

ONTARIO LAND TRIBUNAL

OLT 23-000534

PROCEEDINGS COMMENCED UNDER subsections 22(7), 34(11), and 51(34) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended.

Applicant and Appellant: Caivan (Perth GC) Limited
Subject: Request to amend the Official Plan – Failure to adopt the requested amendment | Application to amend the zoning By-Law – Refusal or neglect to make a decision | Proposed Plan of Subdivision – Failure of Approval Authority to make a decision
Description: To permit 940 single detached dwellings and townhomes, a nine-hole golf course, park and open space areas
Reference Number: OPA-01-2023 | ZBL-03-2023 | O9-T-22001
Property Address: 141 Peter Street, Part of Lots 26 & 27, Concession 1, Part Lots 25, 26 & 27, Concession 2, Geographic Township of Bathurst, and Part Lot 1 in Southeast Half Lot 1, Concession 1, Part Lot 1 in Southwest Half Lot 1, Concession 2, Geographic Township of Drummond, now in the Town of Perth, County of Lanark
Municipality/UT: Town of Perth / County of Lanark
OLT Case No.: OLT-23-000939, OLT-23-000940, OLT-23-000534
OLT Lead Case No.: OLT-23-000534

WITNESS STATEMENT OF TREVOR CHOFFE
Filed June 12, 2024

1. My Name is Trevor Choffe. I am the Director of Protective Services/Fire Chief for the Town of Perth.
2. My experience and qualifications include over sixteen years of direct work in the fire service field with eight years in the role of Fire Chief. I am responsible for the overall management, direction, and leadership of the fire service, including fire education, suppression, inspection, investigation, and training to name a few. I hold the role of Community Emergency Management Coordinator and fulfill all requirements of the Town of Perth’s Emergency Management Plan. I am responsible for issues pertinent to enforcement of Municipal and Provincial Fire Codes, the *Fire Prevention and Protection Act*, *Occupational Health and Safety Act*, and the *Emergency Management Act*.
3. A copy of my CV and Acknowledgement of Expert’s Duty is attached hereto as Appendix “A”.

4. I will be providing expert opinion evidence in the field of fire emergency response. My evidence will relate primarily to Issue 6 of the Issues List:

“Will the proposed ingress and egress to and from the subdivision be sufficient from an emergency services perspective and from the perspective of long-term infrastructure replacement/maintenance?”

5. In summary, it is my professional opinion that in order for the ingress and egress to the subdivision to be sufficient from an emergency services perspective, a second, separate bridge access is required before any more than 100 units are occupied. In addition, both the second access and the existing Peter Street access, including the twinned portion of the bridge, and road widening of Peter Street and North Street access, into the subdivision should be constructed to meet required emergency access widths under the National Fire Protection Association standards.

Summary of Opinion

Assessment Recommended

6. Based on the current information provided in the proposal, I recommend that an assessment be conducted to determine the impact of the land use change on fire protection services. The assessment should be conducted by a person with appropriate qualifications and address the following:
 - 1) Dispatching. Are the current system and staff able to manage the increased call volume likely to be generated by the buildout resulting from the land use change?
 - 2) Fire station locations. In order to maintain an acceptable level of fire department and emergency response times within the response area, are current fire stations distributed and designed to service changing demands resulting from the land use changes and development?
 - 3) Fire service resources. Are there adequate fire apparatus and staffing to meet the increased service demands likely to be generated by the buildout?
 - 4) Special services. Will the development introduce a need for special services not currently within the capability of the fire department?
7. In my opinion, if the assessment determines that the existing fire department cannot maintain its current level of service delivery while also providing services to the proposed development, the fire department and the developer should jointly determine how to mitigate the impact on the delivery of fire services or increase the capability of the fire department and how those services are to be provided.

Separate Second Access Required

8. I also agree with the comments by the Town's servicing and traffic peer reviewers, Mark Bissett and Jennifer Luong, that the proposed twinned-bridge at Peter Street would "still constitute a single point of access for the entire development. A blockage on either side of the bridge will still leave the development with no alternative access point."
9. In my opinion, a blockage would render the access inoperable either for additional emergency vehicle access or for occupants exiting the site. It is my opinion that the proposed single access point, whether twinned or not, does not provide adequate vehicular access and circulation for firefighting or other emergency vehicles and based on the proposal, at minimum a second access is required.
10. According to the National Fire Protection Association (NFPA) Standard 1141, section 11.1.4.1, a second public access is required when the total number of households exceeds 100. Furthermore, when a residential project exceeds 600 homes a third access point may be required (per section 11.1.4.1). Based on these standards, in my opinion, the second public access should be installed in the early stages of the development or in conjunction with the primary access for emergency egress and for construction traffic. The second public access should be installed as remote from the primary access as possible or practical to qualify as a second access. Without these adjustments, adequate vehicular access would not be sufficient. An excerpt of the NFPA Standard 1141 is attached as Appendix "B".
11. The current planning rationale indicates a clear driving width of 6m, whereas 7.4m is the recommended minimum width if two lanes are proposed. NFPA 1141, sections 11.2.2 and 11.2.3 state that roadways shall have a minimum clear width of 3.7m (12') for each lane of travel, excluding shoulders and parking and be constructed with a hard, all-weather surface designed to support all legal loads of the jurisdiction. Parking, bike lanes or other conditions must not interfere with the minimum width driving surface. Curves should not reduce the width of the roadway (11.2.3.1) and provisions should be made for drainage, snowbanks, parking, utilities, and the like such that they do not impinge on the minimum clear width (11.2.3.2).
12. NFPA Standard 1141 is the Standard for Fire Protection Infrastructure for Land Development in all Suburban and Rural Areas. This standard has recently been consolidated with NFPA 1140, the Standard for Wildland Fire Protection. The NFPA adopts codes and standards that are considered best practice, evidence-based and commonly used across North America. The Ontario Fire Code (O. Reg. 213/07) has adopted many NFPA codes and standards and when referenced, they are legally

enforceable parts of adopted codes per section. The NFPA standards that are not specifically referenced in the Fire Code – such as NFPA 1140 and 1141 – are utilized by our fire service as a best practice and guide to establishing a localized standard in safety.

13. In my professional opinion, the development should be designed to conform to these standards to ensure adequate emergency access.

Trevor Choffe

Trevor Choffe

Director of Protective Services/Fire Chief for the Town of Perth

Appendix A



TC

TREVOR CHOFFE

DIRECTOR OF PROTECTIVE SERVICES/FIRECHIEFFIRECHIEF@PERTH.CA

OBJECTIVE

Utilizing my work and life experience, I am seeking the Director of Protective Services/Fire Chief position for the Town of Perth

SKILLS

Experienced Manager
Knowledgeable tradesman
Certified Fire Instructor
Active Volunteer
Adaptable Learner
Challenge driven
Group leader

EXPERIENCE

DIRECTOR OF PROTECTIVE SERVICES/FIRE CHIEF SEPTEMBER 2016 TO PRESENT

Organize and lead the Perth Fire Services

Responsible for ensuring the municipality is covered 24 hours a day, seven days a week

Responsible for overall management, direction and leadership to the fire service, fire education, fire suppression, inspection, investigation, mutual aid, and training etc.

Responsible for recommendations regarding issues pertinent to enforcement of Municipal and Provincial Fire Codes, Occupational Health and Safety Act, Emergency Management Act.

Implements an Emergency Management program and fulfills the Community Emergency Management Coordinator duties

Responsible for the operational budget of the fire service etc. and monitors an asset management plan for the fire inventory

Assists municipal officials with technical components of the fire service

Supervises 33 volunteer firefighters', 6 crossing guards, 1 Assistant Fire Chief, 1 Fire Admin and 1 Animal Control Officer

Acts as an Assistant to the Fire Marshal and represents the municipality

Performs the duties of the Health and Safety Officer

Organizes and directs firefighting activities at fires and/or emergencies

Determines the probable cause and particulars of all fires

Completes all documentation and reporting as required by the Ontario Fire Marshals Office

HVAC TECHNICIAN • BC MECHANICAL • JUNE 2006 TO 2016

Install and maintain commercial and industrial heating, air conditioning, refrigeration, electrical and humidification systems

Operate elevated work platforms

Conduct brazing and welding

Provide customer service including price estimates, warranty and cost reviews, budgeting etc.

Read and evaluate blueprints related to the installation



T_CHOFFE@YAHOO.CA



@XTCEELC



613-812-1415



N/A



TC

TREVOR CHOFFE

DIRECTOR OF PROTECTIVE SERVICES/FIRECHIEF |
FIRECHIEF@PERTH.CA

FIREFIGHTER/OPERATOR • PERTH FIRE DEPARTMENT • 2008 TO 2016

Responds to emergency calls, lays and connects hose, holds nozzles and directs water streams, raises and climbs ladders, uses extinguishers and other equipment

Provides emergency medical responses and aid; perform rescue/back-up operations where necessary to prevent loss of life or further injury from any cause

Provides search and rescue in various forms

Drives and operates firefighting and emergency equipment as assigned

Conducts fire prevention inspections and public education programs as assigned

Completes inspection reports and maintains vital incident information for investigative and record keeping purposes

Wears self-contained breathing apparatus and full protective clothing while working in noxious and/or smoke filled environments

Responsible for workplace safety as outlined in the Ontario Occupational Health & Safety Act and organizational policies, procedures, and guidelines

Currently rotates in as an On Call Captain as required

Performs the trainer facilitator roll and assists in the yearly curriculum planning

R&AC APPRENTICESHIP • THE STATE GROUP • MAY 2002 TO JUNE 2006

Install and maintain commercial and industrial heating, air conditioning, refrigeration and humidification systems on behalf of a large-scale company

Provide 24-hour emergency service

Large-scale corporate work involved major safety measures to ensure the work was provided in a safe and risk-free manner.

Completed projects from the construction to the maintenance phase

Clients included Ford, GM, The Toronto Catholic School Board, The

Orlando Corporation, Darlington Ontario Power Generation, Imperial Oil

Member of the local 787 Union



T_CHOFFE@YAHOO.CA



@XTCEELC



613-812-1415



N/A



TC

TREVOR CHOFFE

**DIRECTOR OF PROTECTIVE SERVICES/FIRECHIEF |
FIRECHIEF@PERTH.CA**

EDUCATION

**LOCAL 787 CERTIFICATION SCHOOL • 2005 • LOCAL 787 BRAMPTON
ONTARIO**

Obtained Union Certification Red Seal for HVAC

**HVAC TECHNICIAN COLLEGE DIPLOMA • 2001 • ALGONQUIN COLLEGE,
OTTAWA, ONTARIO**

Obtained G2 Residential Mechanic license and Ozone Depletion Potential
Certificate with Honors

ONTARIO SECONDARY SCHOOL DIPLOMA • 1999 • TISS

Obtained secondary school diploma

LICENSING & CERTIFICATION (ALL UP TO DATE)

2023 - NFPA 1035 PUBLIC INFORMATION OFFICER

2023 - NFPA 1521 INCIDENT SAFETY OFFICER

2022 - NFPA 1033 FIRE INVESTIGATOR

2021 - FIRE SERVICE STRATEGIC MANAGEMENT

2021 - FIRE SERVICE RECRUITMENT MANAGEMENT

2021 - FIRE SERVICE MUNICIPAL MANAGEMENT

2020 - HEALTH AND SAFETY FIRE SERVICE MANAGEMENT PROGRAM

2019 - PUBLIC SAFETY LEADERSHIP PROGRAM

2019 - FIRE INVESTIGATOR PART 1

2019 - ESSENTIALS IN MUNICIPAL FIRE SERVICE

2018 - OPIOID AWARENESS CERTIFICATION

2018 - NFPA 1031 PART 1 INSPECTOR

2018 - NFPA 1021 LEVEL 1 CERTIFICATION



T_CHOFFE@YAHOO.CA



@XTCEELC



613-812-1415



N/A



TC

TREVOR CHOFFE

**DIRECTOR OF PROTECTIVE SERVICES/FIRECHIEF |
FIRECHIEF@PERTH.CA**

**2017 • NFPA 1001 LEVEL 1 AND 2 CERTIFICATION
2017 • NFPA 472 HAZMAT CERTIFICATION
2017 • BEM 200, CEMC 300, NOTE TAKING, IMS 100, IMS 200
2016 • OFMEM VOLUNERABLE OCCUPANCY CERTIFICATION
2016 • JOINT HEALT & SAFETY COMMITTEE CERTIFICATION
2016 • VIOLENCE THREAT RISK ASSESSMENT CERTIFICATION
2016 • FIRE SERVICE INSTRUCTOR 1 CERTIFICATION
2012 • FLASHOVER CERTIFICATION
2011 • STANDARD FIRST AID, LEVEL C CPR/AED
2011 • DZ LICENCE
2010 • OPERATION PUMPS COURSE
2009 • MODULE A VOLUNTER FIREFIGHTER COURSE
2008 • COMPANY OFFICER LEGISLATION 101
2007 • R&AC SYSTEMS MECHANIC COMMERCIAL INTERPROVINCIAL LICENCE
(9000 HOUR APPRENTISHIP)
2006 • LOCAL 787 UNION TRADE SCHOOL CERTIFICTION
2005 • G1 TECHNICAL (COMMERCIAL) LICENCE (4500 HOURS)
2003 • FALL ARREST SYSTEMS & ELEVATED WORK PLATFORMS
2003 • TRANSPORTATION OF DANGEROUS GOODS AND SERVICES
2003 • HOISTING AND RIGGING CERTIFIED
2003 • OZONE DEPLETION POTENTIAL LICENCE
2001 • WHIMIS
(OTHERS AVAIBALBE UPON REQUEST)**

VOLUNTEER EXPERIENCE OR LEADERSHIP

PERTH FIREFIGHTERS' ASSOCIATION • PRESIDENT • 2009 TO 2016

Leads the Firefighters' Association meetings and public relations

Organizes the Perth Firefighters' Association Golf tournament

Organizes and developed the Perth FireDawgs ball hockey league which reaches over 235 kids

Organizes the Junior Ryder Cup golf tournament and weekly kids golf nights throughout the summer



T_CHOFFE@YAHOO.CA



@XTCEELC



613-812-1415



N/A



TC

TREVOR CHOFFE

DIRECTOR OF PROTECTIVE SERVICES/FIRECHIEF |
FIRECHIEF@PERTH.CA

Started a Bike Rodeo for children in the community
Working on FireDawgs basketball to startup in the fall
Leads the annual Christmas float construction
Organizes the bi-annual Muscular Dystrophy boot drive
Developed the FireDawgs Fun2Run Program for The Stewart School
Partnered with the Perth & District Community Foundation to start an endowment fund
Chair of the Conlon Bike Park committee

PERTH LANARK MINOR HOCKEY • VICE PRESIDENT/COACH • 2006 TO PRESENT

Provide leadership on and off the bench for a variety of ages and skill levels
Provide Head Coaching Services to the Ottawa Valley Silver Seven
Provide skills training for players in the PLMHA
Oversee and address any parental concerns
Provide coach and player assessment for Silver 7 and PLMHA
Set up and organize the Novice and Initiation age groups
Responds to any concerns, risk and safety etc.

Nominated for the Perth Medal



T_CHOFFE@YAHOO.CA



@XTCEELC



613-812-1415



N/A



Ontario
Ontario Land Tribunal

ACKNOWLEDGMENT OF EXPERT'S DUTY

Case Number	Municipality
OLT-23-000534	Town of Perth

1. My name is Trevor Choffe. I live at the
in the in the Province of Ontario
2. I have been engaged by or on behalf of the Town of Perth to provide evidence in relation to the above-noted OLT proceeding.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
 - a. to provide opinion evidence that is fair, objective and non-partisan;
 - b. to provide opinion evidence that is related only to matters that are within my area of expertise; and
 - c. to provide such additional assistance as the OLT may reasonably require, to determine a matter in issue.
 - d. not to seek or receive assistance or communication, except technical support, while under cross examination, through any means including any electronic means, from any third party, including but not limited to legal counsel or client.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date April 15/24


.....
Signature

Appendix B

10.1.3.4.7* Prior to occupancy of any portion of the development, supporting infrastructure shall be installed, operational, and approved by the AHJ.

10.1.3.5 Public Notification.

10.1.3.5.1 The applicant for a land development or land use change shall provide written documentation and illustrative maps to the AHJ that specify areas that will be included in the proposed land development or land use change.

10.1.3.5.2 One or more published public announcements shall be made to publicize one or more public hearings at which the AHJ will present the proposed project, outline proposed methods to comply with Chapters 10 through 18 using best applicable data, and allow testimony by the public.

10.1.3.5.3 The applicant for a land use or land development change shall submit a written proposal to the AHJ regarding the level to which Chapters 10 through 18 shall be imposed, including justifications that demonstrate compliance, fire service impact, and responses to the public testimony.

10.1.3.5.4 The AHJ shall review the applicant's land use, or land development change proposal and public testimony and render a written final determination if the proposed land use or land development change complies with Chapters 10 through 18.

10.1.3.6 Public Appeals Process. Any person shall be permitted to appeal a decision of the AHJ. A process for appeal shall be made available to the public by the appropriate administrative body of the local adopting authority.

10.1.3.6.1 Adoption Appeals.

10.1.3.6.1.1 Appeals shall be permitted, in part or whole, to the adoption of Chapters 10 through 18.

10.1.3.6.1.2 Upon appeal, the designated local government having authority shall affirm, modify, or disapprove in writing the determination of the AHJ in accordance with 10.1.3.5.3.

10.1.3.6.2 Other Appeals. Appeals of individual requirements shall be permitted when it is claimed that any one or more of the following conditions exist:

- (1) The true intent of the requirements described in Chapters 10 through 18 has been incorrectly interpreted.
- (2) The provisions of Chapters 10 through 18 do not fully apply.
- (3) A decision is unreasonable or arbitrary as it applies to alternatives or new materials.

10.1.3.7 Impact Assessment. The AHJ shall conduct an impact assessment of the proposed land development or change in land use to determine the extent of impact on fire services currently available, as specified in Chapter 12 of this standard.

10.2 General. As a minimum, the AHJ shall require preliminary, working, and as-built plans to be submitted in a timely manner.

10.2.1 Plans shall demonstrate compliance with this standard.

10.2.1.1 The AHJ shall be permitted to require the review by an approved independent third party with expertise in the matter to be reviewed at the developer's expense.

10.2.1.2 The independent reviewer shall provide an evaluation and recommend necessary changes to the proposed plan development.

10.2.1.3 The AHJ shall be authorized to require design submittals to bear the stamp of a registered design professional.

10.2.1.4 Review and approval by the AHJ shall not relieve the applicant of the responsibility of compliance with this standard.

10.3 Noncombustible Material. See 25.2.1.

Chapter 11 Means of Access (NFPA 1141)

11.1 General.

11.1.1 This section shall apply to all means of access, publicly or privately owned, whether or not they are designated as public thoroughfares.

11.1.2 Means of access shall be provided to all buildings more than 400 ft² (37 m²) in ground floor area and to public occupancies with structural components.

11.1.3 The AHJ shall have the authority to require a means of unlocking any security feature that is installed.

11.1.3.1 Any gates shall not be located closer than 30 ft (9.144 m) from an intersection and shall open in the direction of emergency vehicle travel unless other provisions are made for safe personnel operation.

11.1.3.2 The clear opening through gates shall have a usable width at least 2 ft (0.6 m) wider than the means of access it controls.

11.1.4 Number of Means of Access.

11.1.4.1* A land development shall have one or more means of access in accordance with Table 11.1.4.1(a), Table 11.1.4.1(b), or 11.1.4.2, whichever produces the greatest number.

11.1.4.2 Where residential areas are mixed with nonresidential areas, the minimum number of access routes shall be determined by calculating five parking spaces for each dwelling unit, adding that number to the parking spaces count for the nonresidential area, and using Table 11.1.4.1(b).

Table 11.1.4.1(a) Required Number of Access Routes for Residential Areas

Number of Households	Number of Access Routes
0-100	1
101-600	2
>600	3

Table 11.1.4.1(b) Required Number of Access Routes for Nonresidential Areas

Number of Parking Spaces	Number of Access Routes
0-1250	1
1251-3000	2
>3000	3

11.1.4.3 Where multiple means of access are required, one of the means of access shall be permitted to be restricted for emergency use only, when approved by the AHJ.

11.1.4.4 Where multiple means of access are required, they shall be located as remotely from each other as practical and acceptable to the AHJ.

11.2 Roadways. Roadways shall be constructed and maintained in accordance with this section.

11.2.1* The legal right-of-way for a roadway shall accommodate the width necessary for the construction, drainage, erosion control, and maintenance of the roadway, and provisions for utilities and sidewalks.

11.2.2 Roadways shall be constructed of a hard, all-weather surface designed to support all legal loads of the jurisdiction.

11.2.3 Roadways shall have a minimum clear width of 12 ft (3.7 m) for each lane of travel, excluding shoulders and parking.

11.2.3.1 Curves shall not reduce the width of the roadway.

11.2.3.2 Provisions shall be made for drainage, snowbanks, parking, utilities, and the like such that they do not impinge on the minimum clear width.

11.2.4 Where parking is permitted, such space shall be provided in accordance with Section 11.4.

11.2.5 Any roadway intersecting with another shall be sloped to prevent the accumulation of water and ice on either roadway.

11.2.6 At least 13 ft 6 in. (4.2 m) nominal vertical clearance shall be provided and maintained over the full width of the roadway.

11.2.7 Turns in roadways shall be constructed with a minimum radius of 60 ft (18.2 m) to the outside of the turn.

11.2.8 Median left-turn lanes and traffic signals shall be provided at intersections where necessary to prevent traffic from impeding fire department response time.

11.2.9 Where required by the AHJ, any traffic signal system shall have an automatic means for fire apparatus to control the signals to maintain an unimpeded right-of-way.

11.2.9.1 Sight distance shall be incorporated into the design of intersections.

11.2.10* Bridges and culverts shall be designed to accommodate a minimum of 100-year flood elevations and flows in accordance with accepted engineering practices.

11.2.11 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

11.2.12 Easements shall be obtained to permit vegetation clearance alongside roads to minimize the likelihood of evacuation routes being blocked during wildfire or other natural disasters.

11.2.13* Roadways shall not be designed and constructed to include speed bumps or speed humps.

11.2.14 Alternative traffic calming devices such as chicanes and roundabouts shall be acceptable with approval by the AHJ.

11.2.15 Roadway design shall incorporate provisions for emergency pull-offs, spaced according to the AHJ.

11.2.16 Grades.

11.2.16.1 Grades shall not be more than 10 percent, except as permitted by this section.

11.2.16.2* Grades steeper than 10 percent shall be permitted by the AHJ where mitigation measures can be agreed upon by the fire department and the road engineering department, taking into consideration climate, traffic load, environmental conditions, the number of turns that would affect traffic flow, and the ability of fire apparatus to operate on steeper grades.

11.2.16.3 The angle of approach and the angle of departure shall not exceed 8 degrees at any point on the roadway or its intersection with another roadway or fire lane.

11.2.16.4 Where local conditions do not allow the maximum angles of approach and departure be limited to 8 degrees, the AHJ shall permit greater angles where local emergency apparatus can accommodate such angles.

11.2.16.5 Where grades are less than 0.5 percent, the road shall be crowned in the center to prevent pooling of water in a traveled way.

11.2.16.6 The design of grade crossings at railroad tracks shall be done by a professional engineer with expertise in railroad grade crossings.

11.2.17 Dead Ends.

11.2.17.1 Every dead-end roadway more than 300 ft (91 m) in length shall be provided at the closed end with a turnaround having no less than a 120 ft (36.6 m) outside diameter of the traveled way.

11.2.17.2* The length of any cul-de-sac shall not exceed the firefighting capability of the fire department.

11.2.17.3* A cul-de-sac exceeding 1200 ft (366 m) in length shall be provided with approved intermediate turnarounds at a maximum of 1200 ft (366 m) intervals.

11.2.18 Signage.

11.2.18.1 Addresses and Street Names.

11.2.18.1.1 Addresses shall be assigned in a logical, consistent manner based on the local addressing system.

11.2.18.1.2 Street names shall be phonetically unique.

11.2.18.2 Sign assemblies with the name of each road shall be constructed of noncombustible material and installed at each intersection.

11.2.18.3 These signs shall be installed a minimum of 7 ft (2.1 m) above the traveled way.

11.2.18.4 The letters on the signs shall be no less than 4 in. (100 mm) in height, with at least a 0.5 in. (12.7 mm) stroke, reflective and of a contrasting color to the background of the sign.

11.2.18.5 Where required by the AHJ, signs shall also include references to address numbers pertinent for that section of the road.

many areas of the US, building and fire codes might not have been adopted, in which case this standard is meant to apply.

A.10.1.3.1 Wildland, rural, and suburban areas have conditions, threats, and needs that might be different from those assumed under other codes and standards. In addition, other codes and ordinances might not be in place to guide fire departments in many rural areas.

A.10.1.3.4.2 Structures could include such occupancies as amphitheaters, grandstands, or other public assembly structures that could need fire protection infrastructure.

A.10.1.3.4.7 Supporting infrastructure includes roads, bridges, water supply systems, and similar utilities.

A.11.1.4.1 The information in Table 11.1.4.1(a) was crudely estimated using Equation 8-3 in the 1997 *Highway Capacity Manual* (Transportation Research Board 1997).

[A.11.1.4.1]

$$SF_i = 2800(v/c)_i f_a f_w f_g f_{IV}$$

This equation states that a road's service flow rate (SF_i) in vehicles per hour (vph) is the product of the volume-to-capacity ratio for level-of-service $i(v/c)_i$, and a set of adjustment factors for directional traffic distribution f_a , lane and shoulder width f_w , grade f_g , and the presence of heavy vehicles f_{IV} . A narrow, mountainous road operating at level-of-service F (0.78) (maximum capacity) is assumed (for this analysis) with 100 percent of the traffic in one direction (0.71) on a 9 ft (2.7 m) wide lane and 2 ft (0.6 m) shoulder (0.70) heading downhill (1) with the possible 3 percent presence of large recreational vehicles (0.75) for an estimate of capacity per exit in clear visibility conditions with moderate demand rates of 814 vph (rounded to 800). In communities with uphill exits, wider roads, or no recreational vehicles, this can be adjusted. Concentrated demand could greatly degrade this flow rate to level-of-service F where capacity can no longer be reliably estimated. Also, it should be noted that this number is very optimistic because it does not consider driveways along a road or other merge points that could create flow turbulence. This information, from "Public Safety in the Urban-Wildland Interface: Should Fire-Prone Communities Have a Maximum Occupancy?," is provided only to reference the rationale and background for the round numbers in the tables, not for specific calculations.

A.11.2.1 When approving a development, the AHJ should consider whether future rights-of-way might be needed for widening streets or providing additional means of access as the project is built out or adjacent properties are considered for development. Where there is a perceived need, the AHJ should work with the developer to set aside such rights-of-way for future use.

A.11.2.10 Driveway entrances constructed of multiple surfaces of dirt, concrete, and asphalt are usually a single vehicle width and cross the culvert leading into the actual driveway. The culverts often have either a metal or plastic pipe laid into them and the driveway is built over the pipe. During the response effort of the Black Forest Fire in Colorado in 2013, at least three incidents were cited where the integrity of the plastic pipe had been compromised by the fire and resulted in fire apparatus getting stuck in the culvert area. This situation can compromise egress of the occupants as well as the safety of

responding fire crews. Fire apparatus access roads should be designed and maintained to support the imposed load of a fire apparatus and withstand the impacts of (or from) fire.

A.11.2.13 A wide variety of traffic calming devices is available. Prior to installation of any of these devices, the AHJ should work with the emergency response departments to ensure traffic calming devices can be negotiated by emergency response vehicles in a safe and timely manner without damage to those vehicles. More information on the impact of traffic calming devices on emergency vehicles can be found in "The Influence of Traffic Calming Devices on Fire Vehicle Travel Times", by the Portland, OR, Office of Transportation and the Fire Rescue and Emergency Services. (For brevity, the tables have been eliminated from the following summary, but the full report is available at www.portlandoregon.gov.)

The Influence of Traffic Calming Devices on Fire Vehicle Travel Times. January 1996, *Portland Bureau of Fire, Rescue, and Emergency Service and the Traffic Calming Section Bureau of Traffic Management of the Portland Office of Transportation.*

Introduction. Traffic calming devices are used on Portland's neighborhood streets when traffic conditions are out of character with their adjacent residential, institutional, and recreational land uses. Calming devices are used to slow vehicle speeds, to encourage the use of more appropriate streets for through trips, and to enhance pedestrian, bicycle, and transit safety. The devices have proven to be effective without significantly impacting convenience, mobility, and travel time for drivers. At the same time, certain devices affect the speed of various fire vehicles and may increase overall response times. In 1995, the city's Fire Bureau and Bureau of Traffic Management conducted a thorough data collection effort to help quantify the relationship between three types of traffic calming devices and fire vehicle travel times. The study was conducted to determine how speed bumps and traffic circles affect fire vehicle travel times.

Research Method. The testing considered four variables that influence the speed at which a fire vehicle can be negotiated around traffic circles or across speed bumps. The variables tested were the driver (36 different drivers), the type of fire vehicle (six fire vehicles of varying characteristics), the desirable vehicle speed, and the types of calming devices. Test runs were conducted on a total of six streets: two with 22-foot speed bumps; two with 14-foot speed bumps; and two with traffic circles. The speed and time data for each test run (four per vehicle/street, total 24 per street) was transcribed and used to calculate the distance traveled after each second as well as the vehicle's distance from the starting line after each second of the run. For various combinations of the four variables, the time needed to travel a length of street that had no calming device was compared to the time needed to travel the same length with a calming device. The difference between these times equals the delay associated with the calming device. Delays-per-device were calculated for desirable response speeds of 25, 30, 35, and 40 mph.

Findings.

Depending on the type of fire vehicle and the desirable response speed, the three devices were found to create a range of delays for each device as follows:

- (1) 14-foot bumps: 1.0 to 9.4 seconds of delay per bump
- (2) 22-foot bumps: 0.0 to 9.2 seconds of delay per bump
- (3) Traffic circles: 1.3 to 10.7 seconds of delay per circle