wheelchair pad should be present at a bus stop for wheelchair accessibility. All Transit Windsor buses are equipped with a mechanical ramp at the front door of the bus to allow wheelchair customers to board or alight the bus.

A wheelchair pad is a designated area within the passenger waiting area, located near to where the front door of the bus will be located once the bus stops. The wheelchair pad is an obstruction free area that allows space for the bus to deploy its ramp or lift, and to allow the wheelchair to manoeuvre as needed in order to move between the sidewalk and the bus and vice versa. Figure 80 shows a bus with the wheelchair ramp deployed.

Figure 80 Transit Windsor Accessibility Ramp

To ensure that the wheelchair ramp is deployed safely and efficiently, and to facilitate the maneuverability of wheelchair users, a clearance zone should be provided at the bus stop pole as illustrated in Figure 81 for Standard/Articulated Buses. To improve operation efficiency and to accommodate wheelchair users with less agility, a wheelchair clearance area of 3 m (10 ft) long by 3 m wide (10 ft) is preferred. The minimum width of the clearance area should be 2 m (7 ft).

Overhead clearance above the wheelchair pad must be at least 2.7 m (9 ft) at bus bays to accommodate the wheelchair ramp. In some highly constrained locations, it is acceptable to locate the wheelchair pad partly within the shelter. Where the wheelchair pad is inside the shelter, the overhead clearance of 2.7 m (9 ft) is of particular importance.

The required cross section for a wheelchair pad and the protective measures at the back of the wheelchair pad are shown in Figure 82.

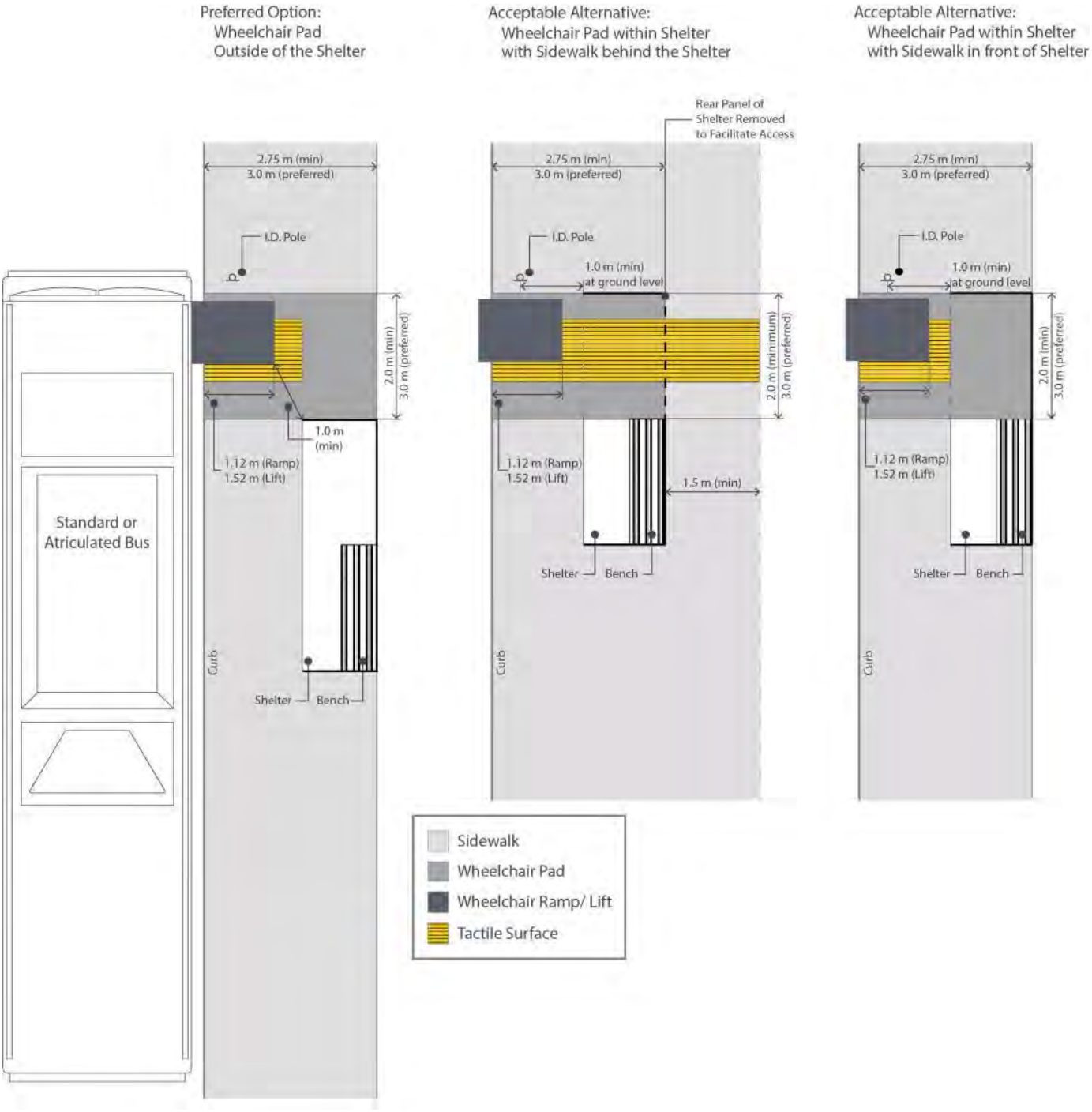
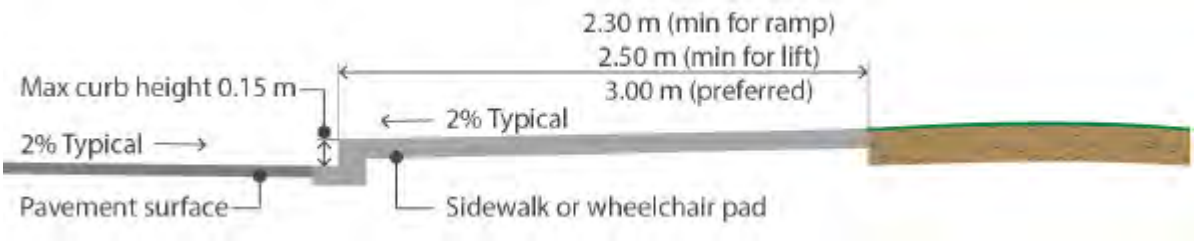
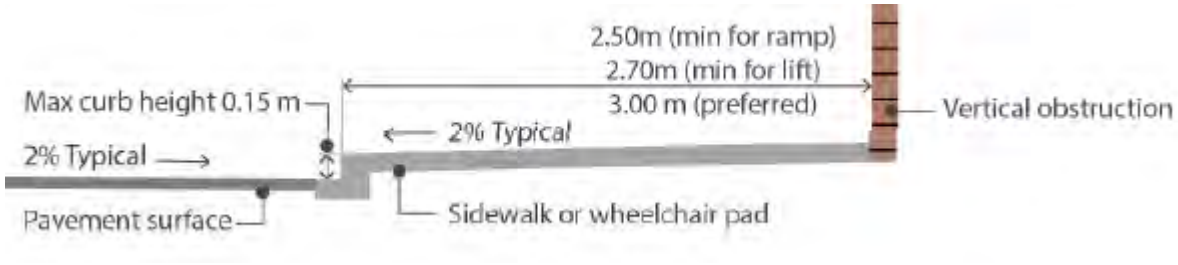


Figure 81 Wheelchair Pad Dimensions

Scenario 1: Surrounding ground behind sidewalk is level and extends for at least 0.2 m (0.7 ft).



Scenario 2: Vertical obstruction at the back of the sidewalk (ie. Wall, fence, etc.)



Scenario 3: Surrounding ground behind sidewalk slopes or drops down. The installation of a protecting curb or handrail at the back of the sidewalk is required.

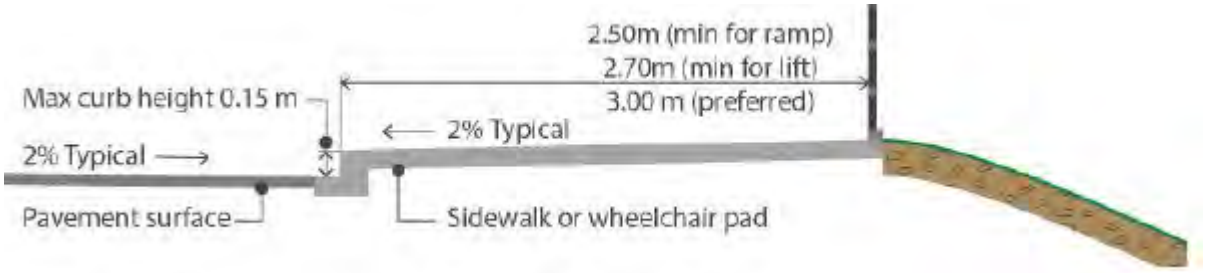


Figure 82 Wheelchair Pad Cross-Section Design

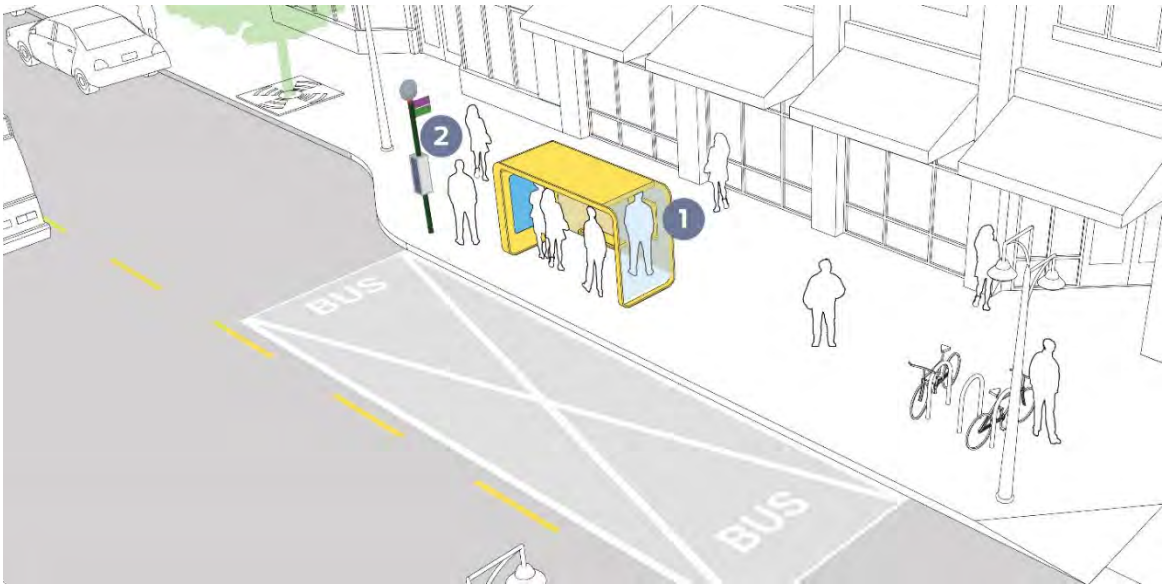
4.3.3 Bus Shelter

Bus shelters protect waiting customers from poor weather and may provide additional integrated amenities such as benches, route maps, lighting, etc. There are several forms of bus shelters, which meet various space restrictions and weather protection requirements. Figure 83 shows the preferred placement of Transit Windsor bus shelter and Figure 84 shows the bus schedule display on the bus shelter. Figure 85 shows a more complete diagram of shelter placement. Please see Appendix C to view the various types of Transit Windsor shelters

Transit shelters should be designed to be comfortable and highly visible with transparent sides, seating with armrests to support passengers with mobility issues and lighting. Shelters should be designed to accommodate a range of users including people with carriages or wheelchairs. Provision of comfortable shelter and seating can significantly improve perception of wait time and rider satisfaction. Bus shelter specifications are outlined in Appendix D. The conditions to be considered for the installation of bus shelters are described in Table 7.

Figure 83 Transit Windsor Bus Shelter Preferred Placement

Figure 84 Bus Shelter Schedule



1) *Ensure the waiting passengers can be seen from outside by using glass or open design for the back wall. Include lighting in the shelter, or locate shelters in a well-lit area. Social safety is a primary consideration at shelters. Use transparent materials to enhance visibility of waiting passengers*
2) *Pole and bus stop signs must indicate critical information including the stop name, route number, stop number, direction or destination, and system logo. Shelter should include stop name and further system information*

Figure 85 Diagram of a Typical Bus Shelter Placement

Table 7 Considerations of Bus Shelter Installation

Condition	Bus Shelter is more warranted when
Bus Service	Frequent services are provided and/or there are a number of transfers at a stop, hence more passenger activities
Adjacent land use	Shelter can be made compatible with the adjacent land use (for example, a bus stop in a busy commercial area) and space is available for construction such that the shelter can be sited on level ground and without obstructions by trees, utility poles, etc.
Passenger demographics	There are relatively high percentages of seniors and/or people with physical disabilities using the bus stop
Passenger request	The request is supported by the conditions above

Provision of a bus shelter is more warranted when multiple of the above conditions are met. A more detailed bus shelter site evaluation form is found in Appendix E.

Shelters should be located and oriented in the following manner if possible:

- Parallel and facing curb
- Bus driver can easily see passengers that are waiting
- Clear from the passenger landing area or pedestrian path
- Clear of steps between the sidewalk/bus pad and the shelter
- Placed to not obstruct sightlines at intersections or driveways

The shelter size should be determined with reference to maximum number of expected customers waiting at the stop with an appropriate level of service. On higher-frequency transit streets, shelter dimensions and amenities should be expanded to meet increased demand. Transit Windsor bus shelter concrete needs are laid out in Appendix F.

General considerations for shelters include:

- Shelters should be located close to bus boarding locations, typically at the bus stop ID post, but not farther than 9 m (29.5 ft) from the ID post, for customer convenience and to ensure timely boarding
- Shelters should be designed to maximize visual transparency in order to improve visibility of buses to passengers and reduce Crime Prevention Through Environmental Design (CPTED) issues
- Shelters should be designed as to not impede passenger queuing and pedestrian circulation. This can often be achieved by reducing the shelter's number of touch-down points. Site-specific analysis of passenger queuing and pedestrian circulation can inform the shelter design
- In locations where pedestrian circulation would not be impeded, shelters may provide side or back panels. Advertising and wayfinding may be incorporated into bus shelters if they can be placed in such a way that allows for adequate sightlines
- The shelter interior should be illuminated by its own light source or by adjacent street lighting
- The closest portion of the shelter should maintain a minimum lateral clearance of 0.6 m (2 ft) from the curb face to avoid contact with a bus (to account for the maximum rear sweep of a bus)
- In narrow areas where adequate space is not available to site a bus shelter, it may be prudent to put the shelter immediately downstream. Customers waiting in the shelter should be able to clearly see approaching buses

Shelters should be provided wherever possible. As a minimum, shelters are recommended at the following locations:

- Bus stops at transit exchanges or major transfer points
- Bus stops with high loading/unloading volumes
- Bus stops located near schools, seniors' housing developments, community and recreation centres, and other major generators such as shopping malls

Specific considerations with respect to wheelchair accessibility include:

- A bus shelter should incorporate seating for at least three people and a clear area at least 1.0 m (3 ft) wide for one wheelchair
- If wheelchair accessibility is provided within the shelter, the back of the shelter should preferably be set back at least 3 m (10 ft) from the curb face
- Where the wheelchair pad is located within the shelter or under an existing building feature, overhead clearance of 2.7 m (9 ft) must be maintained

The Transit Windsor Master Plan – More Than Transit (2019), states that there should be 25% shelter coverage for bus stops. Transit Windsor currently has 1136 bus stops. At this time, there are 214 shelters throughout Transit Windsor's service area for a 19% coverage rate.

Street Seen Media is the company that is in charge of the advertisements that are placed on the bus shelters for the City of Windsor. Canada Lighting and Sign is used for all structural maintenance required on shelters including installation and removal. Tecumseh Window Cleaning has a contract for all shelters to be cleaned twice a month, including the removal of any garbage inside or outside the shelter at the time of cleaning.

4.3.4 Seating

Seating is one of the most basic features at transit stops. Seats are an opportunity to incorporate attractive design and durable materials into a transit stop. Seats should be designed or selected on the basis of comfort relative to expected wait time and boarding demand at a stop.

Providing comfortable seating at or near transit stops dramatically improves the comfort for passenger experience. Comfortable seating can provide valuable resting places whether or not a transit trip is involved.

The provision of seating at transit stops should be prioritized with the goal of improving comfort for the greatest number of passengers. Stops with a moderate or high number of boardings should be furnished with seating, as should stops with long wait times and stops with relatively high use by senior and child passengers. Observe peak hour queues at stops and stations to determine the adequate number of seats to install.

In the design and placement of bus benches, the following factors should be considered:

- Benches should be large enough to seat three or more persons
- Benches should be constructed to be comfortable and safe for customer use
- Materials should have high resistance to vandalism and weathering
- Armrests must be located at both ends of the bench
- Benches without middle armrests are preferred
- Backrests are preferred along the length of the bench. The backrest should have a typical height of 440-455 mm and be positioned at an angle between 95 degrees and 100 degrees to the (horizontal) seat surface
- Benches should be located to minimize obstruction to the public right-of-way and access to/from the bus for all users, including those in wheelchairs
- The minimum setback for a bus bench from the curb face should be 1.5 m (5 ft)

The clearance requirements between a bench and the ID pole for different bus stop layouts can be found in Appendix G.

Typically, seating space inside a shelter is smaller than standing space to accommodate for more standees. Seating may still be desired when the installation of a bus shelter is not recommended. For example, the passenger demographics may warrant seating, or where there is evidence of transit passengers sitting or standing on nearby land structures.

The location of benches may be coordinated with nearby trees for shade and protection from wind or rain.

Benches should be located away from access driveways if possible. They should have sufficient clearance from the passenger landing pad (especially from the bus rear door), an example of a bench is shown in Figure 86.

Creative Outdoor Advertising is the company that is in responsible for all the benches in the City of Windsor (except for the ones owned and maintained by the city Business Improvement Associations (BIA's)).

Figure 86 Public Seating at Bus Stops

4.3.5 Other Bus Stop Amenities

Other potential amenities to accompany shelter and seating installation include:

- Bicycle storage facilities
- Lighting
- Real-time information display
- Trees
- Fare vending
- Garbage and recycling receptacles (shown in Figure 87)

Bus stops should provide a positive customer experience in order to make transit a more appealing travel choice. High quality, attractive, and co-ordinated furniture should be chosen, with fittings and finishing of comparable quality. Street furniture should not interfere with safe bus/passenger operations at the bus stop. To provide adequate lateral clearance, street furniture at bus stops, including the bus stop ID post, shelter, lamp standards, etc., should be set back at least 0.6 m (2 ft) from the curb face.

Figure 87 Trash and Recycling Receptacle

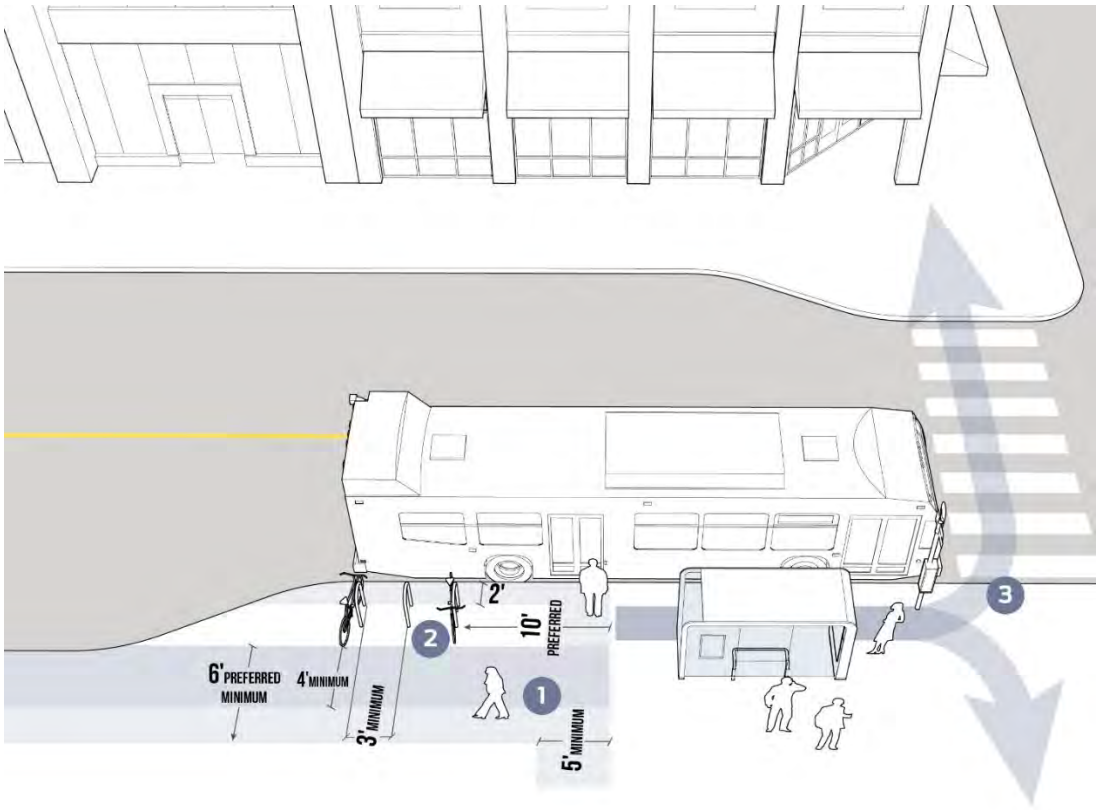
4.3.5.1 Bike Storage Facilities

The provision of proper bicycle storage facilities at bus stops can result in several benefits. While bike racks and bike storage lockers provide organized storage of bikes, innovations such as bike arcs can be visually appealing. Besides the visual benefits, these provisions can prevent unwanted locking of bicycles to other bus facilities and nearby property.

Safe storage of bikes can deter damage and theft of bikes which is a major concern. Not only is this convenient for cyclists using transit; it may also encourage more transit users to bike.

Bicycle storage facilities should be visible while not obstructing pedestrian movements and should not pose as a safety hazard, design is shown in Figure 88. Similar to bus shelters, bicycle storage must be designed so that it is durable and not easily subjected to vandalism and theft. In addition, providing proper lighting and implementing these facilities close to bus stops is important for the convenience and safety of users. Implementation of a bicycle storage facility should depend on passenger demands, which will typically be higher in suburban areas.

Bike parking elements can expand transit sheds, enhancing access to stop-adjacent destinations, and boosting intermodal connectivity.



1) *Provide a clear zone around bicycle parking to avoid impeding traffic, including near transit vehicle doors, on adjacent sidewalks, and through long-term storage facilities*
2) *If multiple bicycle racks are installed, place them at least 1 m (3 ft) apart to allow convenient, uncluttered access*
3) *Short-term bike parking should be located within 15 m (50 ft) of stop, as well as major destinations*

Figure 88 Bike Parking Design

4.3.5.2 Fare Vending

Ticket machines allow riders to purchase single fares, add value to fare cards, or generate proof-of-payment (PoP) tickets from passes. Riders can use a number of payment methods to ride transit, including credit and debit cards, cash and mobile payment systems.

Curbside fare machines are costly to install and maintain; use on high-frequency or high-volume corridors where reduced dwell time is a priority, as seen in Figure 89. Accessibility is key; fare payment purchase instructions should be clear, simple and well communicated, potentially in multiple languages. Machines should also include raised lettering or audible instructions, unless alternatives are available for visually-impaired passengers. Cities are beginning to leverage mobile technology for ticketing, including system apps for off-board fare and pass purchases. The need for off-board fare payment may be reduced or eliminated where passengers are widely able to pay by app, substantially reducing the need for on-board fare payment.

Vending machines must not block accessible path and boarding areas, or bus door zones. Install an adequate number of machines to handle the expected number of passengers purchasing tickets during peak hours, especially if all riders must collect PoP tickets to board. Assess how many tickets can be purchased per machine per hour, and ensure fare machines can accommodate peak hour boardings. Operable parts (including buttons or touch screens) must be placed at a height between 34 and 48 inches to accommodate users in wheelchairs.

Figure 89 Example of a Fare Vending Machine

4.3.5.3 Passenger Information & Wayfinding

Every transit stop must include information about routes served at the stop in a clear, legible manner. Providing clear and simple information like route and system maps, schedules, expected travel times, real-time arrival times, and ridership procedures makes the system more attractive and simpler to use, and improves rider satisfaction. Additionally, good information can enhance the transit stop as a gateway to its surrounding neighborhood or destinations.

Maps, routes and other wayfinding should be prominent at stations and stops, especially high-volume, high-activity, or transfer stops. System information may include strip maps of single routes, fixed schedules or frequencies, full system maps and pertinent transfer maps or schedules. Information can be shown on hanging signs or signage integrated into the shelter. Temporary posted information should be protected from weather behind placards.

At busy transfer nodes, wayfinding promptly guides riders to connecting routes. Outside of stations, wayfinding materials guide rider decision making and transit access. Where bus routes run on one-way streets, or where the location of the stop in the opposite direction is not obvious, wayfinding signage should indicate its location.

For riders with visual impairments, provide an alternative to visual display boards; audible announcements are preferred over braille and other methods that require finding the display. Consider station/street noise and environmental characteristics during implementation.

When at an intersection, signs identifying stop location must be visible from all corners with either a recognizable system logo or standard transit stop marker. Use wayfinding signage and materials that are consistent with regional or agency brand; consistent use of logos, colours and fonts reinforces visibility.

Providing route information that is clear, understandable and accurate makes it easier for passengers to understand their travel options. Schedule and real-time arrival information reduce uncertainty and improve rider satisfaction.

The level of detail for information displayed must be carefully considered to provide clarity and avoid confusion. Avoid over-signing or cluttering the station area with too much information which may be ignored or contribute to information overload.

Real-time arrival displays with mobile app integration improve rider satisfaction and can increase ridership. Real-time displays can range from simple one-color LED text to full-resolution screens (shown in Figure 90), and should be accompanied by audible announcements. Integrate route and real-time arrival information into mobile applications, with emphasis on applications usable by people with visual impairments. Providing information in these formats can strongly complement the written, visual and audio information present at a stop.

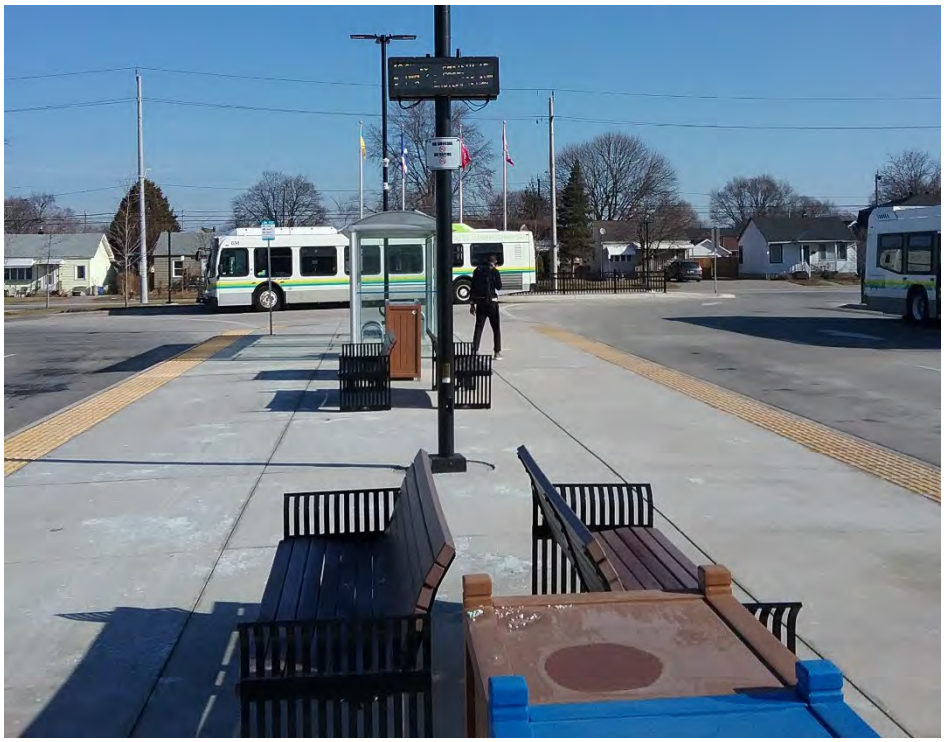


Figure 90 Example of a Real-Time Display Sign

4.4 Universal Access

While accessibility standards are integrated into these Bus Stop Planning and Design Guidelines, several design criteria must be implemented to allow bus stop facilities to remain accessible to all users. Universal design features are critical throughout the transportation network, making it possible for any street user to comfortably and conveniently reach every transit stop. Universal street design facilitates station access, system equity and ease of movement for all users, especially people using wheelchairs or mobility devices, the elderly, people with children and strollers and people carrying groceries or packages.

Employ tactile, visual and audible design elements together to guide people of all abilities through the street environment. Consistently using detectable surfaces, colour contrast and audible warnings assists all users, enhancing safety and accessibility.

Bus stops on steep hills are to be discouraged. However, if unavoidable, bus stops should only be placed at the section of the slope with a gradient less than 8% as that is the maximum grade at a bus stop that wheelchair users can manoeuvre manually.

Stops and stations with real-time arrival information should include audible announcement capabilities.

General provisions of an accessible bus stop are as follows:

- Non-slip finishes are provided
- Street furniture and signage are kept out of the way of pedestrian access and circulation
- Hazards are eliminated and dangerous areas are marked clearly where they cannot be eliminated
- Visual and tactile cues are made through colour and texture contrast
- The area is well lit for orientation and security
- Waiting passengers are visible to the bus driver

According to accessibility guidelines, the necessary minimum infrastructure requirements for an accessible stop are summarized in Table 8.

Table 8 Accessible Bus Stop Dimensions

Amenity to be provided	Dimensions
Concrete barrier curb	150 mm (6 in) high, without indentation for a catch basin
Wheelchair pad	Minimum 2 m x 2.75 m (7 ft x 9 ft)
One or two paved connections from transit stop waiting pad to the sidewalk	1.5 m (5 ft) wide
Accessible ramps on either side	Maximum slope 12:1 (8%), minimum 1.2 m (4 ft) wide
Street furniture or other such objects	Minimum clear width of 1.5 m (5 ft) and clear headroom of 2 m (7 ft), kept clear of transit loading and unloading areas
Bench	Only to be provided where sidewalk width is greater than 2 m (7 ft), and where a fire hydrant is located more than 6 m (20 ft) away

4.4.1 Tactile Walking Surface Indicators

Tactile Walking Surface Indicators (TWSIs), when incorporated into the sidewalk and passenger area, enable customers with visual impairments to locate bus stops within the pedestrian environment.

The primary purpose of TWSIs is to alert customers with vision loss of the bus stop location. The tactile pattern used at bus stops should be a raised flat-topped elongated bars style (pattern for direction purpose as per CSA Standards), as opposed to the truncated domes pattern. Figure 91 shows the example of the flat-topped elongated bars style (for bus stop use) and the truncated domes style (not for bus stop use).

Generally, TWSIs for individual stops should extend a sufficient distance from the curb to intersect the general flow of pedestrian traffic along the passenger waiting area, as shown in Figure 92. Refer to Appendix H for detailed dimensions of the TWSIs for bus stop application and an example of bus stop configuration.

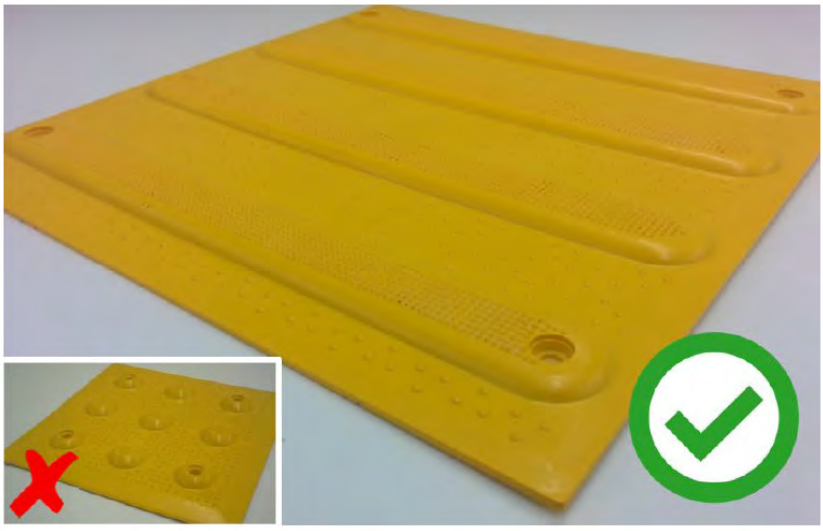


Figure 91 TWSI's example with Pattern of Flat Top and Elongated Bars

It is important to note that TWSIs can only be installed at bus stops with a hard-surfaced passenger zone. The TWSIs should have its base surface levels with the surrounding surface or not more than 3 mm above or below it.

Figure 92 Example of TWSI's at the Hotel Dieu Grace Healthcare Terminal

Detectable warning strips must be applied at all curb ramps for their entire width or at any location where pedestrians cross into another modal zone. Where the boarding platform is higher than a typical curb height, including near-level or level boarding platforms, 0.6 m (2 ft) deep detectable warning strips must be applied the entire length of the platform edge.

Where passengers using wheelchairs are directed to specified doors, ensure the accessible doors are clearly communicated throughout the boarding platform using signs and markings. At sidewalk-level stops, detectable warning strips may be used to indicate door locations.

4.4.2 Colour

Use colour consistently to delineate modal zones and edges; for instance, transit lanes may be red/terra cotta, and bike zones or crossings may be green. Colour repetition reinforces legibility and should be employed at conflict zones, flush crossings, or likely sites for encroachment, as shown in Figure 93. Colour-coded detectable warning strips can draw attention to conflict points.

Detectable warning strips should visually contrast with adjacent surfaces to alert pedestrians that they are crossing into a new modal zone (such as a transitway, bikeway, or vehicle traveled way).

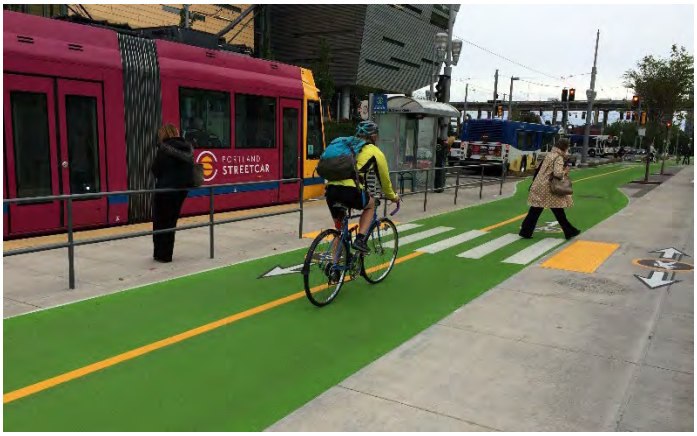


Figure 93 Example of the Use of Colour at Bus Stops

Section 5 Transit Priority Measures

The purposes of transit priority measures are (i) to maximize the 'people carrying' capacity of the road system and (ii) to minimize overall person travel times. As priorities are given to buses, other traffic may incur additional delay or inconvenience. Hence, it is also important to maintain a reasonable balance in the design so that the overall service level is acceptable to both bus and other road users and that an overall net gain is achieved in the performance of the road system. A test for the reasonableness of transit priorities is that the combined auto and transit passenger volumes in the direction(s) and for the time period(s) will not be reduced below the existing level. Another criterion is that the total person-delay will be reduced.

There are three categories of transit priority measures:

- Transit Lanes – a portion of the street designated by signs and markings for the preferential or exclusive use of transit vehicles, sometimes permitting limited use by other vehicles
- Signals and Operations – giving public transit vehicles preferential treatment in the general traffic flow by use of traffic signals
- Legislative and Regulatory Measures – priorities resulting from traffic regulations, national and local acts, and rules of the road (e.g., priority to buses leaving stops, turn exemptions, etc.)

5.1 Transit Lanes

On busy urban streets, transit lanes aid in providing reliable and robust transit service. Continuous lanes provide the greatest benefit to transit operations, and can often be implemented with little impact, or even positive impact, on general traffic flow.

Transit lanes can be dedicated at all times, or only during peak times or daylight hours. Full-time lanes better serve transit performance and visibility, but peak-period lanes may be appropriate in specific contexts. Transit lanes, unlike on-street transitways, are not physically separated from other traffic, as shown in Figure 94.

Transit lanes are best used on streets where transit is delayed by high motor vehicle traffic volume, congestion and curbside activities. Transit lanes organize traffic flow and improve on-time performance and transit efficiency.

Figure 94 Diagram of a Typical Transit Lane

Red colour treatments are effective in reinforcing lane designation. Apply red color along the entire lane.

The decision to dedicate a lane to transit on a multilane street should be based on a combination of factors:

- Transit volume and demand
- Potential to reduce total person delay
- Potential to limit average travel time over both short and long term analysis periods.
- Motor vehicle traffic capacity and travel time

The recommended minimum lane width for a curb transit lane on city streets is 3.3 m (11 ft). When a curb parking lane is converted to exclusive bus use, it may be necessary to flatten out the street crowns at cross streets to avoid the "roller-coaster" effect that occurs when traveling on the curb lane. Physical obstructions, such as utility poles and signs, should also be set back far enough from the curb to allow space for vehicle "tilt" on high crowned roadway sections. When right-turn movements are allowed at intersections, the transit lane should be set back far enough from the stop bar to provide the required right-turn capacity. In locations where right-turn and conflicting pedestrian volumes are high, an advanced right-turn arrow should be considered to minimize the bus delay on the transit lane.

For a median transit lane (or busway), the minimum lane width for bus operation on city streets is 4 m (13 ft) where design speed is greater than 60 km/h and 3.7 m (12 ft) to 4 m (13 ft) where design speed is equal to or less than 60 km/h. Median transit lanes are normally controlled by traffic signal phasing designated for 'with-flow' through traffic.

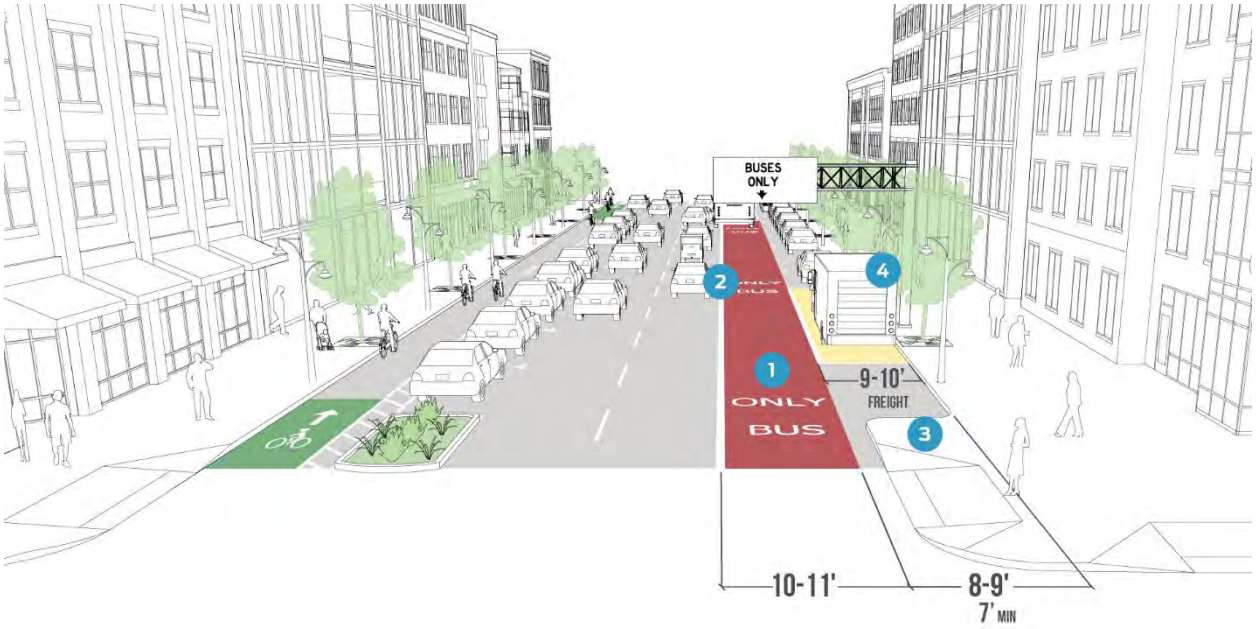
For operational efficiency and safety reasons, a bus lane should not be less than 3.3 m (11 ft) in width if it is adjacent to a bike lane. A real-world transit lane example is shown in Figure 95 and design is shown in Figure 96.

Figure 95 Example of a Transit Lane

Figure 96 Diagram of a Transit Lane

5.1.1 Offset Transit Lane

Also known as “floating” or “parking-adjacent” lanes, offset transit lanes place transit vehicles in the right-most moving lane, but are offset from the curb by street parking, curb extensions, or raised cycle tracks, shown in Figure 97. Offset transit lanes accommodate high transit vehicle volumes and improve both reliability and travel times on streets operating near or beyond their motor vehicle traffic capacity.

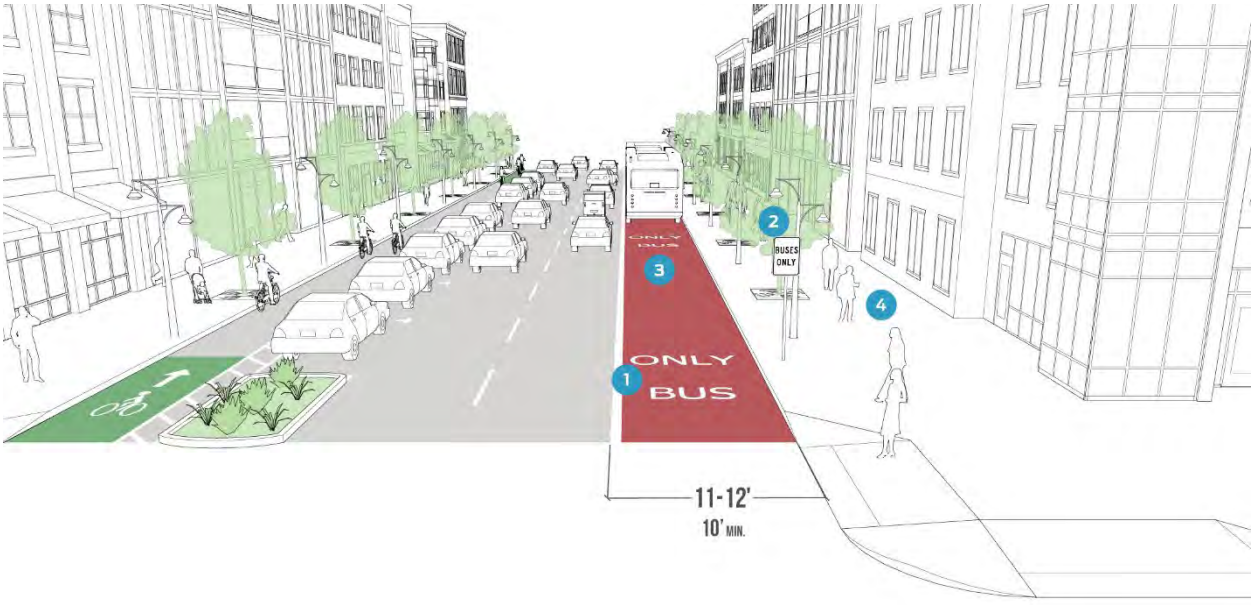


1) *Designate lanes using “BUS ONLY” markings and signs*
2) *Dedicated transit lanes must be separated from other traffic using solid single stripes or double white stripes. A solid single white line conveys that crossing into the transit lane is discouraged, and typically indicates that using the transit lane to pass is prohibited, whereas a double solid white line means that encroachment is legally prohibited*
3) *Transit bulbs should be installed at stops to enable in-lane stops, and provide space for other stop and sidewalk amenities. Curb extensions may be installed at non-stop intersections to increase pedestrian space and shorten crossing distance—interim treatments and materials such as paint, planters, and bollards can be implemented at low cost*
4) *It may be desirable to assign additional space to a buffer or to a parking lane rather than to the bus lane, especially when large vehicles use the parking lane for loading. A 3 m (10 ft) bus lane provides a predictable operating environment when adjacent to a buffer or bicycle lane on at least one side*

Figure 97 Diagram of an Offset Transit Lane

5.1.2 Curbside Transit Lane

The lane adjacent to the curb can be dedicated to transit vehicles, especially on through corridors where parking is either not provided or not well utilized, as shown in Figure 98. Curbside transit lanes can be implemented with varying levels of separation, increasing service capacity and allowing riders to board directly from the curb.

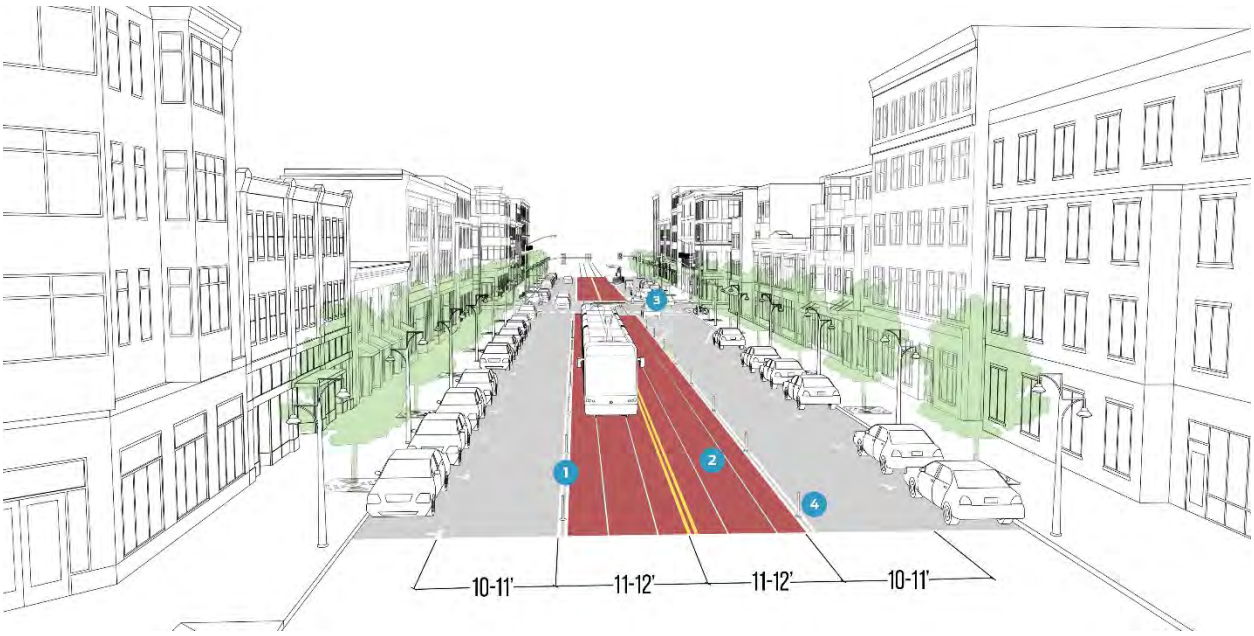


1) *Designate lanes using a single or double solid white line, as well as a stenciled "BUS ONLY" marking*
2) *Signage must designate the transit lane as restricted. Place signs either on the curbside or overhead*
3) *Mark the transit lane with red color. Red color treatments are effective in reinforcing lane designation*
4) *Wider sidewalks, especially those buffered with plantings or furnishings, increase pedestrian safety and comfort adjacent to curbside transit lanes*

Figure 98 Diagram of a Curbside Transit Lane

5.1.3 Centre Transit Lane

Centre transit lanes are typically used on major routes with frequent headways and where traffic congestion may significantly affect reliability. They also reduce the chance of conflicts with parked vehicles. Centre transit lanes can play a key role in creating high-quality transit service. While traditionally found on streetcar streets, centre transit lanes can be used with buses as well. With left turn restrictions and minimal separation, centre transit lanes can be effectively converted to transitways, as shown in Figure 99.



1) *Solid white lines or double white lines must be striped along the right side of the transit lane, along with BUS ONLY or LRT ONLY pavement markings*
2) *Centre-running lanes should be designated using red/terra cotta color to emphasize the lane and deter drivers from entering it*
3) *To avoid conflicts with centre-running transit vehicles, left turns should be prohibited, or accommodated using left-turn lanes and dedicated signal phases. Left turns from the centre bus lane add significant safety and operational issues for high-frequency bus service, but left turns may be permitted at times of day with longer headways*
4) *Separation with soft (e.g. rumble strips) or hard (e.g. concrete curbs) barriers may be used to reduce encroachment from general traffic. Install reflective vertical elements to enhance visibility at night*

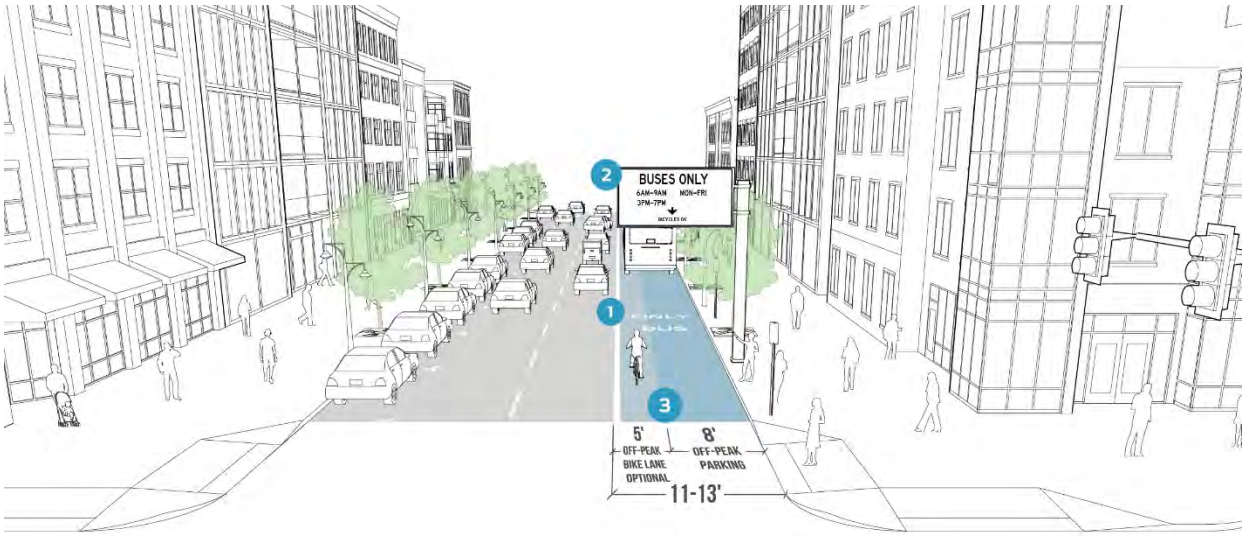
Figure 99 Diagram of a Centre Transit Lane

5.1.4 Peak Only Bus Lane

Many streets with a trunk line role in the bus network have high demand at peak commute periods, but a rich array of goods movement and social life at other times. A peak-only bus lane allows transit to take precedence over parking and curbside access at peak hours when it most benefits bus operations.

A peak-only bus lane can operate as a dedicated bus lane at peak travel periods and provide general curbside uses at other times as shown in Figure 100 and Figure 101. Wider lanes can enable an effective bicycle lane off-peak adjacent to parking. Peak-only transit lanes may also be exclusive to streetcars or buses at peak times while permitting mixed traffic at other times.

Figure 100 Example of Peak-Only Bus Lane

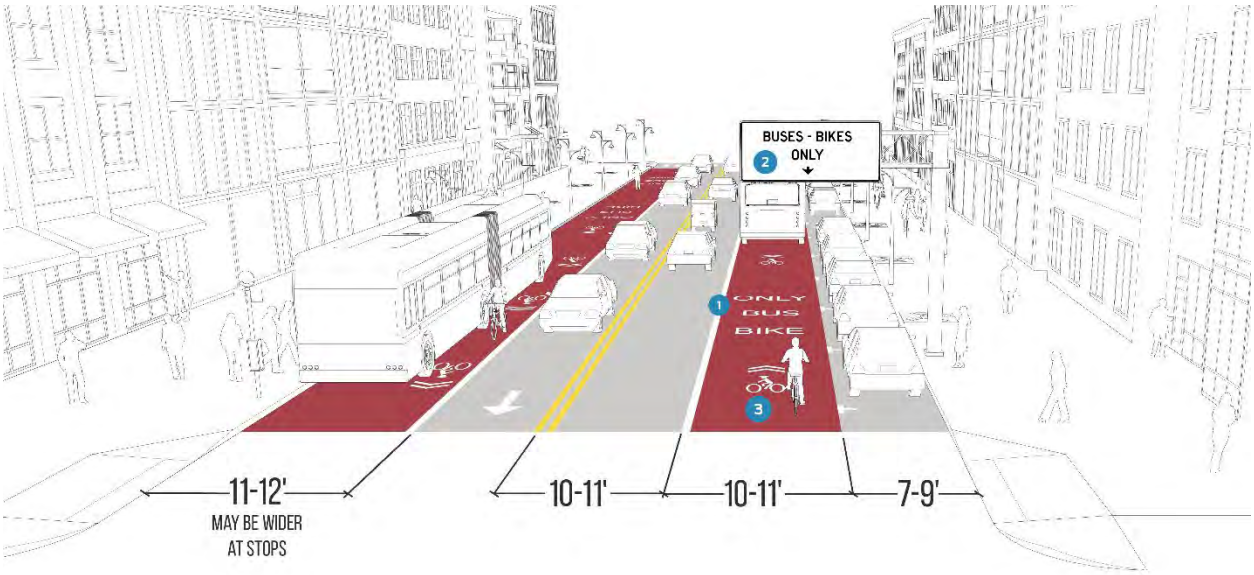


1) *Pavement markings must indicate that the lane is dedicated to transit, including a solid white line and "BUS ONLY" stencil. Skip-lines may be applied where vehicles are permitted to cross, such as at intersections and turn pockets*
2) *Signage must clearly indicate the lane restriction, as well as hours of enforcement and any turn allocations*
3) *During non-operational hours, the curbside portion of the lane may become a parking lane. A 3.7 m (12 ft) or 4 m (13 ft) wide lane can accommodate curbside parking with a bike lane during non-peak hours, and operate as a shared bus-bike lane during peak hours. Signage must communicate that bicycling is permitted at all times*

Figure 101 Diagram of a Peak-Only Bus Lane

5.1.5 Shared Bus Bike Lane

The shared bus-bike lane is not a high-comfort bike facility, nor is it appropriate at very high bus volumes. However, buses and bicycles often compete for the same space near the curb. On streets without dedicated bicycle infrastructure, curbside bus lanes frequently attract bicycle traffic. Shared bus-bike lanes can accommodate both modes at low speeds and moderate bus headways, where buses are discouraged from passing and bicyclists pass buses only at stops, as shown in Figure 102. In appropriate conditions, bus-bike lanes are an option on streets where dedicated bus and separate high-comfort bicycle facilities cannot be provided.



1) *Pavement markings must indicate that the lane is dedicated to transit, including a solid white line and "BIKE BUS ONLY" or similar marking*
2) *Install signs permitting buses and bicycles, and excluding other traffic. "BUSES-BIKES ONLY" signs may be used. Overhead signs are preferred*
3) *Bicycle shared lane markings should be placed in the center or left side of the lane. At stops, place markings at the left side of the lane*

Figure 102 Diagram of a Shared Bus Bike Lane

5.1.6 Queue Jumper Lanes

A queue jumper lane refers to a special lane for transit buses to bypass the general traffic queue, usually at a location where queues frequently form. In designing a queue jumper lane it is important to ensure that the entry to the lane is not blocked by the traffic queue in the adjacent travel lane and that it is long enough to accommodate the expected bus volumes. In some cases, a queue jumper is provided for transit vehicles through the regulation of "Right Turn Only Except Buses" on an exclusive right-turn lane to transit vehicles to continue through the intersection.

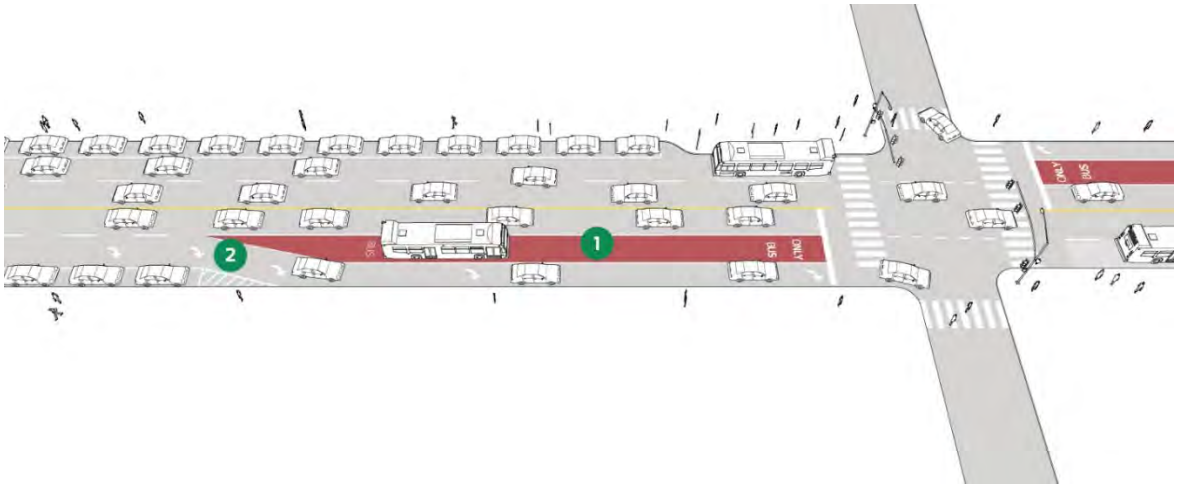
A queue jumper lane at an intersection can be facilitated by a bus-only traffic signal phase (for example, a bus activated phase) so that buses using the queue jumper lane can leave the queue jumper lane safely and access the travel lane on the far-side of the intersection ahead of other traffic, as shown in Figure 103. Sufficient intersection clearance time is required for the bus to clear the intersection before the conflicting traffic signal turns green. The green times available to other traffic may be slightly reduced. However, a net gain in system performance can often be achieved where the reduction in total bus passenger delay is greater than the increased delay to other road users.

The recommended minimum lane width for a queue jumper lane on city streets is 3.3 m (11 ft).

Figure 103 Diagram of a Queue Jumper Lane

5.1.7 Short Transit Lines

Short transit lanes on the approach to major intersections, sometimes paired with active signal priority, allow transit vehicles to bypass long queues that form at major cross streets, as shown in Figure 104. Since these streets often have long signal cycles or break the progression of the transit street, they often present a significant source of delay across downtown, neighborhood and corridor transit streets. Transit approach lanes let the transit vehicle stay in its lane.



1) *The dedicated approach lane should be long enough to allow the transit vehicle to fully bypass a routinely forming queue. Queue length calculations must account for the additional length of the queue after a general traffic lane is reassigned to a transit lane; in the example shown, this length is twice the pre-existing queue length*
2) *Right turns either should be accommodated with a dedicated turn pocket/turn lane to the right of the transit approach lane, or should be restricted to prevent queuing in the transit lane.*

Figure 104 Diagram of a Transit Approach Lane/Short Transit Lane

5.2 Signals and Operations

Signals and operations on the road can be used as tools to facilitate smoother movement of buses throughout their routes. These can range from equipment for use with traffic signals to regulatory measures to give priority to buses.

5.2.1 Bus-Only Signals

Bus-only signals are typically used in conjunction with a bus lane (or a queue jumper lane) on the near-side of the intersection, as shown in Figure 105. Under this type of transit priority treatment, buses are given an exclusive traffic signal phase (i.e. protected movement) to clear a congested intersection ahead of the main traffic stream.

Figure 105 Diagram of a Typical Bus-Only Signal

5.2.2 Bus-Actuated Signals

Priority for transit buses turning onto a major street from a minor street can be provided through traffic signals that can only be actuated by buses, a shown in Figure 106. The actuation may be achieved by physical loop detectors, video detectors way-side or wireless detectors that communicate with a transmitter on the buses. When the presence of an approaching bus is detected, a special protected signal phase is provided allowing the transit bus to proceed safely through the intersection. This phase may or may not be associated with a pedestrian walk phase. Typically, the minor street operates under a "stop sign" control when no bus is detected.

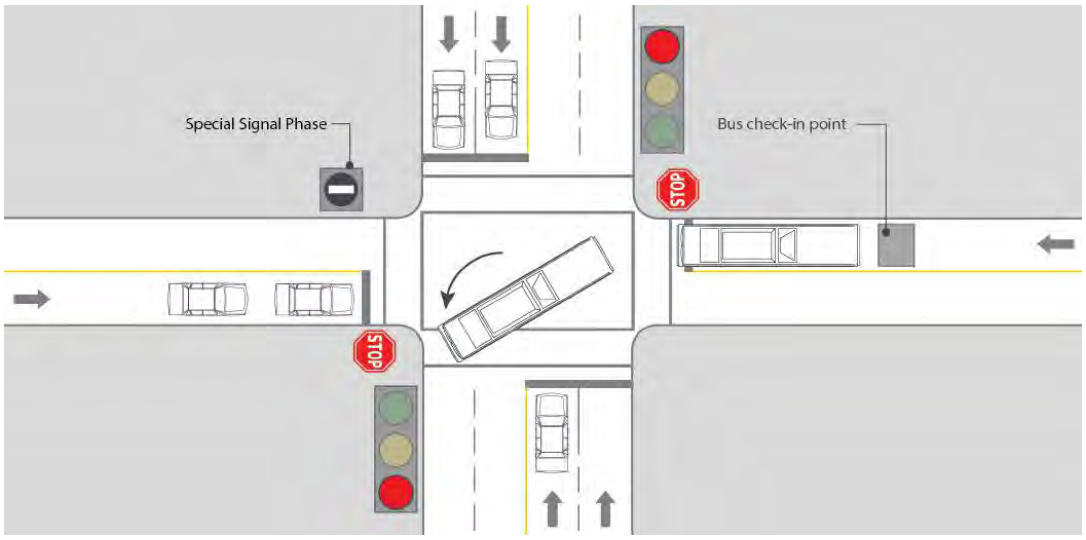


Figure 106 Diagram of a Typical Bus-Actuated Signal

5.2.3 Transit Signal Priority (TSP)

Transit signal priority (TSP) is an operational measure that assists transit vehicles through signalized intersections through Passive (non−bus−activated) or Active (bus−activated) measures, as shown in Figure 107. These signal priorities can be done in conjunction with emergency vehicles.

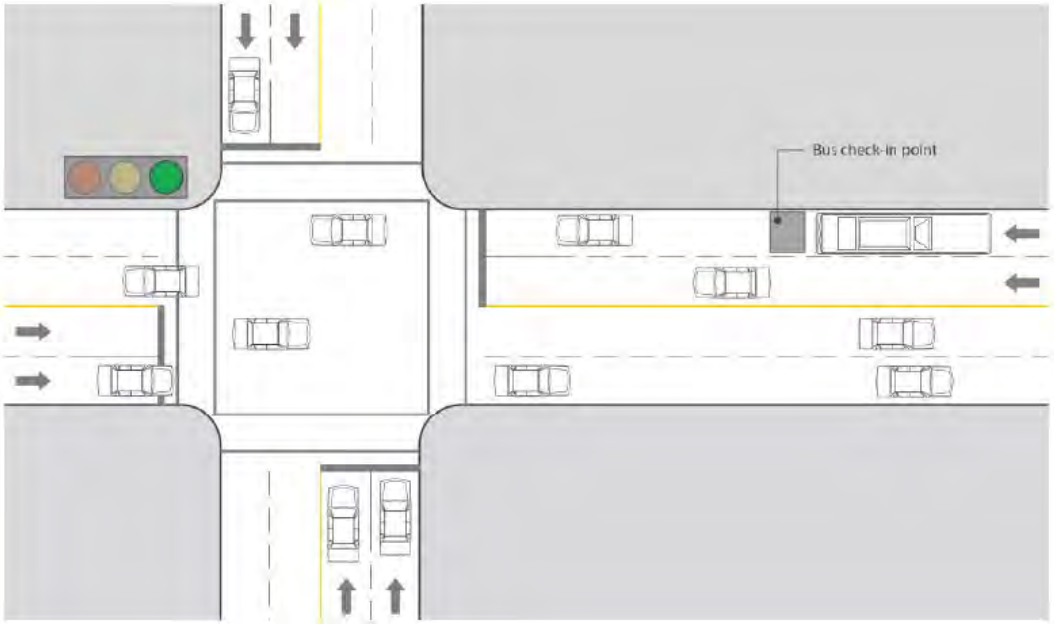


Figure 107 Diagram of a Transit Signal Priority Intersection

5.2.3.1 Passive TSP

Passive priority strategies give priority to transit vehicles without the need for transit vehicle detection. Transit Signal Progression a form of passive TSP involves re-optimization of signal timing and adjustment of phases, splits and /or off-sets to provide a green band that reflects the travel time of buses along the transit corridor. This is a passive measure because the optimized signal timings will be there regardless of the presence of the bus. Signal progressions (green waves) are set to realistic travel speeds for on-street transit. Signal progressions are frequently set without considerations of stop-related delay, including dwell time and time lost to acceleration and deceleration at each stop. Reducing signal progression speeds to meet average transit running times allows buses to keep up with the signal progression.

Below are examples of good candidates for passive TSP:

- On signalized streets with a high volume of transit vehicles, typically more than 10 per hour or with combined headways less than 4 to 6 minutes, in mixed-traffic or dedicated lanes.
- Where active TSP is less feasible or has limited benefits, including streets with short distances between signals, streets with high pedestrian activity levels, and streets with short signal cycles.

5.2.3.2 Active TSP

Active TSP tools modify traffic signal timing or phasing when transit vehicles are present either conditionally for late runs or unconditionally for all arriving transit. For active TSP to work, transit vehicles must be able to reach a signal, either with a dedicated lane or by using a clear lane. For transit corridors with short headways (under 6 minutes) it may be beneficial to operate conditional TSP, providing priority only to late vehicles. On corridors with longer headways or with high reliability, TSP should generally be applied to all transit runs, with time savings incorporated into the service schedule. Figure 108 shows a diagram of this technology while Table 9 shows different examples of active TSP.

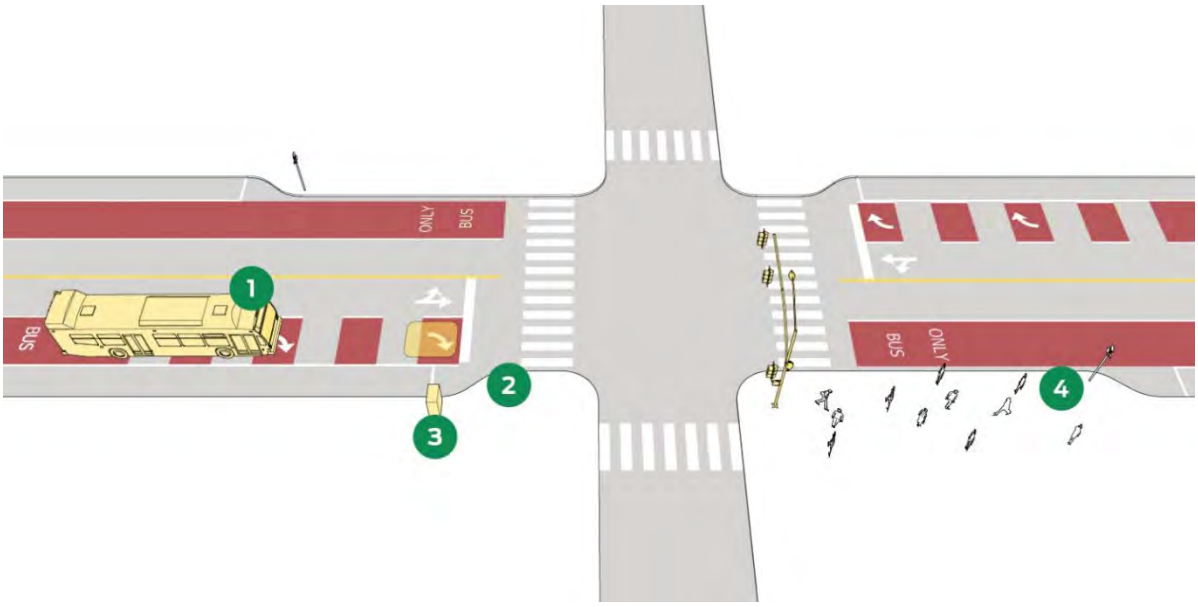
Active TSP can reduce transit delay significantly. In some cases, bus travel times have been reduced around 10%, and delay was reduced up to 50% at target intersections.

Below are examples of good candidates for active TSP:

- Corridors where signal delay is a significant portion of transit delay
- Corridors with relatively long signal cycles, or relatively long distances between signals.
- Specific intersections that favor the cross street and operate off of the progression of the rest of the corridor
- Where transit routes turn, active TSP can extend turn phase time or re-service a turn phase to provide a clear turn lane and additional phase time for slow maneuvers
- Intersections with a far-side stop or no stop, allowing the bus to clear the intersection without waiting at a signal

Table 9 Examples of Active TSP Treatments

TSP Treatment	Definition	Lane Types	Stop Types
Green Extension	Provides extra time for detected transit vehicle to clear intersection, green light extended	Transit Lane, Mixed Travel	Far-Side Pull-Out or In-Lane
Green Reallocation	Green phase begins and ends late to accommodate transit	Transit Lane, Mixed Travel	Far-Side Pull-out or In-Lane
Red Truncation	Provides green phase earlier than programmed, red light reduced	Transit Lane, Shared Right Turn / Queue Jump	Near-Side or Far-side; Pull-Out or In-Lane
Upstream Green Truncation	Stops traffic behind bus as boarding is completed	Mixed Travel	Near-Side or Far-Side; Pull-Out
Phase Insertions / Phase Sequence Changes	Special bus-only phases or prioritization of turn phases	Transit Lane	Any
Phase Reservice	Provides same phase twice in given signal cycle	Transit Lane, Mixed Travel	Any



1) *Active signal priority uses a combination of on-board and wayside technology that determines what type of signal priority can be implemented. Conditional priority usually requires on-board automatic vehicle location (AVL), GPS, optical or laser communication, or other link between the transit vehicle and the signal system*
2) *Active transit signal priority can be provided on transitways using in-ground loop detectors to identify arriving transit vehicles, since only authorized vehicles are present*
3) *Intersection signal controllers and centralized traffic signal management systems are usually the longest-lifecycle elements of the system, and should be chosen with flexibility in mind and in direct coordination with transit agencies and technical specialists*
4) *Using mobile Wi-Fi or other higher-bandwidth communication, transit vehicles can communicate their estimated time of arrival at an intersection, passenger load, schedule adherence, route number or type, and other attributes to the traffic signal controller or signal system. Various technologies can be used to detect when a transit vehicle has cleared an intersection and no longer requires priority. Advanced signal systems can use this information to prioritize signal priority requests, select the most appropriate TSP strategy for the situation, and end a priority phase as soon as it is no longer needed*

Figure 108 Diagram of Transit Signal Priority Technology

5.2.3.3 Short Signal Cycles

On average transit speeds are slower than car traffic. Transit vehicles make regular stops and tend to fall behind signal progressions. Shortening signal cycle length can greatly reduce the time spent by transit vehicles waiting at red signals.

Below are examples of good candidates for short signal cycles:

- When there is no coordinated signal progression
- Streets that take a “minor” role in the signal system
- Signalized streets with frequent transit service, in mixed-traffic or dedicated lanes
- Where active transit signal priority is less feasible or has limited benefits, including streets with short distances between signals, and downtown streets with high pedestrian activity

Short signal cycles reduce overall pedestrian wait times and cross street delay, improving rider access to transit. With sufficient pedestrian crossing time, shorter cycles can improve pedestrian safety by reducing wait times and crossings against the signal.

5.3 Legislative and Regulatory Measures

There are legislative and regulatory measures that can be practised to provide transit priority.

5.3.1 Exemptions from Prohibited or Forced Turns

Exemptions from turns that general traffic are prohibited from making or forced turns (i.e. designated right turn lanes) at intersections allow transit vehicles to service their designated route with minimal detouring, as shown in Figure 109.

Figure 109 Example of "Buses Exempted" Sign

5.3.2 Priority to Bus Leaving Stop

The “YIELD TO BUS” sign on the back of buses gives them a priority right - of way when leaving a bus stop or bus bay, thereby reducing the delay in re−entering the general traffic flow.

5.3.3 No Stopping Signage

No stopping signs at bus stops are used to prevent activity by other vehicles at a bus stop. Stopping bans at bus stops are the most common legal transit priority to prevent pick-up and drop-off activities by other vehicles at a bus stop. This is important for the stop to maintain wheelchair accessibility since the space required by the buses to stop parallel to the curb for the deployment of wheelchair ramp is specific. The distance of the no stopping zone is dependent on the bus stop type. Please refer to Section 2.1 for bus stop dimensions.

Figure 110 Example of a "No Stopping" Sign

5.3.4 Exempting Transit Vehicles from Roadway Infrastructure with Size or Weight Limitations

Exempting transit vehicles from weight restrictions on bridges, or length or width restrictions on narrow roads, allow buses to travel along the most desirable route. These measures may only be considered where bridge or roadway conditions can safely accommodate transit vehicles.

Section 6 Transit Road Design

Transit Streets are Living Streets

Great transit brings more people to a street in less space than other modes of transportation, creating nodes of activity around stations and along routes. Designing transit streets as linear public spaces enhances both the attractiveness of transit and its ability to support healthy urbanism. Shift vehicular priority from cars to transit to unlock space for parklets, plazas, bike lanes and sidewalk cafes.

Transit streets are Active Streets

Transit streets are built around safe, low-stress, and complete pedestrian and bicycling infrastructure. Transit riders are active users of the street, relying on comfortable sidewalks and bikeways—and orderly motor vehicle traffic moving at safe speeds. Intuitive travel paths and frequent opportunities to cross the street make it easy and safe for people to get to transit stops, and are essential to building ridership.

As specific roadway requirements for transit operations are not included in most design manuals, they are included in this section to assist roadway designers. Transit Windsor should be given an opportunity to review and comment on roadway−related designs on all existing or planned bus routes. It should be noted that the design objective is to provide bus operators with adequate opportunity to act and react safely in all traffic conditions, taking into account the design and performance characteristics of buses, particularly those critical in roadway design. If any minimum design standards are not met, one or a combination of the following scenarios may occur, which may compromise public safety, transit efficiency and customer service:

- A bus may not be able to physically complete a certain maneuver without conflicting other traffic movement(s)
- A bus operator may be forced to maneuver without adequate visibility of adjacent traffic
- Bus adherence to schedule may be delayed due to design deficiency
- The mechanical parts of the bus may be damaged, increasing maintenance needs and affecting operational safety
- The safety and comfort of the customers may be adversely impacted
- The opportunity to provide bus customer facilities or bus stops may be limited

6.1 Transit Buses

The dimensions of transit buses are important when designing roadways intended for transit operations. When designing a road or transit facility, the designer should identify the types of transit vehicles that would use the roadway or transit facility, and the dimensions (e.g., minimum width and height clearances, turning radius, etc.) based on the proposed bus maneuvers.

Transit Windsor currently operates several models of buses. Bus dimensions vary by manufacturer, model and production year, but generally fall within a consistent range.

These transit models are:

- New Flyer Xcelsior Hybrid
- New Flyer Xcelsior Clean Diesel
- Orion VII (7)
- Nova LFS Diesel

The current fleet consists of all 40 foot (ft) buses that run on diesel fuel or a hybrid of diesel - electric power, details found in Table 10. There is potential to have 60 foot articulated buses in the future as well as 30-35 foot buses as the Transit Master Plan – More Than Transit is developed. Detailed dimensions of Transit Windsor buses can be found in Appendix I.

All buses are equipped with a bicycle rack at the front of the bus and a wheelchair ramp to provide access to customers with disabilities.

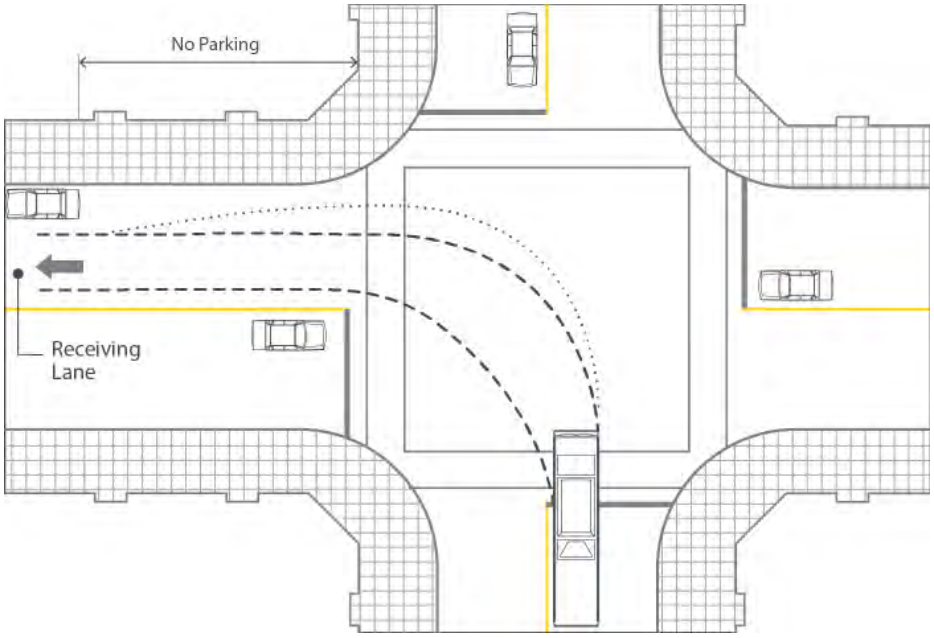
Table 10 Transit Bus Dimensions

Bus Type	Length Over Bumpers (m)	Length Over Body (m)	Width (m)	Height (m)	Wheelbase (m)	Step Height (mm)	Front Step Height (Kneeled) (mm)	Turning Radius (m)
New Flyer Xcelsior Hybrid	12.5	12.24	2.6	3.3	7.2	356	254	13.4
New Flyer Xcelsior Clean Diesel	12.5	12.24	2.6	3.2	7.2	356	254	13.4
Orion VII (7)	12.6	N/A	2.59	3.38	7.26	368.3	279.4	13.2
Nova LFS Diesel	12.19	N/A	2.59	3.2	6.2	N/A	N/A	12.45

6.2 Intersection Design

The design of intersections should accommodate the required bus turning paths. The Design Vehicle selected should reflect the "worst case" condition for the types of vehicles, including buses, expected to operate on the specific route. It should be noted that the following design dimensions are provided as a guide only. Realities of urban design should be acknowledged, such as curb radius vs. pedestrian exposure and other trade-offs. Traffic conditions and frequency of bus movements may also affect intersection design. Figure 111 illustrates the vehicle path of a Standard Bus making a typical left - turn movement at an intersection with either one or two receiving lanes. During the design of a new intersection or the evaluation of an existing one, the receiving lane should be wide enough to prevent a left - turning bus from encroaching on the directional lane line or from coming into contact with a parked vehicle. It is generally preferred that a buffer distance of 0.45 m (1.5 ft) is provided between the bus and these hazards.

One receiving lane



Two receiving lanes

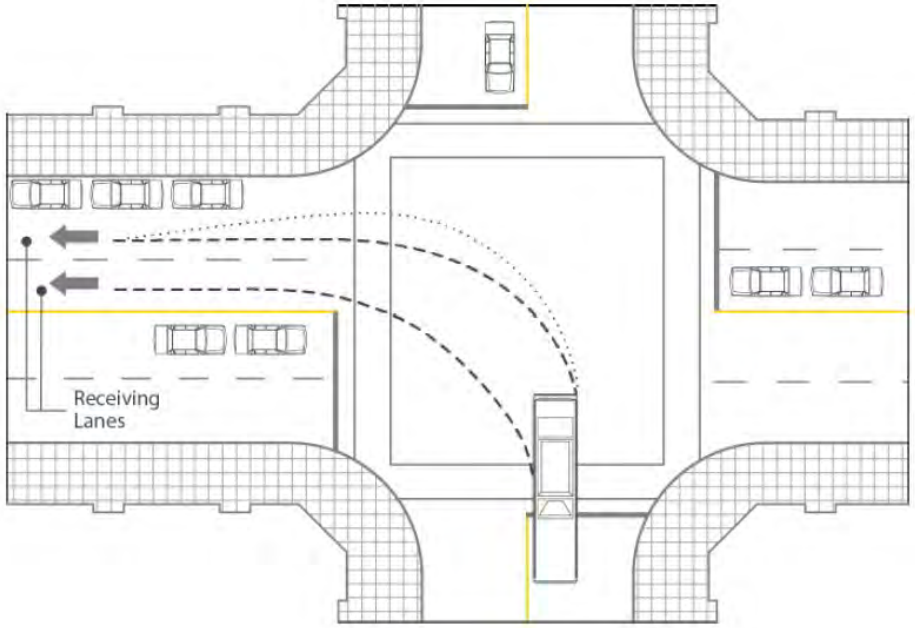


Figure 111 Diagram of Bus Turning Left at an Intersection

Figure 112 illustrates the vehicle path of a Standard Bus making a typical right - turn movement at an intersection and the associated design considerations for corner radii and entry/receiving lane widths. During the design of a new intersection or the evaluation of an existing one, critical vehicle turning paths and other site-specific characteristics should be taken into account when determining corner radii and entry/receiving lane widths.

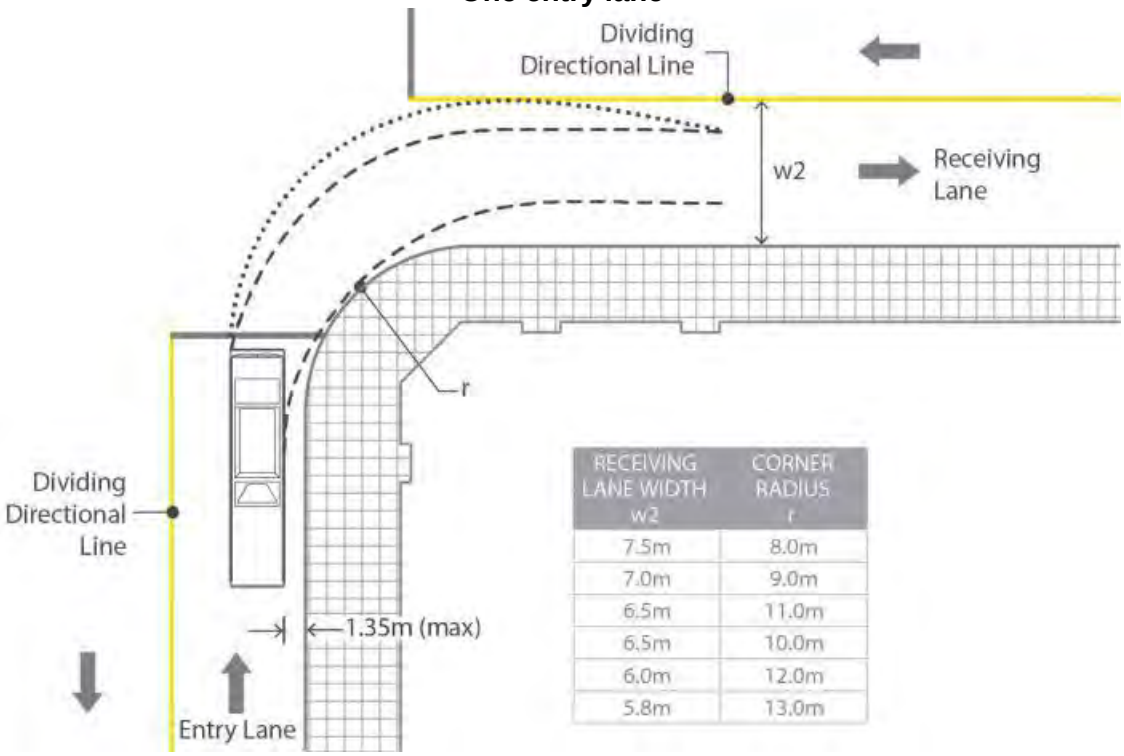
In a single wide lane, the current practice for a right - turning bus is to leave no more than a 1.35 m (4 ft) gap from the curb prior to the turn to avoid safety hazards resulting from vehicles, bicycles, etc. trying to pass the bus on its right side. This is a 'defensive driving' behavior.

Depending on the lane assignment at an intersection, specific design considerations at entry and receiving lanes, as summarized in Table 11, should be reviewed.

Table 11 Bus Turning Design Considerations at Intersections

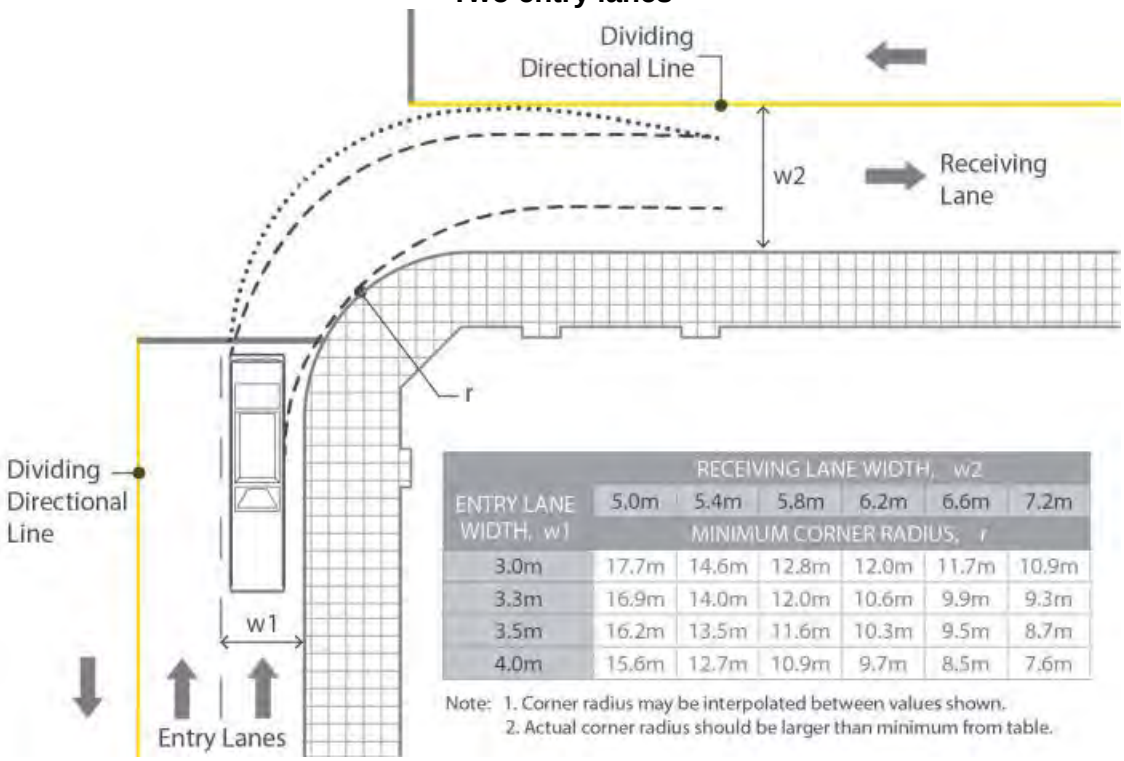
Turn Type	Entry Lane	Receiving Lane
Left Turn	• The starting position of the turn • The sight triangles for crossing traffic • The potential conflict with the turning path of opposing traffic • The sight line for opposing traffic	• The stop position of the cross traffic on the left • The width of the receiving lane(s) • The lateral clearance between any parked vehicles and the turning path of the bus
Right Turn	• The starting position of the turn • To prevent small vehicles such as bicycles, motorcycles, etc. from passing the bus on its right side, a right-turning bus should commence the turn at a distance no more than 1.35 m (4 ft) from the curb, where possible • The sight triangles of traffic from the left	• The corner radius • The width of the receiving lane(s) • The lateral clearance between any parked vehicles and the turning path of the bus

One entry lane



RECEIVING LANE WIDTH w2	CORNER RADIUS r
7.5m	8.0m
7.0m	9.0m
6.5m	11.0m
6.5m	10.0m
6.0m	12.0m
5.8m	13.0m

Two entry lanes



ENTRY LANE WIDTH, w1	RECEIVING LANE WIDTH, w2					
	5.0m	5.4m	5.8m	6.2m	6.6m	7.2m
	MINIMUM CORNER RADIUS, r					
3.0m	17.7m	14.6m	12.8m	12.0m	11.7m	10.9m
3.3m	16.9m	14.0m	12.0m	10.6m	9.9m	9.3m
3.5m	16.2m	13.5m	11.6m	10.3m	9.5m	8.7m
4.0m	15.6m	12.7m	10.9m	9.7m	8.5m	7.6m

Note: 1. Corner radius may be interpolated between values shown.
2. Actual corner radius should be larger than minimum from table.

Figure 112 Diagram of Bus Turning Right at an Intersection

6.3 Lane Widths

Pavement widening beyond standard widths should be considered when buses are the largest design vehicle for an undivided roadway.

Figure 113 through Figure 118, show the desirable curb lane widths on road sections for bus operation, as well as the ideal pull−out distance between a stopped bus and parked vehicles.

The required width of the curb lane depends on the number of through lanes available in the same direction of travel, any allowance for parking in the curb lane, and the presence of bike lanes. The minimum width of a shared lane for transit and bicycle use is 4.3 m (14 ft).

When two or more through lanes are available and parking is not allowed in the curb lane, the desirable width of the curb lane ranges from 3.3 m (11 ft) to 3.7 m (12 ft). When more than one lane is available and parking is allowed in the curb lane, the minimum width of the shared curb lane is 5.8 m (19 ft). When there is only one travel lane in the direction of travel and parking is allowed, the minimum lane width is increased to 6 m (20 ft) to provide clearance from opposing traffic.

The width of the travel lane immediately upstream of a bus stop should not be more than 4.5 m (15 ft) such that approaching vehicles must change lanes to pass a stopped bus. The 4.5 m (15 ft) width can be achieved by having a curb bulge at a bus stop area close to an intersection.

Buses are among the largest vehicles operating on city streets, with mirror widths often exceeding available lane space. Where buses operate in a narrow mixed-traffic lane, intrusion into adjacent lanes may sometimes occur, such as when two buses pass each other. Ensure that adjacent lanes in a street section can occasionally accommodate such movements when needed. Figure 119 and Figure 120 explore the widths of buses and lanes interacting with the buses.

Three through lanes

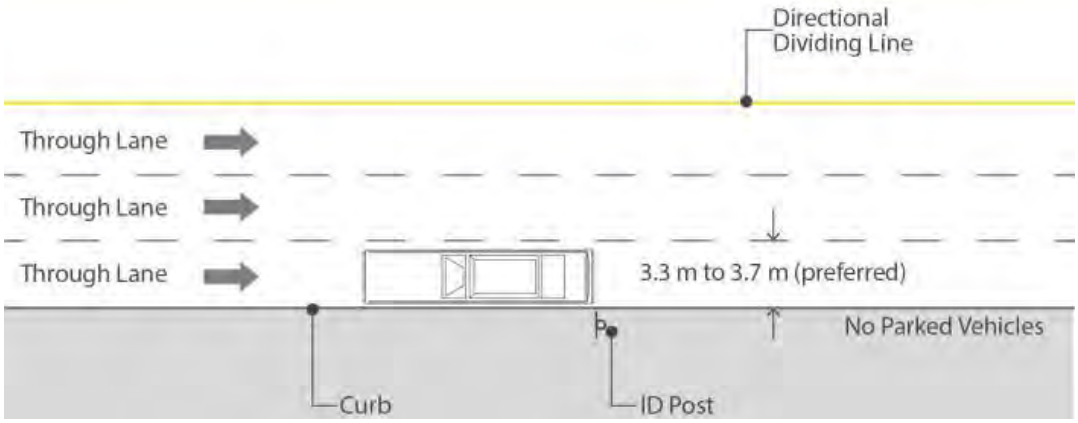


Figure 113 Three Through Lanes Diagram

One through lane and one shared/parking lane

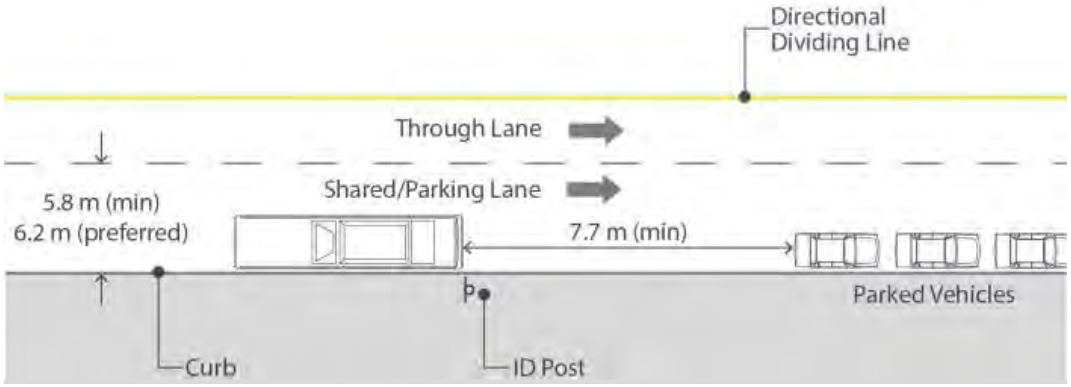


Figure 114 One Through Lane and One Shared/Parking Lane Diagram

Two - way bus - only lane

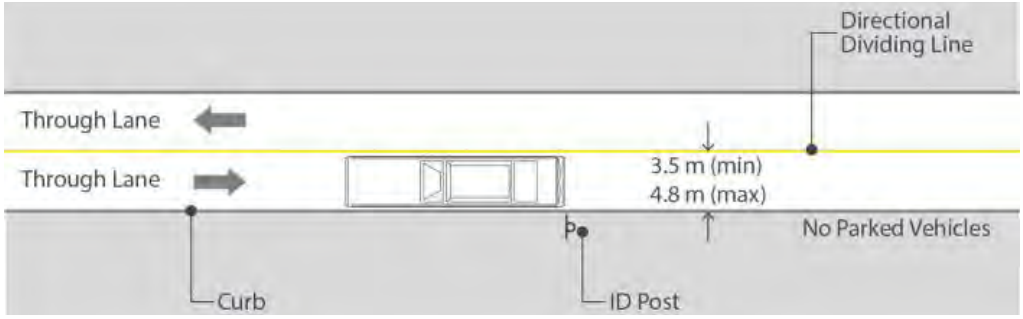


Figure 115 Two-Way Bus-Only Lane Diagram

Shared/parking lane

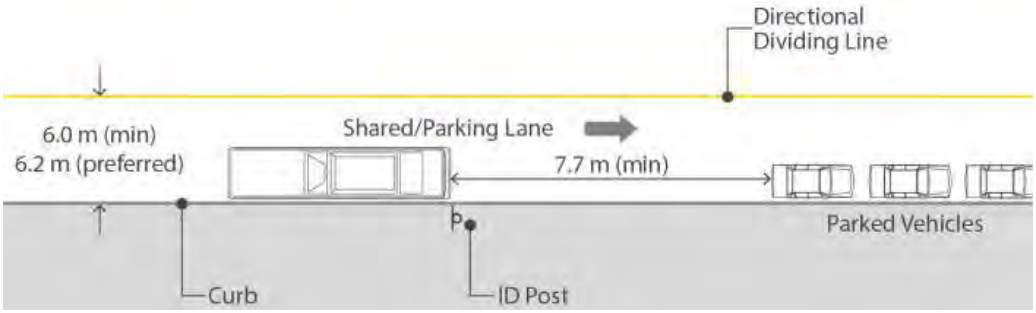


Figure 116 Shared/Parking Lane Diagram

Bike lane – separated

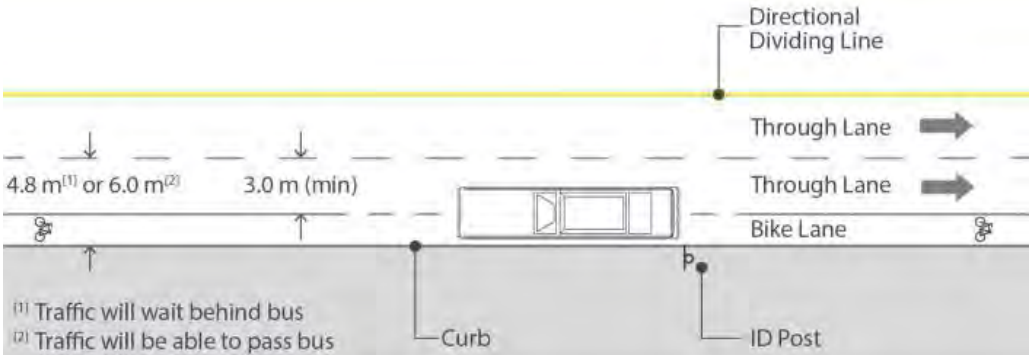


Figure 117 Bike Lane - Separated Lane Diagram

Bike lane – shared

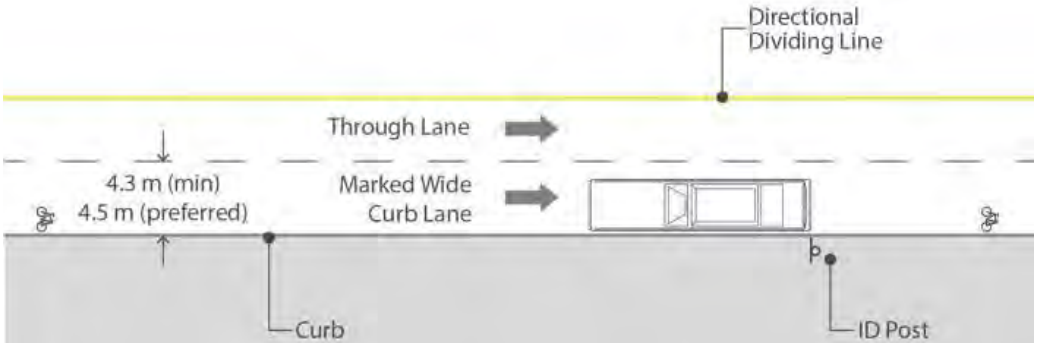


Figure 118 Bike Lane - Shared Diagram

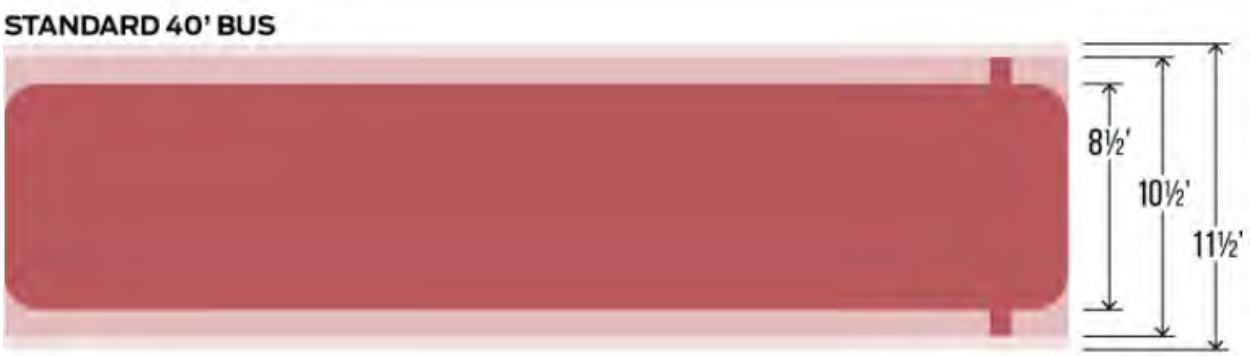


Figure 119 Width and Buffer for a Standard 40 foot Bus

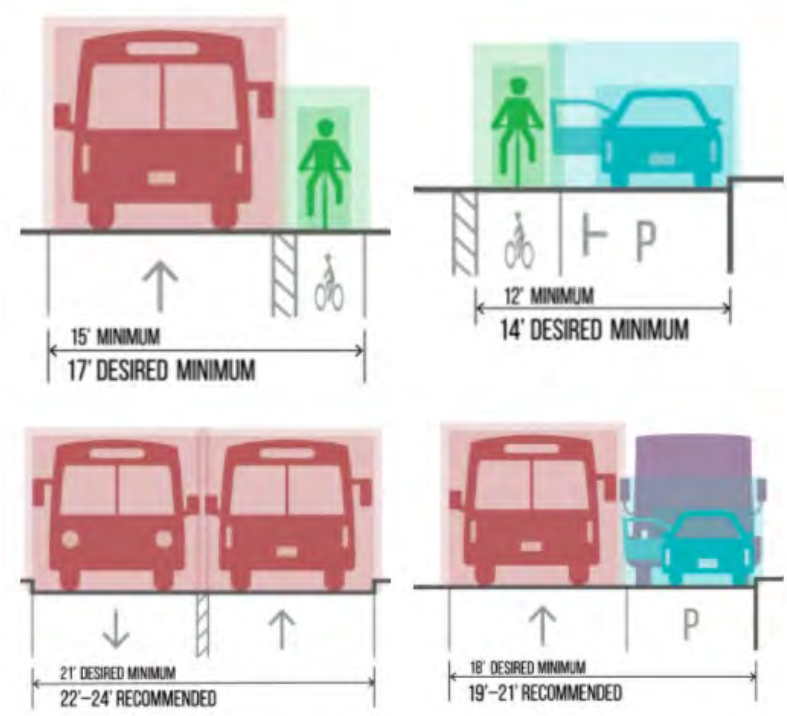


Figure 120 Minimum and Recommended Lane Widths for Transit Vehicles

6.4 Alignment, Grades, and Height

Given the vehicle performance characteristics of buses, such as lower rates of acceleration and deceleration, using minimum geometric design standards should be avoided wherever possible to achieve a high level of bus performance and customer comfort.

6.4.1 Maximum Gradient

The maximum grade or slope that transit buses can negotiate safely and economically is somewhat less than that for general traffic. The maximum grade for roadways designed for transit buses is generally 12%. For sustained gradients longer than 800 m (2625 ft), the maximum grade is 8%. Note that 8% is also the maximum grade at a bus stop so that wheelchair users can maneuver manually. All roads proposed for bus services should preferably be designed with sustained grades of no more than the maximum value to allow safe and efficient bus operation.

Although buses can climb a grade greater than 12%, the speed and operating performance will be significantly reduced. Stopping sight distance and other safety aspects are also important design factors that must be considered on downhill road sections with grades greater than 12%.

The maximum grade at bus layover locations should not exceed 3%.

6.4.2 Minimum Vertical Clearance

When a bus is being towed under a roofed structure, the minimum vertical clearance is 4.5 m (15 ft). This clearance accommodates access for repair activity on the roof of the bus and height needed for towing. Overhead structures including sprinkler and HVAC equipment should be mounted higher than 4.5 m (15 ft) from the ground.

6.5 Traffic Calming Measures

Traffic calming measures are often installed on local or residential streets for the purposes of:

- Reducing vehicular speeds
- Discouraging through traffic
- Minimizing conflicts between street users
- Improving the neighborhood environment

Traffic calming measures may be regulatory, such as posting reduced speed limits or four-way stop signs. However, many involve physical measures that deflect or alter vehicle paths. The latter type includes speed humps, traffic circles, curb extensions, etc. If traffic calming measures are to be installed on transit bus routes, their effects on bus operations must be considered, particularly for the physical traffic calming measures. On bus routes, the impacts of physical traffic calming measures should be very carefully considered in order to maintain safe and efficient bus transit operations. More traffic calming measures are provided in Appendix J.

6.5.1 Speed Humps and Tables

A speed hump slows down vehicles by transferring an upward force to a vehicle and its occupants as it crosses the speed hump. A level of discomfort results, depending on the profile of the hump, the speed of the vehicle, and the length of the vehicle's wheel base. If feasible alternatives are available, speed humps are not recommended for use on streets with public transit. Transit Windsor also does not support, in principle, the installation of speed humps on bus routes for reasons of customer safety and comfort, operational efficiency, and vehicle maintenance implications.

If speed humps or speed tables are to be installed on transit routes, the design should consider the special operational characteristics and the needs of transit vehicles, including:

- A speed table (with flat top) is preferred to a speed hump for installation on transit routes. If speed tables are to be installed on transit routes, a 6.7 m (22 ft) speed table with a 3.1 m (10 ft) plateau, 1.8 m (6 ft) sinusoidal or parabolic approaches and a vertical height of 76 mm (3 in) is recommended. Figure 121 shows the typical sinusoidal and parabolic approach speed tables
- Speed humps should not be installed immediately before or after a bus stop as they may affect the stability of the customers who are walking to the doors for alighting, walking to their seats, or moving toward the back of the bus. It is recommended that the speed tables be located at least 25 m (82 ft) in advance or after a bus stop
- Typically, buses cannot travel over a speed hump at the same speed as passenger vehicles. A special transit speed reduction warning sign may be required to advise the operators of the speed at which they should travel over the speed hump

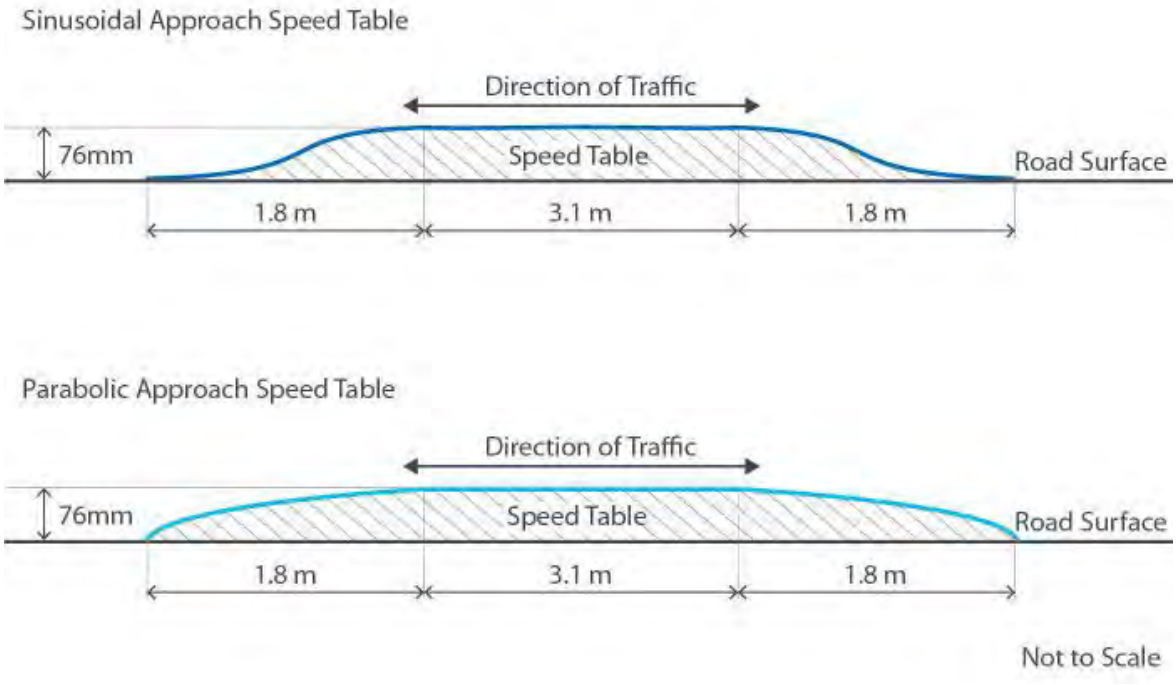


Figure 121 Speed Table Dimensions

6.5.2 Curb Extensions, Radius Reductions, and Traffic Circles

Curb extensions, radius reductions, and traffic circles are examples of traffic calming measures used to influence the path and speed of moving traffic by modifying the alignment, the width of the travel lane and/or the corner radius. Figure 122 shows an example of a curb extension, while Figure 123 illustrates the conceptual layouts of the possible arrangements.

When designing these traffic calming measures on transit bus routes, the following transit operation requirements should be considered:

- Bus routing
- Bus turning paths for a 12.4 m (40 ft) Standard Bus (details provided in Appendix K)
- Minimum lane width
- Corner radii

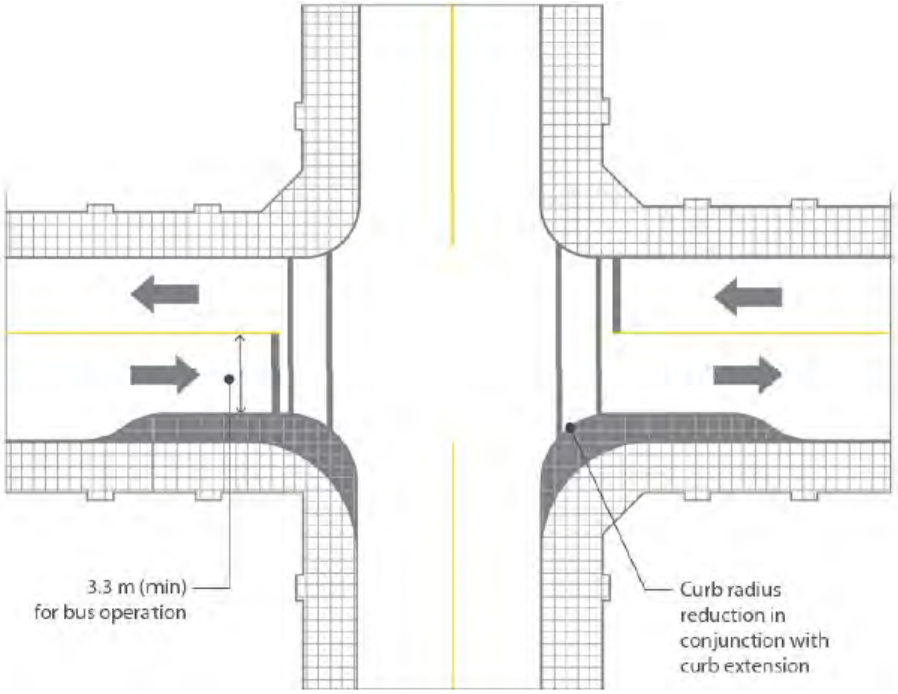


Figure 122 Example of Radius Reduction

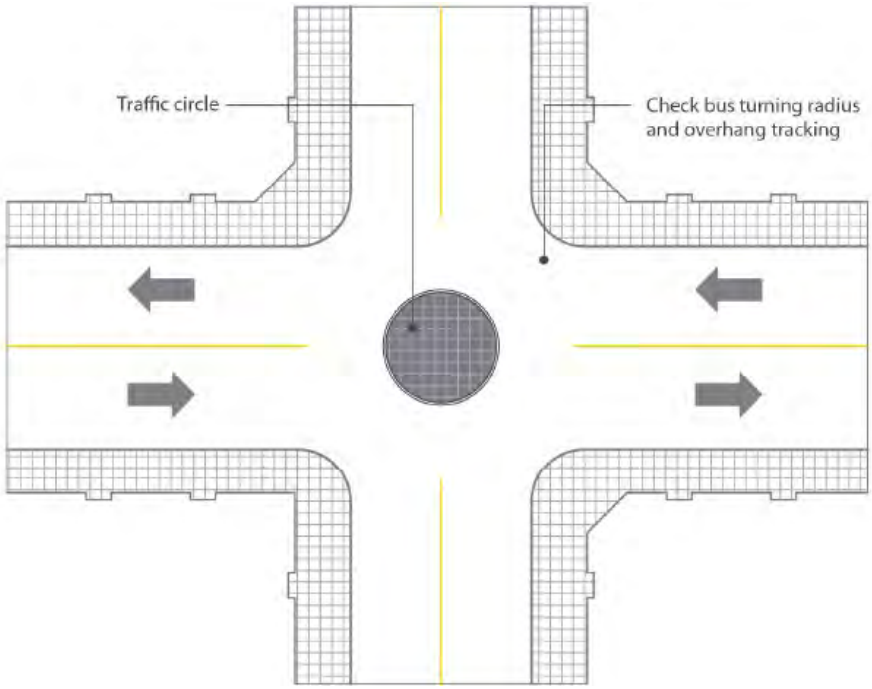


Figure 123 Example of a Traffic Circle

6.6 Roundabout Requirement

To minimize customer discomfort associated with driving over a mountable curb at a roundabout, buses should circulate the roadway without intruding on the truck apron. The minimum diameter of a roundabout is 32 m (105 ft). Figure 124 shows a real-world round-about in Transit Windsor's route network.

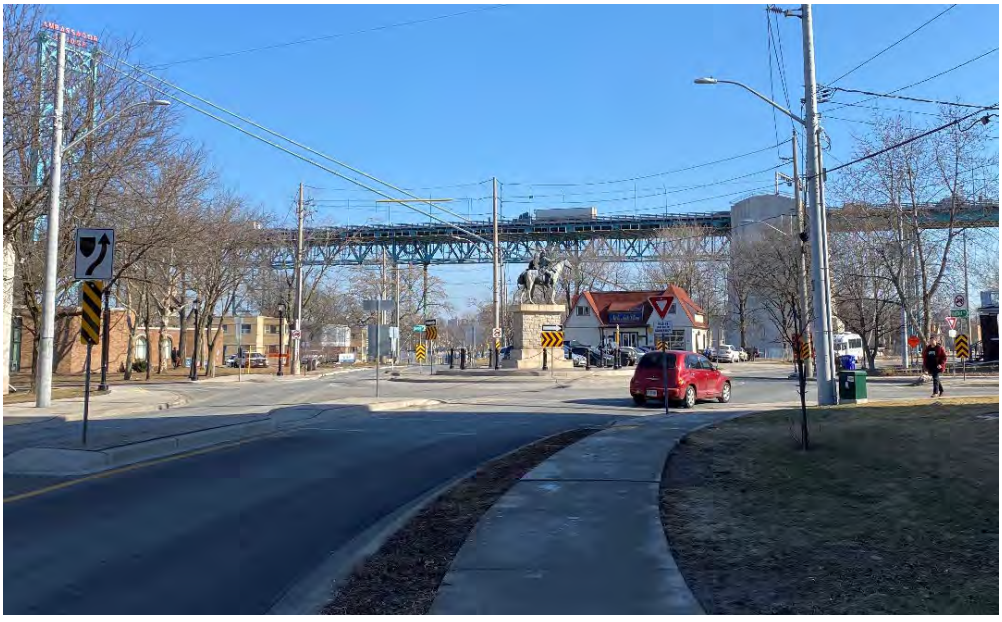


Figure 124 Example of a Roundabout Used by Transit Windsor

Conclusion

Overall, Transit Windsor uses these route infrastructure planning and design guidelines to create consistency when establishing new bus stops and reviewing current bus stops. Having this consistency gives Transit Windsor users a better understanding of the transit system and allows other City of Windsor departments to understand what is needed in the public right-of-way for Transit Windsor. These guidelines also allow Transit Windsor to appropriately address public concerns or suggestion with clarity and reasoning for bus stop and route infrastructure decisions.

These planning and design guidelines emphasize the importance of collaboration between Transit Windsor and other City of Windsor departments in order to achieve proper transit standards. These guidelines have been informed by a variety of guidelines from other transit properties across Canada and national transit organizations to ensure that Transit Windsor is following industry standards and best practices.

Appendix A Bus Stop Design Evaluation

Transit Windsor Bus Stop Design Evaluation

Date of Evaluation:

Submitted by:

Location of Existing or Proposed Stop					
Stop ID:					
Route(s) Affected:					

Criteria	***Answer***	***Points***
Stop Spacing Guidelines *Refer to Section 1 in Transit Windsor Route Infrastructure Planning & Design Guidelines for more information		
1) What type of stop is this or will this be for?	Regular Transit Route Express Transit Route	N/A
a. If the answer to question 1 is regular, is the stop spacing between 200-300 m?	Yes (10 points) No (5 points) N/A	
b. If the answer to question 1 is express, is the stop spacing greater than 300 m?	Yes (10 points) No (5 points) N/A	
Placement of Bus Stop *Refer to Section 2 in Transit Windsor Route Infrastructure Planning & Design Guidelines for more information		
2) What is the bus stop configuration of the proposed / existing bus stop?	Far-Side Near-Side Mid-Block	N/A
3) Is the bus stop In-Lane or Pull-Out?	In Lane (10 points) Pull-Out (5 points)	
4) If a crosswalk is present in the vicinity of the bus stop, is the stop the required distance from the crosswalk?	Yes (5 points) No (0 points) N/A	
5) If parking is present before or after the bus stop, do you have the proper distance between the transit vehicle and parked vehicles?	Yes (5 points) No (0 points) N/A	
6) If a pedestrian crossover (PXO) is present in the vicinity of the bus stop, is the stop the required distance from the crossover?	Yes (5 points) No (0 points) N/A	

Question	Bus Stop Configuration	Answer	Scoring
Is the bus stop near a signalized intersection?	Far-Side	Yes (5 points) No (0 points) N/A	
	Near-Side	Yes (0 points) No (5 points) N/A	
	Mid-Block	N/A	N/A
Is there on street parking?	Far-Side	Yes (5 points) No (0 points) N/A	
	Near-Side	Yes (0 points) No (5 points) N/A	
	Mid-Block	N/A	N/A
If this intersection is a transfer point, is this stop being placed on an adjacent corner to an existing stop?	Far-Side	Yes (5 points) No (0 points) N/A	
	Near-Side	Yes (5 points) No (0 points) N/A	
	Mid-Block	N/A	N/A
Is the bus stop the required distance from the intersection?	Far-Side	Yes (5 points) No (0 points) N/A	
	Near-Side	Yes (5 points) No (0 points) N/A	
	Mid-Block	N/A	N/A
Is there a large ridership generator near the bus stop?	Far-Side	N/A	N/A
	Near-Side	N/A	N/A
	Mid-Block	Yes (5 points) No (0 points) N/A	
Is there a safe pedestrian crossing nearby?	Far-Side	N/A	N/A
	Near-Side	N/A	N/A
	Mid-Block	Yes (5 points) No (0 points) N/A	
Bus Stop Type *Refer to Section 3 in Transit Windsor Route Infrastructure Planning & Design Guidelines for more information			
7) If a boarding bulb is present, does the bus stop meet the required distance?		Yes (5 points) No (0 points) N/A	
8) If a bus bay is present, does the bus stop meet the required distance?		Yes (5 points) No (0 points) N/A	
9) If a bike lane is present, does the bus have to cross over or stop in the bike lane?		Yes (0 points) No (5 points) N/A	

Physical Design for Safe Passenger Access & Amenities *Refer to Section 4 in Transit Windsor Route Infrastructure Planning & Design Guidelines for more information			
10) Is the bus stop sign located at a minimum of 0.6 m from face of curb or can it be?		Yes (5 points) No (0 points) N/A	
11) Is the bus stop sign obscured by objects or will it be?		Yes (0 points) No (5 points) N/A	
12) If the sign is installed behind the sidewalk or it will be, is the sign positioned at a 45 degree angle to road?		Yes (5 points) No (0 points) N/A	
13) If the sign is installed between the road and the sidewalk or it will be, is the sign positioned perpendicular to the road?		Yes (5 points) No (0 points) N/A	
14) If the sign is near a driveway or it will be, what is the distance between the driveway and the sign?		0-4 feet (0 points) 5-9 feet (3 points) 10+ feet (5 points)	
15) What type of bus stop is being analyzed?		Regular Enhanced Terminal	N/A
Amenity	Stop Type	Answer	Scoring
Route / schedule information holder	Regular Stop	Yes (5 points) No (0 points) N/A	
	Enhanced Stop	Yes (5 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
Lighting	Regular Stop	Yes (3 points) No (0 points) N/A	
	Enhanced Stop	Yes (5 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
Passenger Landing Pad	Regular Stop	Yes (5 points) No (0 points) N/A	
	Enhanced Stop	Yes (5 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
Wheelchair Pad	Regular Stop	Yes (3 points) No (0 points) N/A	
	Enhanced Stop	Yes (5 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	

Garbage Receptacle	Regular Stop	Yes (3 points) No (0 points) N/A	
	Enhanced Stop	Yes (5 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
Seating	Regular Stop	Yes (3 points) No (0 points) N/A	
	Enhanced Stop	Yes (5 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
Bus Shelter	Regular Stop	Yes (3 points) No (0 points) N/A	
	Enhanced Stop	Yes (5 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
Real-time Information	Regular Stop	Yes (1 point) No (0 points) N/A	
	Enhanced Stop	Yes (3 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
Bicycle Storage	Regular Stop	Yes (1 point) No (0 points) N/A	
	Enhanced Stop	Yes (3 points) No (0 points) N/A	
	Terminal	Yes (5 points) No (0 points) N/A	
		Total Points	0

	Scoring	
	Maximum:	**150**
	Minimum:	**37**

Additional Comments

Appendix B Maintenance Checklist

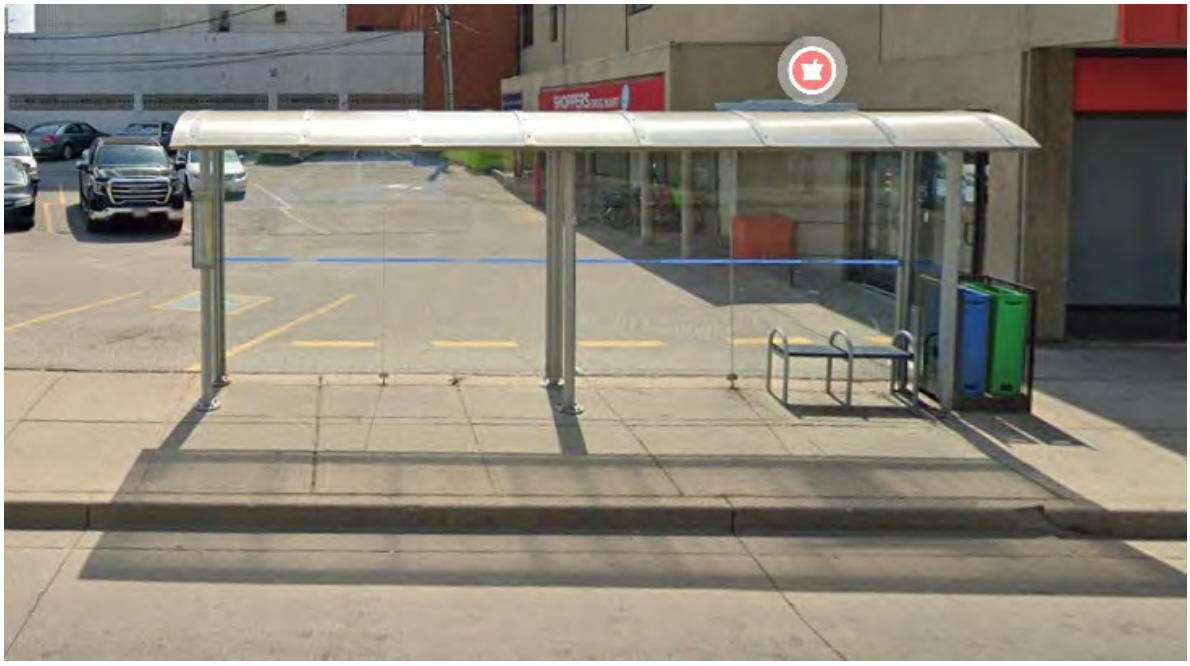
A maintenance checklist was developed for the elements described in the previous sections. The intent is to provide personnel with a list of items that require observation and checking on-site to ensure that maintenance is provided as required. All bus stops will be evaluated on an annual basis. A score will be given to each bus stop.

Element	Preferred Condition
Access routes used by passengers, eg. sidewalks	No physical obstacles, clear of materials that create slippery surfaces
Lighting	In operation, adequate lighting level
Landscaping	Low-level shrubbery or canopied trees
Bus stop signage	Good visibility, not obscured by streetlights or trees Free of vandalism
Bus shelter and bench	Free of vandalism and weathering effects
Refuse receptacles	Free of vandalism, free of pooling of liquids
Bus schedules and route maps	Free of vandalism, good condition
Curb-side	Free of potholes, no drainage issues
Bus pad	Free of cracks in concrete

Appendix C Types of Bus Shelters within Transit Windsor's Route Network

2' x 10' Daytech Avanti Shelter – NON AD

2' x 20' Daytech Avanti Shelter – NON AD



4' x 8' Daytech Avanti Shelter – NON AD

4' x 10' Daytech Avanti Shelter - AD

4' x 10' Daytech Avanti Shelter – NON AD

4' x 20' Daytech Avanti Shelter – NON AD

4' x 20' Daytech Avanti Shelter - AD

5' x 20' Daytech Avanti Shelter – NON AD

4' x 8' Daytech Traditional Shelter – NON AD

4' x 10' Daytech Vangarde Shelter

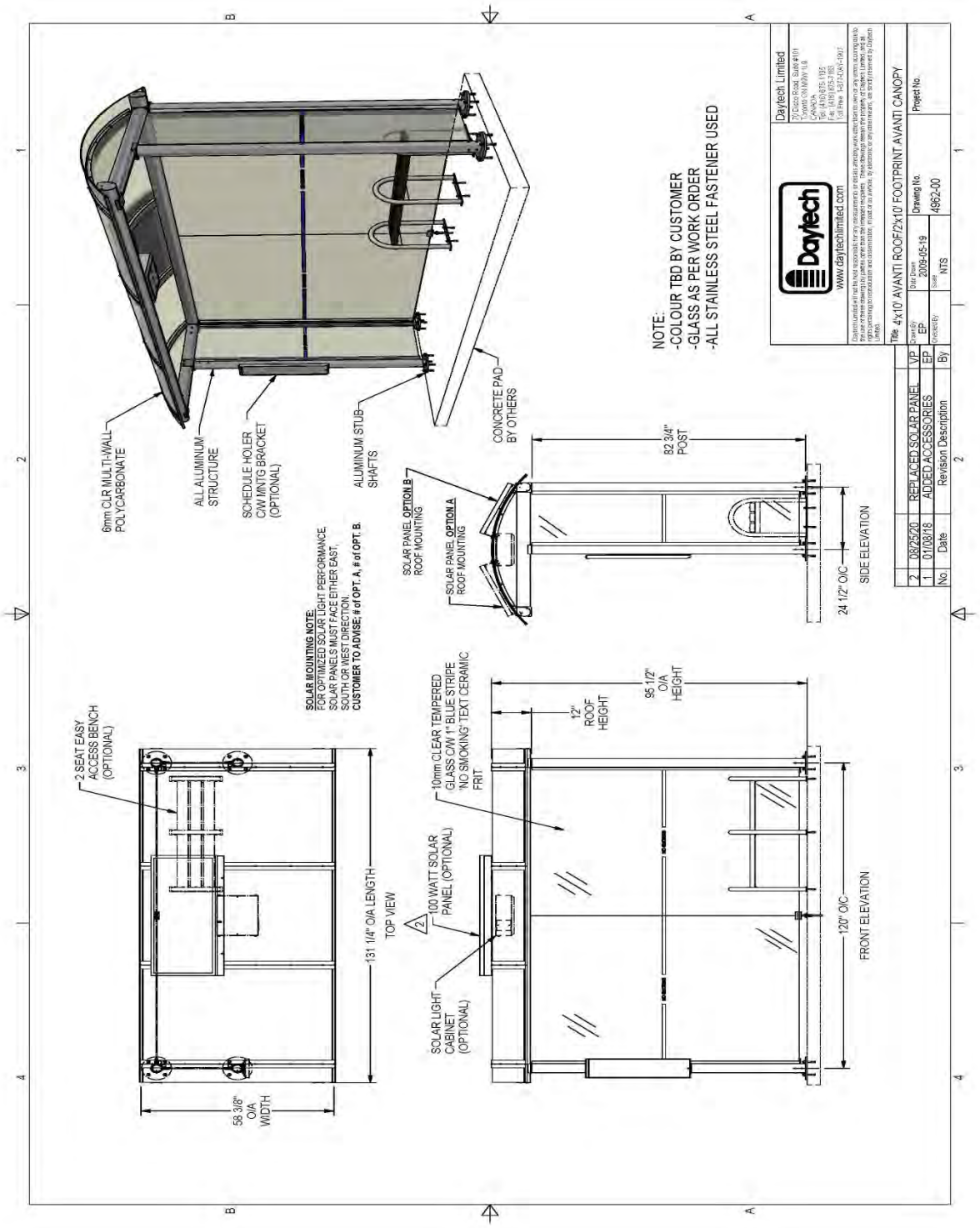
4' x 10' Daytech Traditional Shelter – NON AD

4' x 12' Daytech Contemporary Shelter – NON AD

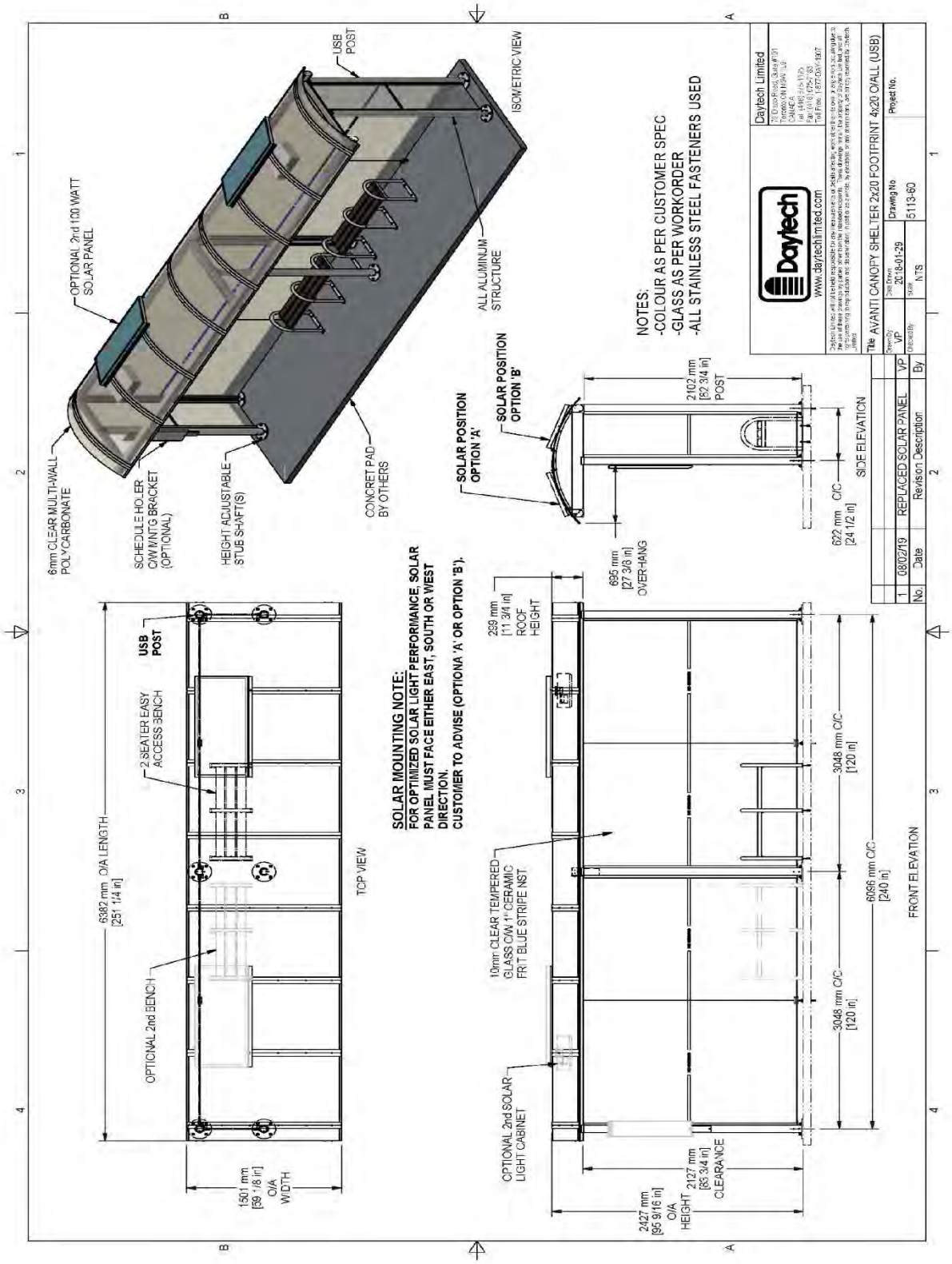
4' x 10' Daytech Classic Shelter

Appendix D Daytech Bus Shelter Specifications

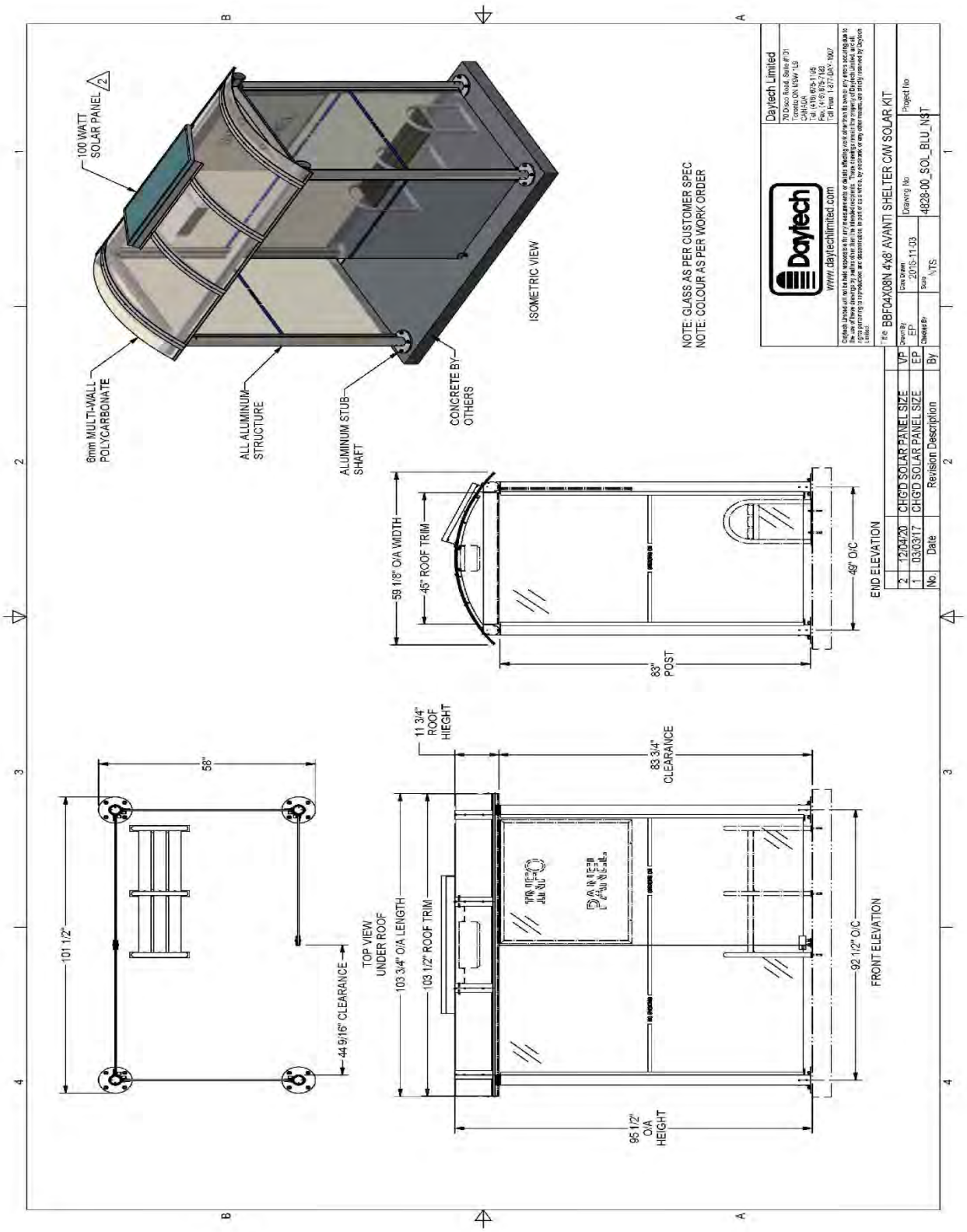
2’ x 10’ Avanti



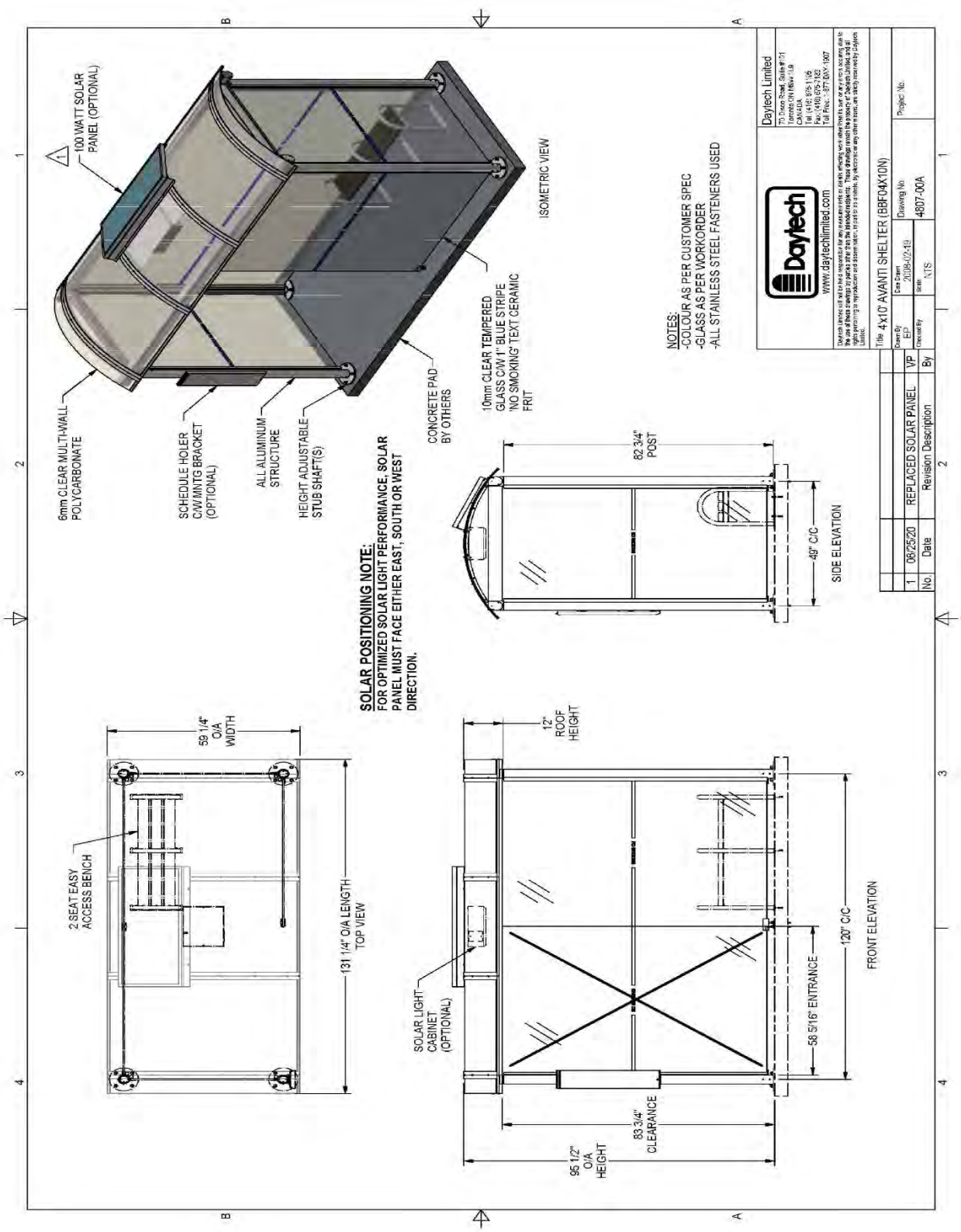
2' x 20' Avanti


ISOMETRIC VIEW
USB POST
OPTIONAL 2nd 100 WATT SOLAR PANEL
ALL ALUMINUM STRUCTURE
6mm CLEAR MULTIWALL POLYCARBONATE
SCHEDULE HOLDER C/W MNTG BRACKET (OPTIONAL)
HEIGHT ADJUSTABLE STUB SHAFT(S)
CONCRETE PAD BY OTHERS
SOLAR POSITION OPTION 'A'
SOLAR POSITION OPTION 'B'
NOTES:
-COLOUR AS PER CUSTOMER SPEC
-GLASS AS PER WORKORDER
-ALL STAINLESS STEEL FASTENERS USED
2102 mm [82 3/4 in] POST
695 mm [27 3/8 in] OVER-HANG
622 mm C/C [24 1/2 in]
SIDE ELEVATION
Daytech Limited
Daytech
www.daytechlimited.com
Title AVANTI CANOPY SHELTER 2x20 FOOTPRINT 4x20 O/ALL (USB)
Drawn By VP
Date 2018-01-29
Drawing No. 5113-60
Project No.
Checked By
Scale NTS
No. Date Revision Description By
1 08/02/19 REPLACED SOLAR PANEL VP
USB POST
2 SEATER EASY ACCESS BENCH
6382 mm O/A LENGTH [251 1/4 in]
OPTIONAL 2nd BENCH
1501 mm [59 1/8 in] O/A WIDTH
TOP VIEW
SOLAR MOUNTING NOTE:
FOR OPTIMIZED SOLAR LIGHT PERFORMANCE, SOLAR PANEL MUST FACE EITHER EAST, SOUTH OR WEST DIRECTION.
CUSTOMER TO ADVISE (OPTIONA 'A' OR OPTION 'B').
299 mm [11 3/4 in] ROOF HEIGHT
10mm CLEAR TEMPERED GLASS C/W 1" CERAMIC FRIT BLUE STRIPE NST
OPTIONAL 2nd SOLAR LIGHT CABINET
3048 mm C/C [120 in]
3048 mm C/C [120 in]
6096 mm C/C [240 in]
2427 mm [95 9/16 in] O/A HEIGHT
2127 mm [83 3/4 in] CLEARANCE
FRONT ELEVATION

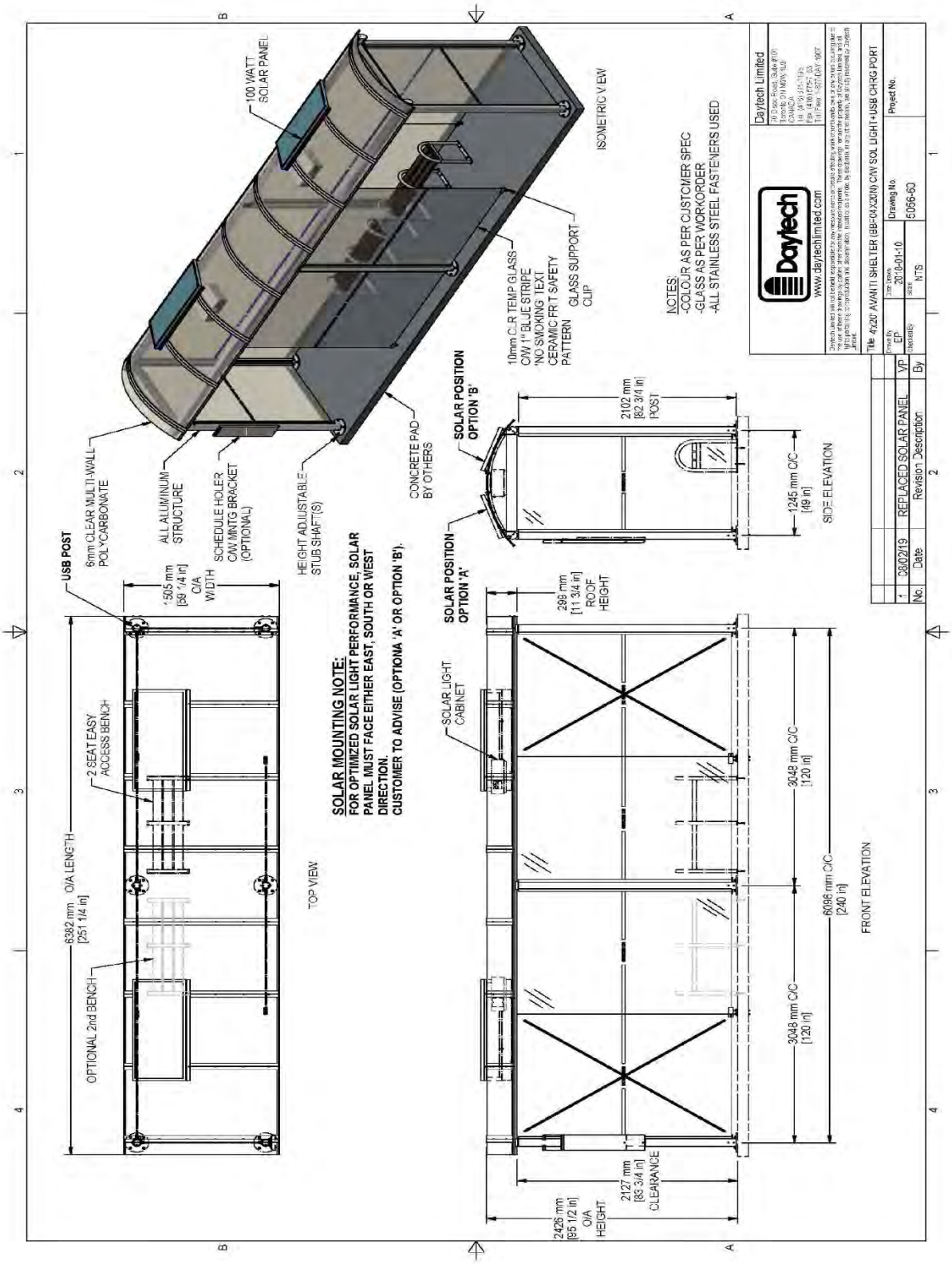
4’ x 8’ Avanti


100 WATT SOLAR PANEL
6mm MULTI-WALL POLYCARBONATE
ALL ALUMINUM STRUCTURE
ALUMINUM STUB SHAFT
CONCRETE BY OTHERS
ISOMETRIC VIEW
NOTE: GLASS AS PER CUSTOMER SPEC
NOTE: COLOUR AS PER WORK ORDER
Daytech Limited
www.daytechlimited.com
Title BBF04X08N 4'x8' AVANTI SHELTER C/W SOLAR KIT
Drawing No 4828-00_SOL_BLU_N3T
Project No
Date Drawn 2016-11-03
Scale NTS
Drawn By EP
Checked By
2 12/04/20 CHG'D SOLAR PANEL SIZE VP
1 03/03/17 CHG'D SOLAR PANEL SIZE EP
No. Date Revision Description By
END ELEVATION
59 1/8" O/A WIDTH
45° ROOF TRIM
49" O/C
83" POST
11 3/4" ROOF HIEGHT
83 3/4" CLEARANCE
TOP VIEW UNDER ROOF
103 3/4" O/A LENGTH
103 1/2" ROOF TRIM
92 1/2" O/C
FRONT ELEVATION
95 1/2" O/A HEIGHT
58"
101 1/2"
44 9/16" CLEARANCE

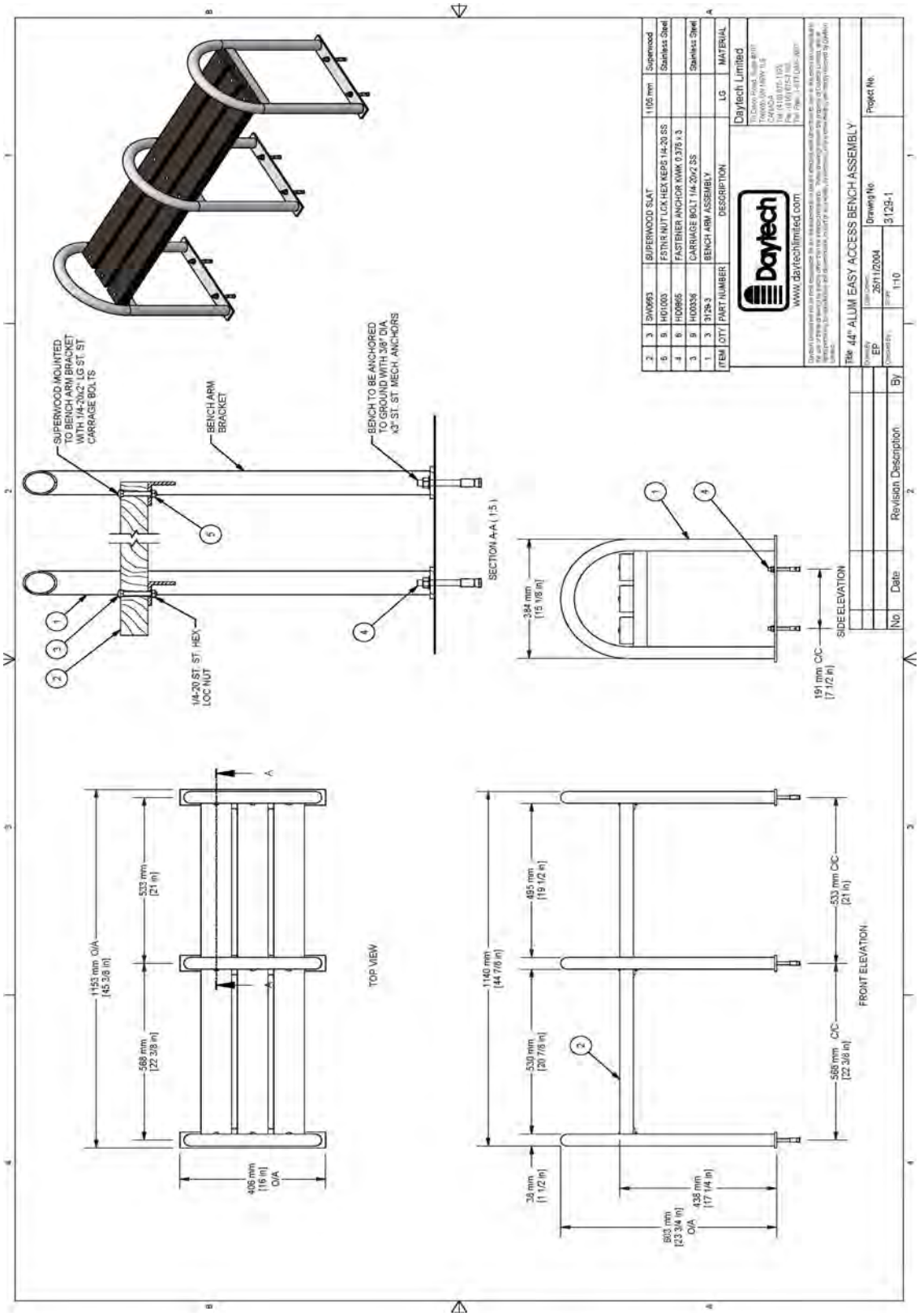
4’ x 10’ Avanti


100 WATT SOLAR PANEL (OPTIONAL)
6mm CLEAR MULTI-WALL POLYCARBONATE
SCHEDULE HOLER C/W MNTG BRACKET (OPTIONAL)
ALL ALUMINUM STRUCTURE
HEIGHT ADJUSTABLE STUB SHAFT(S)
CONCRETE PAD BY OTHERS
10mm CLEAR TEMPERED GLASS C/W 1" BLUE STRIPE 'NO SMOKING' TEXT CERAMIC FRIT
ISOMETRIC VIEW
NOTES:
-COLOUR AS PER CUSTOMER SPEC
-GLASS AS PER WORKORDER
-ALL STAINLESS STEEL FASTENERS USED
SOLAR POSITIONING NOTE:
FOR OPTIMIZED SOLAR LIGHT PERFORMANCE, SOLAR PANEL MUST FACE EITHER EAST, SOUTH OR WEST DIRECTION.
82 3/4" POST
49" C/C
SIDE ELEVATION
59 1/4" O/A WIDTH
2 SEAT EASY ACCESS BENCH
131 1/4" O/A LENGTH
TOP VIEW
12" ROOF HEIGHT
SOLAR LIGHT CABINET (OPTIONAL)
58 5/16" ENTRANCE
120" C/C
FRONT ELEVATION
83 3/4" CLEARANCE
96 1/2" O/A HEIGHT
Daytech Limited
Daytech
www.daytechlimited.com
Title 4x10' AVANTI SHELTER (BBF04X10N)
Drawn By EP
Des Chkd VP
Drawing No 4807-00A
Project No
Scale NTS
Checked By
No. Date Revision Description By
1 06/25/20 REPLACED SOLAR PANEL

4’ x 20’ Avanti


ISOMETRIC VIEW
100 WATT SOLAR PANEL
10mm CLR TEMP GLASS C/W 1" BLUE STRIPE 'NO SMOKING' TEXT CERAMIC FRIT SAFETY PATTERN
GLASS SUPPORT CLIP
NOTES:
-COLOUR AS PER CUSTOMER SPEC
-GLASS AS PER WORKORDER
-ALL STAINLESS STEEL FASTENERS USED
Daytech Limited
www.daytechlimited.com
Title: 4'x20' AVANTI SHELTER (BB-04X20XN) C/W SOL LIGHT+USB CHRG PORT
Drawing No.
5066-60
Project No.
REPLACED SOLAR PANEL
Revision Description
SOLAR POSITION OPTION 'B'
2102 mm [82 3/4 in] POST
1245 mm O/C [49 in]
SIDE ELEVATION
SOLAR POSITION OPTION 'A'
299 mm [11 3/4 in] ROOF HEIGHT
SOLAR LIGHT CABINET
3048 mm O/C [120 in]
6096 mm O/C [240 in]
FRONT ELEVATION
USB POST
6mm CLEAR MULTI-WALL POLYCARBONATE
ALL ALUMINUM STRUCTURE
SCHEDULE HOLER C/W MNTG BRACKET (OPTIONAL)
HEIGHT ADJUSTABLE STUB SHAFT(S)
CONCRETE PAD BY OTHERS
1505 mm [59 1/4 in] O/A WIDTH
2 SEAT EASY ACCESS BENCH
6382 mm [251 1/4 in] O/A LENGTH
OPTIONAL 2nd BENCH
TOP VIEW
SOLAR MOUNTING NOTE:
FOR OPTIMIZED SOLAR LIGHT PERFORMANCE, SOLAR PANEL MUST FACE EITHER EAST, SOUTH OR WEST DIRECTION.
CUSTOMER TO ADVISE (OPTIONA 'A' OR OPTION 'B').
2127 mm [83 3/4 in] CLEARANCE
2426 mm [95 1/2 in] O/A HEIGHT

Bench (2 Seats) for Inside a Bus Shelter



ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
1	3	3129-3	BENCH ARM ASSEMBLY	LG
3	9	H00336	CARRIAGE BOLT 1/4-20x2 SS	Stainless Steel
4	6	H00965	FASTENER ANCHOR KWIK 0.375 x 3	
5	6	H01003	FSTNR NUT LOK HEX KEPS 1/4-20 SS	Stainless Steel
6	3	SW0953	SUPERWOOD SLAT 1105 mm	Superwood

Appendix E Bus Shelter Site Evaluation Form

Transit Windsor will place all requests through a series of selection criteria to ensure that the best utilization of the shelter is achieved by the City of Windsor and the Transit Windsor system. The selection criteria used to assess any proposed shelter installation location includes:

- Number of passenger boardings per weekday (where data is available)
- Initial site survey details
- Long term strategic planning network plans
- Safety of location in terms of passengers, operators, and general traffic
- Historical or present operation concerns
- Funding available

*The amount of funding available each year for this program is allocated through the City of Windsor's capital budget process and is part of a larger scope, not just bus shelters. Limited funding is available each year.

Date of Evaluation:
Submitted By:

Transit Windsor Bus Shelter Site Evaluation Form

Proposed Location Stop ID and Name:
Route(s) Affected:

CRITERIA		Circle		Points
1.)	Is this bus stop a transfer point?	YES (10)	NO (5)	_____
2.)	Is this bus stop an end point to a route?	YES (10)	NO (5)	_____
3.)	Is vandalism a concern at this location? (Consider lighting, remoteness, etc.)	YES (5)	NO (10)	_____
4.)	Is passenger safety/security a concern at this location?	YES (10)	NO (5)	_____
5.)	Is this bus stop near a school, hospital or seniors apartment?	YES (10)	NO (5)	_____
6.)	Is this bus stop near another type of fare generator, such as a shopping mall, plaza, etc.?	YES (10)	NO (5)	_____
7.)	Is this location currently protected from the weather?	YES (0)	NO (5)	_____
8.)	Is a concrete pad required?	YES (0)	NO (5)	_____
9.)	Are there other passenger amenities at this location? (Consider benches, trash cans, etc.)	YES (5)	NO (10)	_____
10.)	Are other expenditures required such as curb cuts, retaining walls, etc.?	YES (0)	NO (5)	_____
11.)	What is the average ridership per day at this stop?			
	a. 0-5 Point Total (0)			
	b. 6-10 Point Total (2)			
	c. 11-20 Point Total (5)			
	d. 21-40 Point Total (8)			
	e. 41+ Point Total (10)			_____
12.)	Is there room on the City right of way to install a bus shelter?	YES (10)	NO (0)	_____
13.)	If the answer to Question 12 is "NO", can this stop be moved to a location in close proximity?	YES (5)	NO (0)	_____
14.)	If the answer to Question 13 is "YES", is there an expenditure to moving the bus stop, excluding signage?	YES (0)	NO (5)	_____
15.)	If the answer to Question 13 is "NO", a shelter cannot be installed at this location and this evaluation is complete.			

Total Points _____

Rating (score out of 100)

Excellent	90-100
Good	75-89
Fair	50-74
Poor	Below 50

Additional Comments

Planning Department Recommendations:

Approved By:

Appendix F Bus Shelter Concrete Pad Specifications

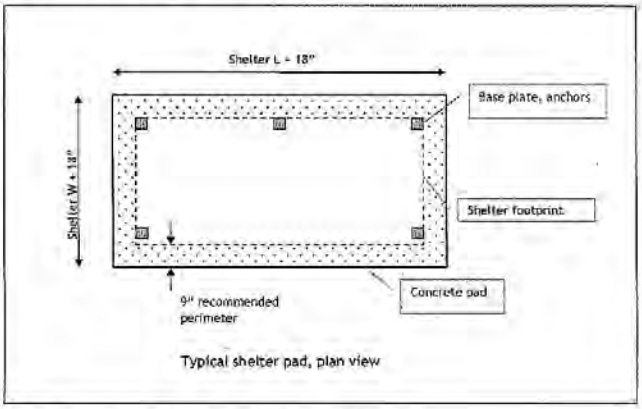
Daytech Limited
70 Disco Rd. Suite 101
Toronto, ON M9W 1L9

Tel (416) 675-1195 Fax (416) 675-7183
www.daytechlimited.com

Concrete pad guidelines

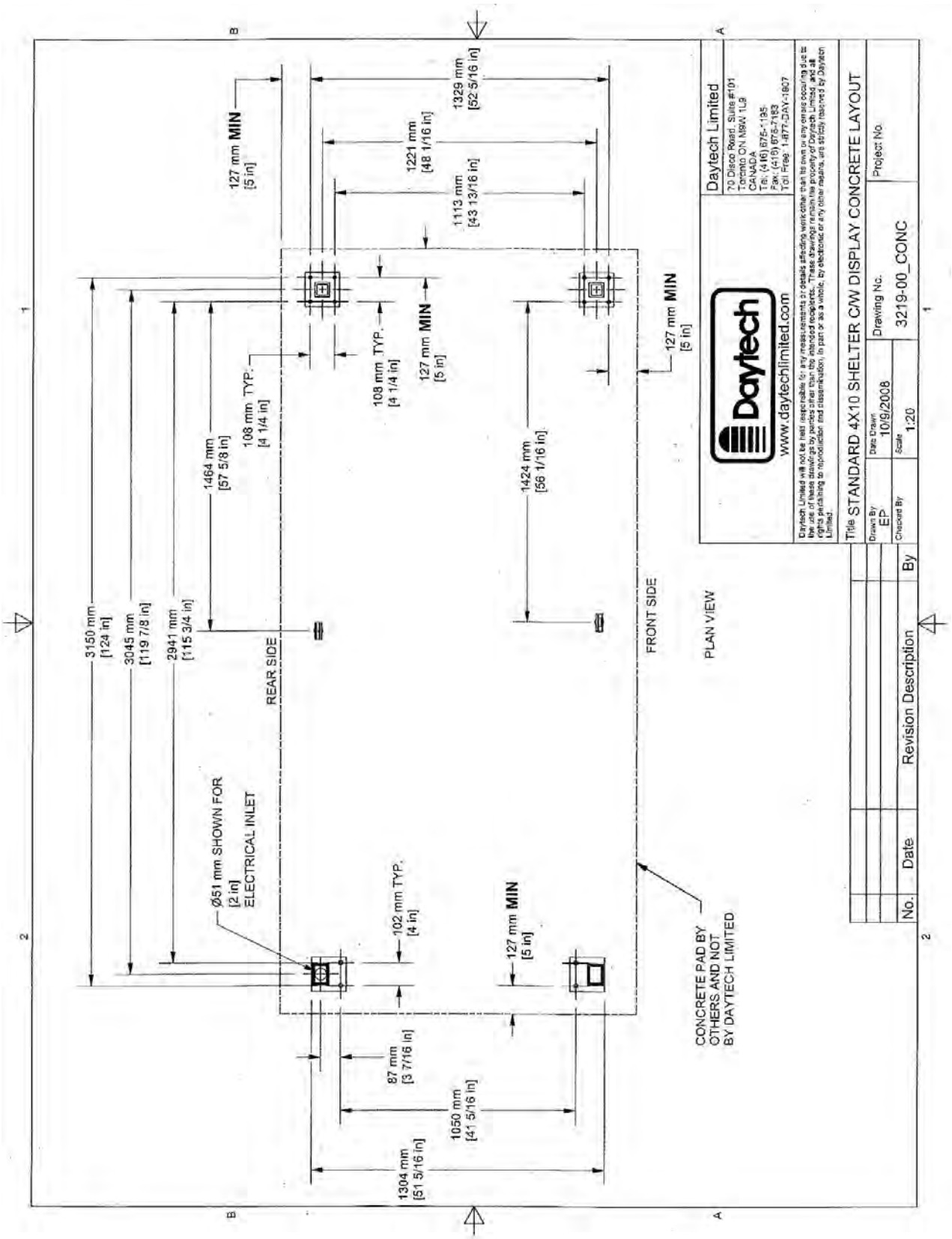
For Transit & Smoking Shelters
Revised: Mar 10, 2007

1. **This is a guideline only. Responsibility for providing a pad suitable for a transit or smoking shelter is the full responsibility of the owner (or it's engineer or contractor) and may be affected by local building codes.**
2. Pad design should take into account barrier-free accessibility for ADA compliance (in USA).
3. Shelter must be grounded (#6 stranded ground wire) as per local electrical codes
4. Concrete pad to be as per local sidewalk construction (retaining walls, grade and access ramps / aprons)
5. All concrete pads should be level. A very slight grade, not to exceed 1" over the entire length, would be advantageous to assist with water drainage and prevent pooling
6. Exposed edges to have a 1" chamfer
7. Pad surface shall be broom finished
8. Prepare underlay with 3/4" gravel, 4" to 6" deep
9. Fiberglass mesh screen or steel re-bar for re-enforcement
10. Pad size should ideally extend 9" on all sides beyond the shelter footprint, or a total of 18" larger than both the length and width dimensions of the shelter.

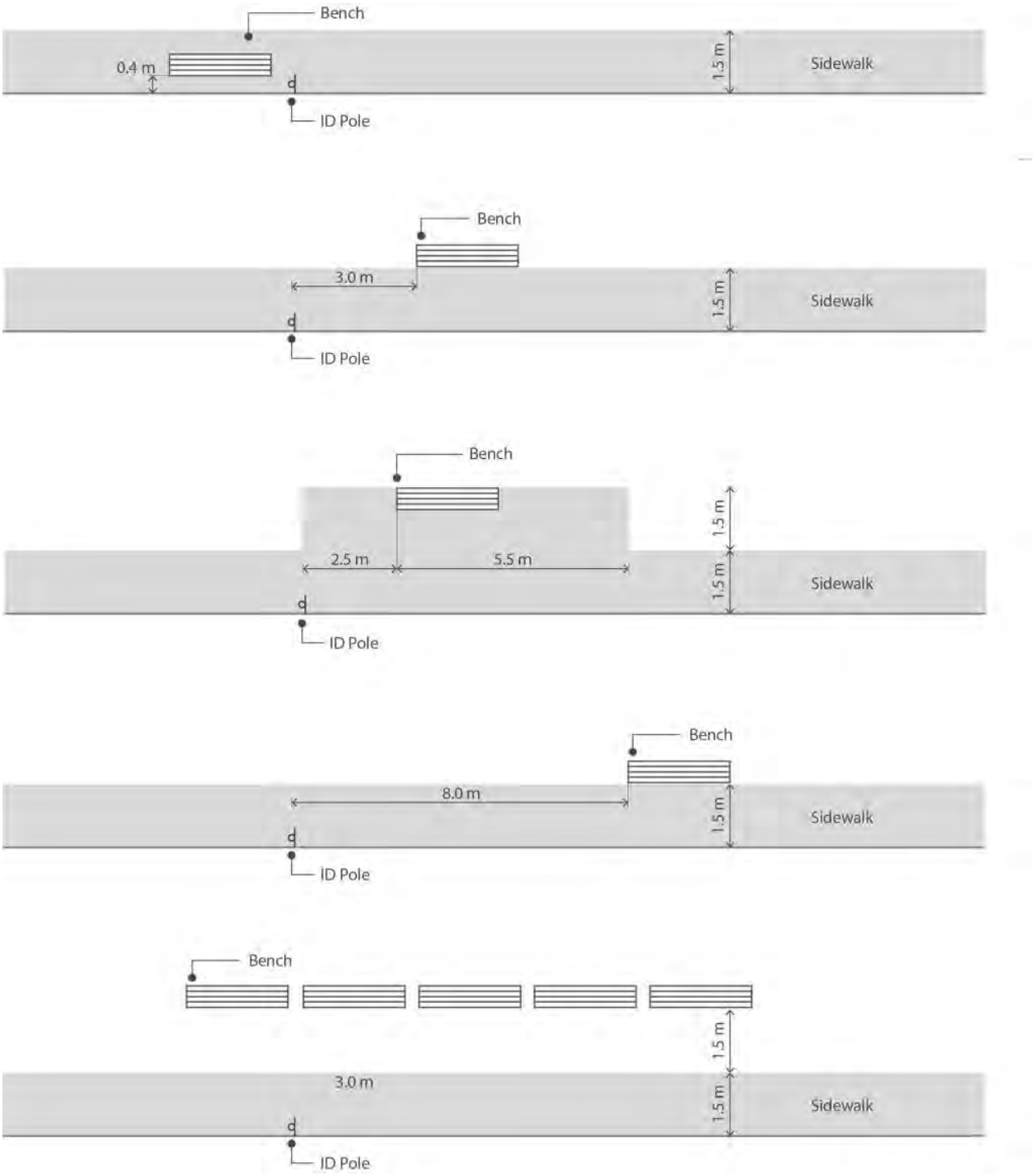


Typical shelter pad, plan view

11. When pad length exceeds 12'-0", a fiber board at perimeter and expansion joints is required
12. Use 3500 PSI concrete 6" to 8" thick, 3" to 4" slump and 5 to 7% air entrained. In some instances, a 20" wide perimeter footing may be necessary which may be 18" thick.
13. If electrical equipment (ie. Light fixture, illuminated ad display sign, or heater) is required, then electrical conduit is required. Supply a PVC conduit (typically 1" to 1"-1/2" dia is suitable)
14. Install anchors per Daytech drawing, using Daytech recommended anchors, following installation procedure supplied by anchor supplier.


127 mm MIN [5 in]
1329 mm [52 5/16 in]
1221 mm [48 1/16 in]
1113 mm [43 13/16 in]
127 mm MIN [5 in]
108 mm TYP. [4 1/4 in]
127 mm MIN [5 in]
108 mm TYP. [4 1/4 in]
1464 mm [57 5/8 in]
3150 mm [124 in]
3045 mm [119 7/8 in]
2941 mm [115 3/4 in]
REAR SIDE
Ø51 mm SHOWN FOR [2 in] ELECTRICAL INLET
102 mm TYP. [4 in]
127 mm MIN [5 in]
87 mm [3 7/16 in]
1050 mm [41 5/16 in]
1304 mm [51 5/16 in]
1424 mm [56 1/16 in]
127 mm MIN [5 in]
FRONT SIDE
PLAN VIEW
CONCRETE PAD BY OTHERS AND NOT BY DAYTECH LIMITED
Daytech Limited
70 Disco Road, Suite #101
Toronto ON M9W 1L8
CANADA
Tel: (416) 675-1135
Fax: (416) 675-7183
Toll Free: 1-877-DAY-1807
www.daytechlimited.com
Daytech Limited will not be held responsible for any measurements or details affecting work other than its own or any errors occurring due to the use of these sketches. These sketches are the property of Daytech Limited and all rights pertaining to reproduction and dissemination, in part or as a whole, by electronic or any other means, are strictly reserved by Daytech Limited.
Title STANDARD 4X10 SHELTER C/W DISPLAY CONCRETE LAYOUT
Drawn By EP
Date Drawn 10/9/2008
Drawing No. 3219-00_CONC
Project No.
Checked By
Scale 1:20
No. Date Revision Description By

Appendix G Bench Locations at Bus Stops



Appendix H Tactile Walking Surface Indicators

In accordance with the Canadian Standards Association (CSA), the Tactile Walking Surface Indicators (TWSIs) shall be composed of flat-topped, parallel, elongated bars having:

- A height of 4 mm to 5 mm;
- A top width between 17 and 30 mm and a base width 10 mm ± 1 mm greater than the top width;
- A centre-to-centre distance between adjacent bars of 57 to 85 mm;
- A top length not more than 270 mm and the base length 10 ± 1 mm greater than the top length;
- A spacing of 20 to 30 mm between the ends of parallel bar; and
- A height of base plate not more than 3mm.

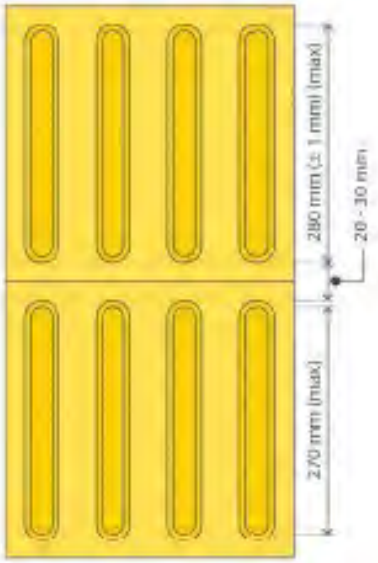
Width of flat-topped elongated bars (mm)	Base width spacing (mm)	Centre-to-centre distance between elongated bars (mm)
17	27	57-78
20	30	60-80
25	35	65-83
30	40	70-85

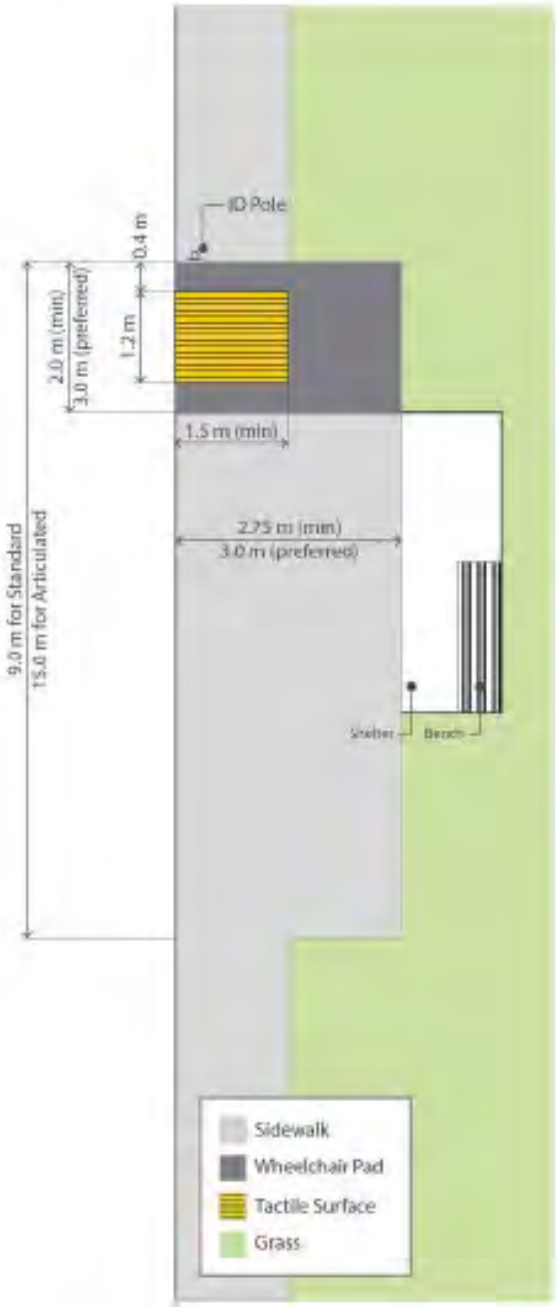
For application at bus stops, the TWSIs should be:

- Placed in parallel groups and oriented in the direction of travel (perpendicular to the curb or roadway edge in the case of directing customers to a bus stop);
- Located at the point where the front door of a bus in line with the bus stop ID pole;
- Installed with its base surface levels with the surrounding surface, or not more than 3 mm above or below it;
- A minimum of 1.2 m in length along the sidewalk and be the entire width of the sidewalk;
- In a contrasting color to surrounding surfaces (yellow is preferred); and
- In slip resistance material.

It is important to note that TWSIs can only be installed at bus stops that provide a hard-surfaced passenger zone.

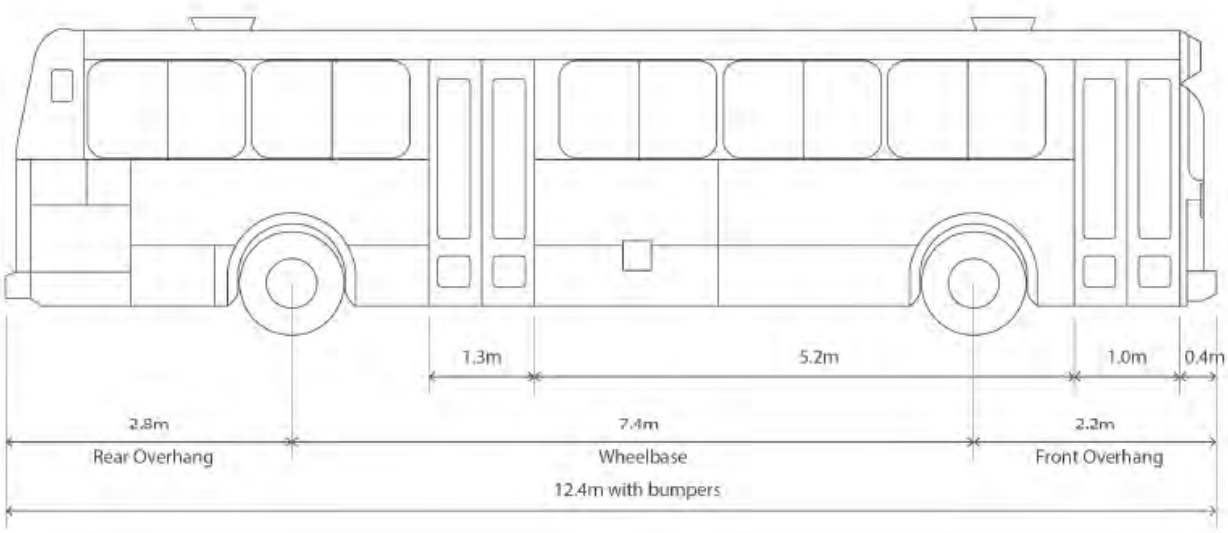

17 - 30 mm
27 - 40 mm
(± 1 mm)
57 - 85 mm
4 - 5 mm
≤ 3 mm

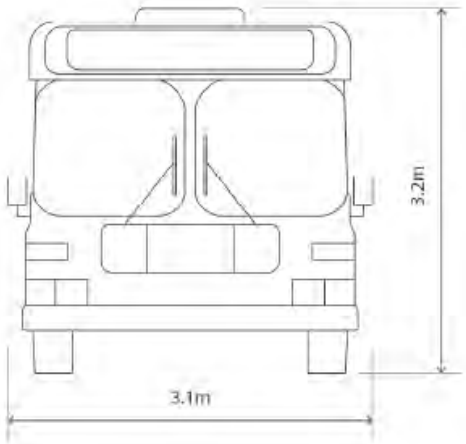

280 mm (± 1 mm) (max)
20 - 30 mm
270 mm (max)

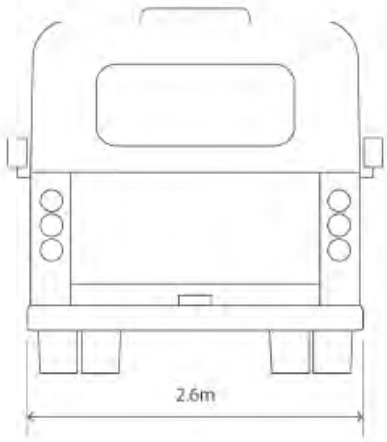

ID Pole
0.4 m
2.0 m (min)
3.0 m (preferred)
1.2 m
1.5 m (min)
2.75 m (min)
3.0 m (preferred)
9.0 m for Standard
15.0 m for Articulated
Shelter
Bench
Sidewalk
Wheelchair Pad
Tactile Surface
Grass

Appendix I Bus Vehicle Dimensions and Photos

Standard 40 foot bus (New Flyer) Dimensions

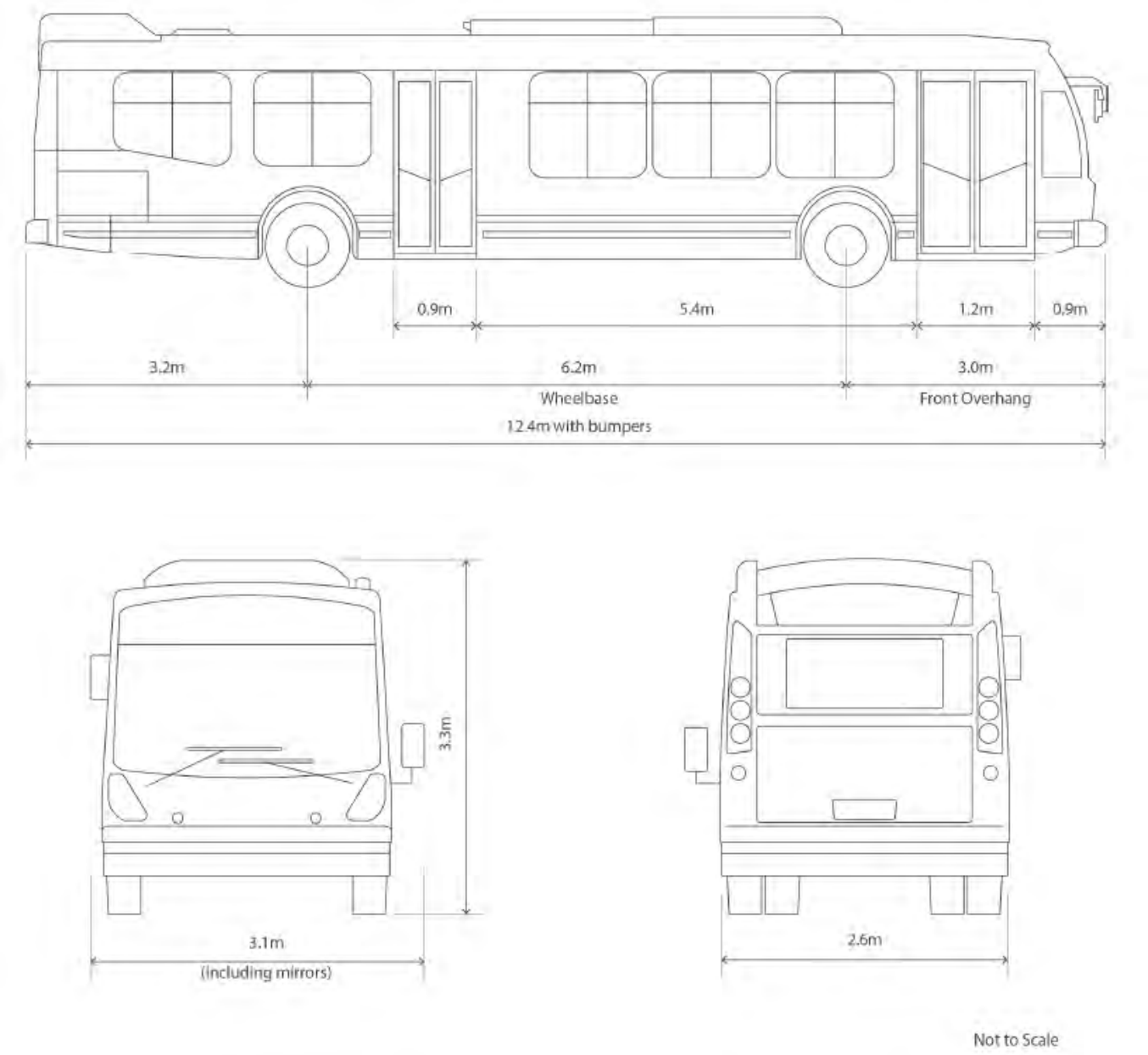






Not to Scale

Standard 40 foot Bus Nova Dimensions



Example of New Flyer Xcelsior Hybrid

Example of New Flyer Xcelsior Clean Diesel

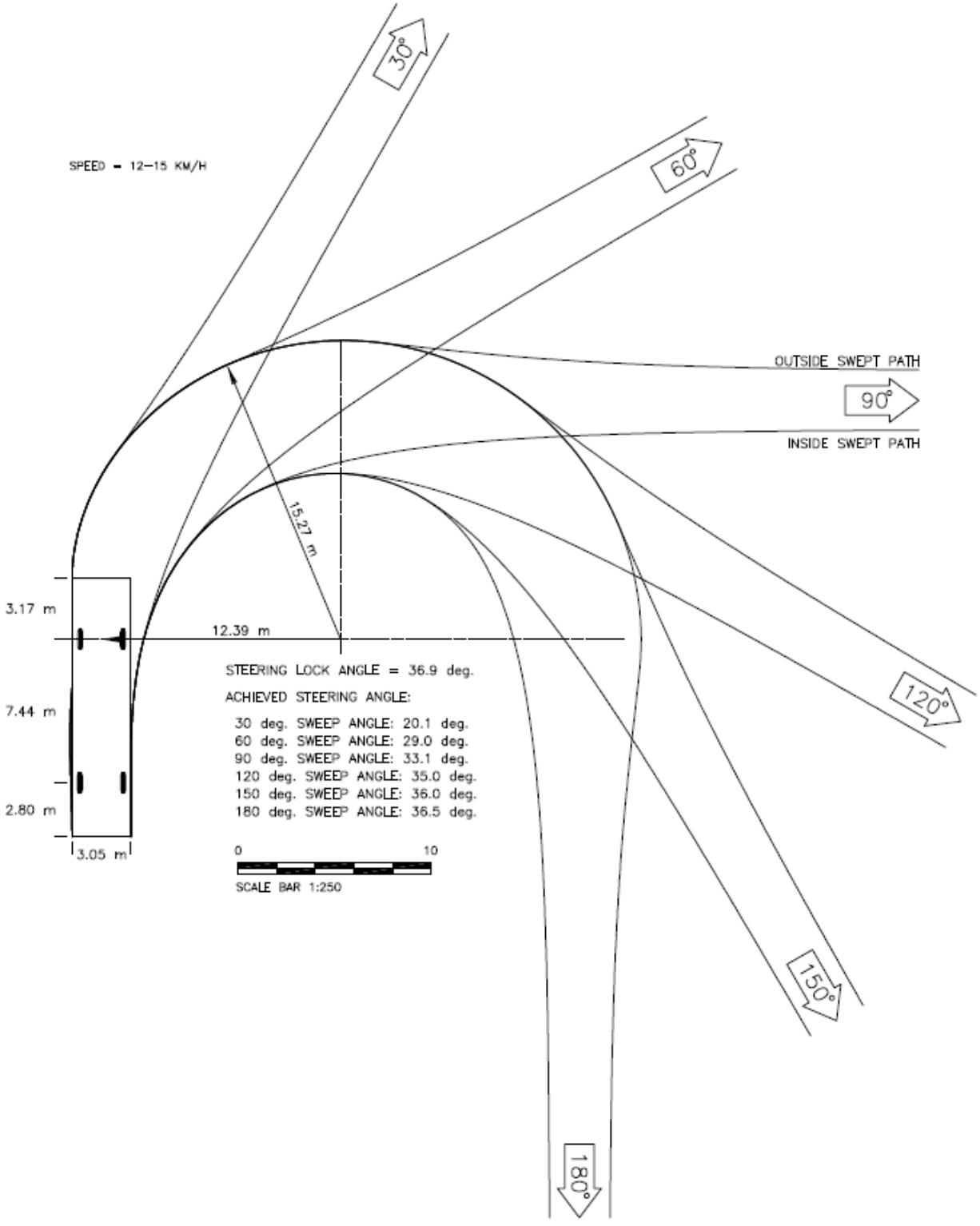
Example of Orion VII

Example of Nova LFS Diesel

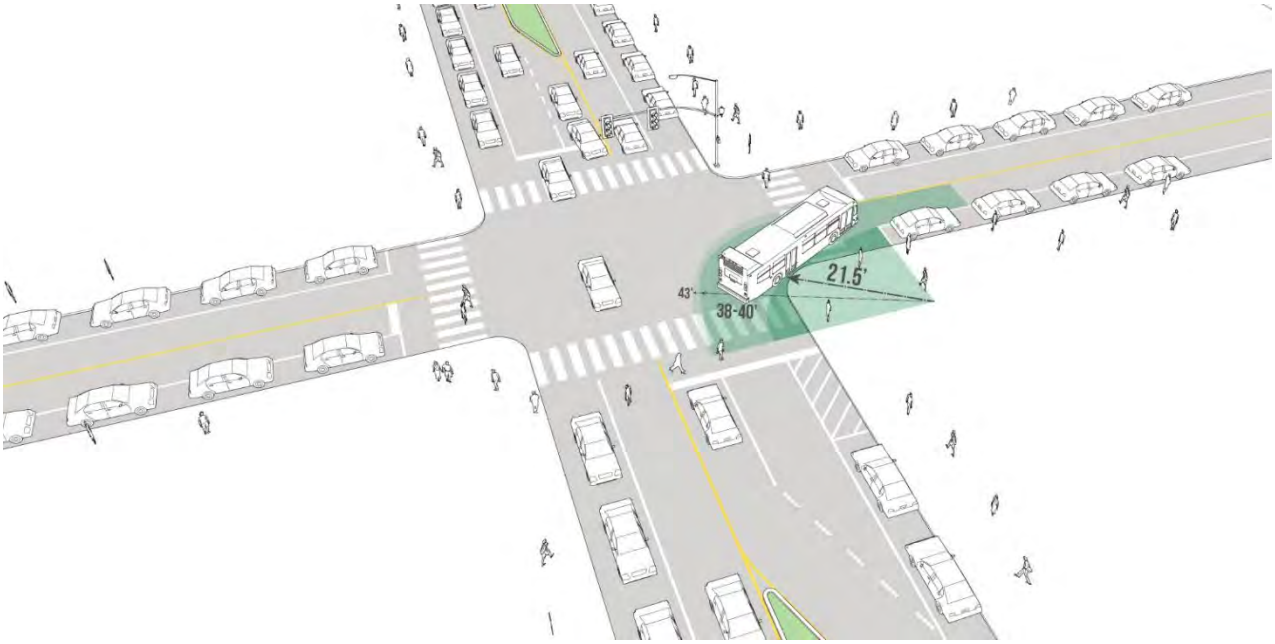
Appendix J Traffic Calming Measures

Traffic Calming Measure	Impact on Passenger Safety	Impact on Bus Operational Efficiency
Traffic Circle	No adverse impact, but avoid a series of traffic circles to minimize side to side movement	The circular roadway width that provides traffic calming for passenger vehicles may result in buses having difficulty going through the traffic circle
Speed Hump	Shorter ramps result in greater passenger discomfort. A speed hump should not be installed immediately before or after a bus stop for passenger safety	Buses need to reduce speed significantly to travel over a speed hump. It may cause damage to the suspension of the bus. A series of speed humps should be avoided along a bus route.
Curb extensions	No adverse impact	The corner radii may impact bus right turning movement
Raised intersection	A raised intersection should not be installed immediately before or after a bus stop for passenger safety	A series of raised intersections should be avoided along a bus route
Diverter	No adverse impact	Room must accommodate bus manoeuvre, and without obstruction by parked vehicles

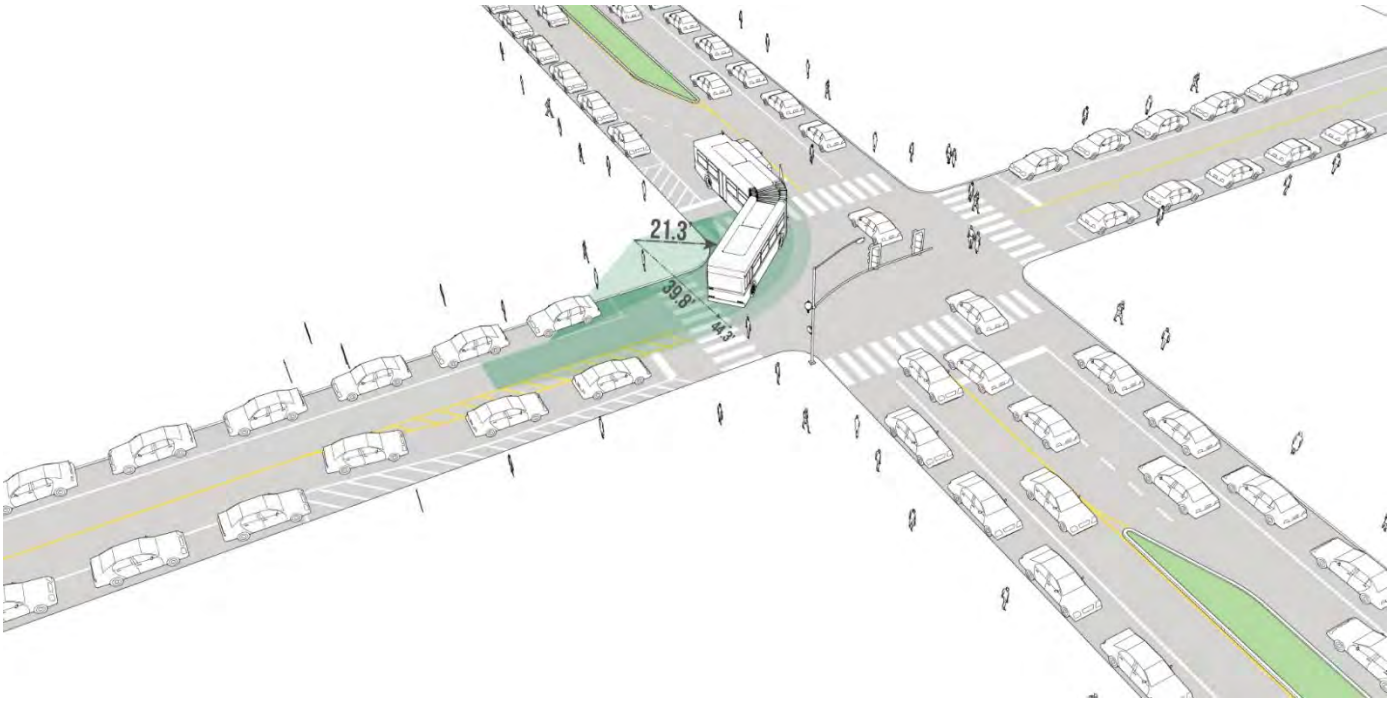
Appendix K Bus Turning Needs



Standard 40 foot Bus Turn Radii

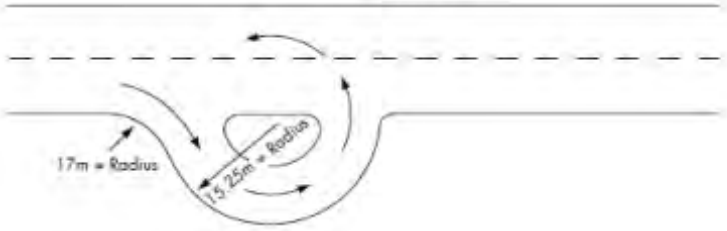


Articulated 60 foot Bus Turn Radii

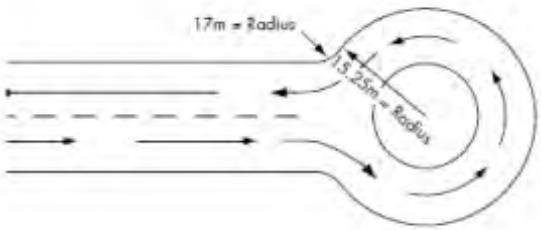


BUS TURNAROUNDS

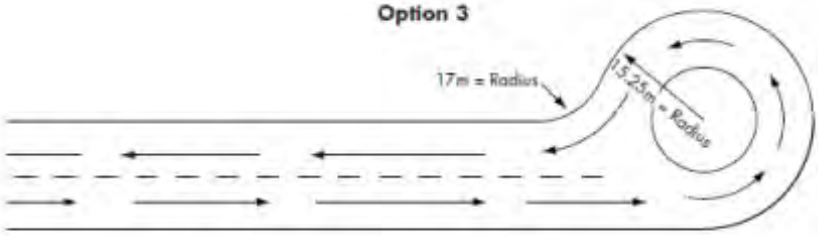
Option 1



Option 2



Option 3



Note: To maintain sight distance, only low plantings are used in island areas

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2. BC Transit Design Guidelines for Accessible Bus Stops, 2002
3. Ontario Ministry of Transportation (MTO) Transit-Supportive Guidelines, 2012
4. Calgary Transit, Transit Friendly Design Guide, 2006
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6. National Association of City Transportation Officials (NATCO), Transit Street Design Guide,
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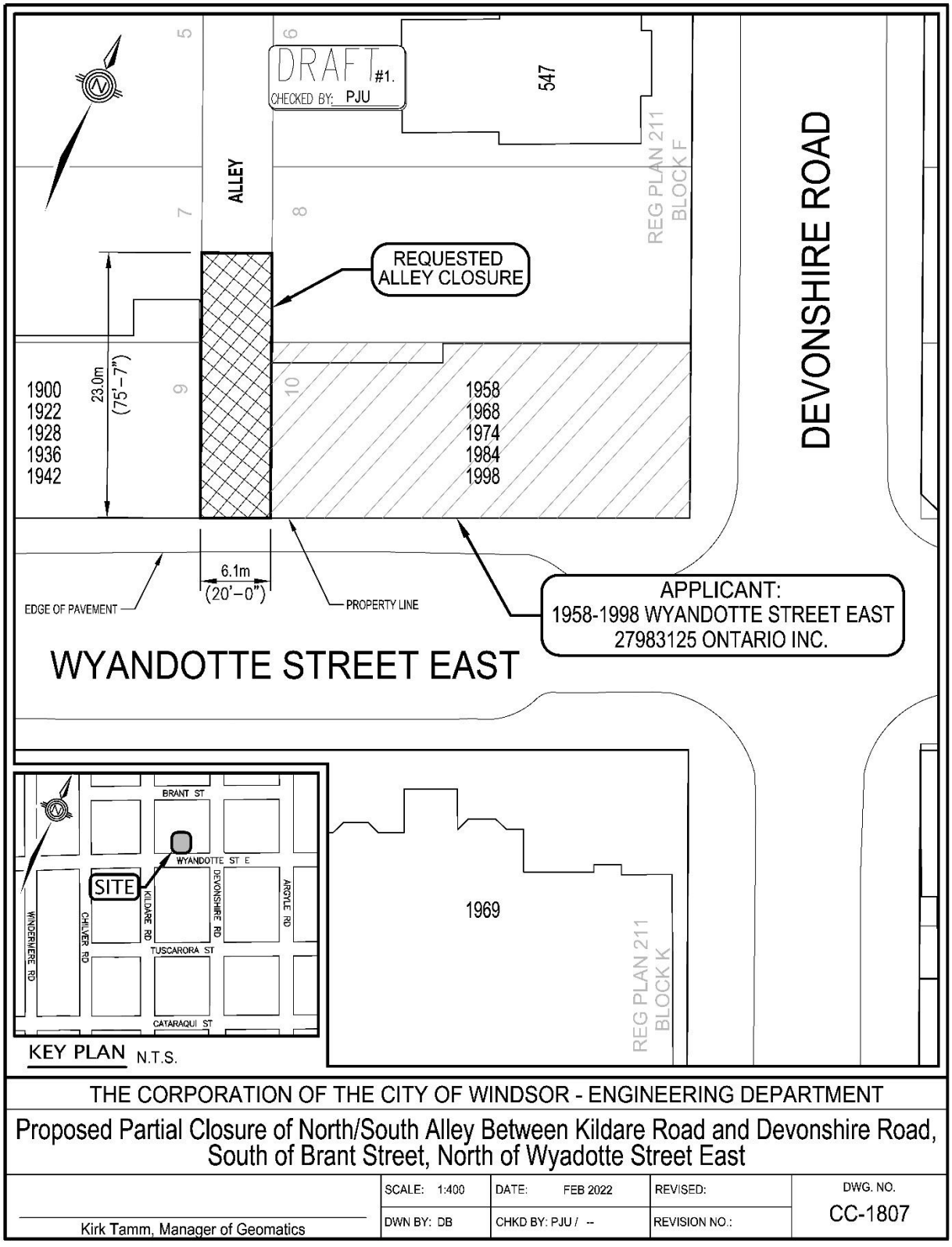
8. Hamilton Transit Bus Stop Accessibility Criteria & Guidelines, January 2014
9. New Flyer, Xcelsior, 2021
10. Nova Bus, Bus Models, 2017
11. Federal Highway Administration, Separated Bike Lane Planning and Design Guide, May 2015
12. Brampton Transit Bus Stop Standards & Technical Guidelines, 2016

APPENDIX "A"
Drawing No. CC-1807



THE CORPORATION OF THE CITY OF WINDSOR - ENGINEERING DEPARTMENT

Proposed Partial Closure of North/South Alley Between Kildare Road and Devonshire Road, South of Brant Street, North of Wyadotte Street East

Kirk Tamm, Manager of Geomatics	SCALE: 1:400	DATE: FEB 2022	REVISED:	DWG. NO. CC-1807
	DWN BY: DB	CHKD BY: PJU / --	REVISION NO.:	

APPENDIX "F"
Ground Floor Plan