

Automated Speed Enforcement as a Mechanism of Social Control?

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Abstract

This thesis focuses on how the recently implemented automated speed enforcement (ASE) program in the City of Toronto functions as a tool of social control. Using a governmentality lens, it investigates the linkages between techniques for regulating conduct and the rationalities that justify and push citizens into modifying and constructing themselves. The central research question guiding this project is: How does automated speed enforcement (ASE) function as a mechanism of social control? The research conducted to investigate this question was divided into two stages. Phase 1 involved examining information from publicly available open datasets from the City of Toronto, the Toronto Police Service, and Ontario's Open Data Catalogue pertaining to ASE. The findings from this phase pointed to differing traffic reporting standards between stakeholders, discrepancies between the publicly stated priorities that are meant to inform the selection of locations at which ASE is installed and the location of 24 current ASE sites in the city, and gaps in ASE related information to which members of the public currently have access. Phase 2 involved conducting key informant interviews with representatives from the City of Toronto, City Councillors, and representatives of the Ontario Ministry of Transportation. These interviews revealed that there exist informal and formalized data sharing practices among road safety stakeholders, and that despite the existence of publicly available site selection criteria ambiguities persist regarding how locations for ASE installations actually are selected. Equally noteworthy, the interviews exposed contrasting perceptions about the extent to which monetary considerations inform the deployment and use of ASE. By examining the assemblages of tools, processes, and practices comprising the City of Toronto's ASE infrastructure, this thesis sheds light on how the latter work together to regulate, shape, and function as a post-panopticon tool of social control in the City of Toronto.

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Chapter 1: Introduction

The City of Toronto has 5,397 total km of roads (City of Toronto, 2017a), 7,945 km total of sidewalks (City of Toronto, 2021a), and over 100 types of road signs (Government of Ontario, 2016) to govern some 2.75 million drivers and commuters (Statistics Canada, 2019). Road safety is a serious transportation concern with many municipal, provincial, and federal stakeholders working to mitigate the adverse effects of traffic collisions and speeding. These efforts include: (i) the enactment of traffic laws pertaining to the use of roadways including the licensing of drivers, the registration of vehicles, the safety and condition of motor vehicles, and rules of the road; (ii) the governing of driver conduct; and (iii) the implementation of technology-based traffic enforcement such as intersection policing using automated red-light cameras, and automated speed enforcement in designated Community Safety Zones.

The automobile as we know it today, was a product of innovations that took place throughout the second half of the 1800s. For instance, in 1867, Henry Seth Taylor, a Quebecois watchmaker and jeweller, produced a steam wagon in Stanstead, Quebec that, in many ways, may be thought of as prototype of the automobile (Petryshyn, 2000). In 1891, William J. Still began to work on electrified vehicles for urban rail transit use that relied upon a storage battery and electric power plant to help run carriages. E.B. Featherstonhaugh, helped finance the construction of Still's battery-powered carriage and commissioned the Dixon Carriage Company of Toronto to build a vehicle based on Still's specifications (Petryshyn, 2000). In 1893, this electric automobile was complete and by 1902 the electric car was relatively well known in Toronto. A few years later Henry Ford's mass production of his automobiles directly contributed to early pervasiveness of automobiles.

Responding to growing public opposition to uncontrolled automobile driving, in the early 1900s provincial governments began to construct automobile centered regulatory frameworks. The first legislation in Ontario specifically addressing the use of automobiles in the province, was the *Motor Vehicles Act, 1903* (Los, 2014). Several amendments were made to the Act in subsequent years. For example, in 1905, amendments were made that sought to hold vehicle owners legally responsible for the driving habits of their chauffeurs and employees by imposing “strict liability upon vehicle owners in the event of any loss or damage incurred or sustained by any person through the frightening of a horse or horses or other animals by a motor vehicle” (Los, 2014 p.154). Further amendments in 1906 required automobile drivers to stop at the scene of an accident and to provide authorities with their name and address, mandated the displaying of large licence numbers on both the front and back of the vehicle, banned intoxicated driving, and classified reckless or negligent driving as an offence. Reflecting the exponential growth of car use and the corresponding increase in traffic accidents, in 1923, the *Motor Vehicles Act* was consolidated into the *Highway Traffic Act*. The latter regulates highways (including common or public highway, street, driveway, bridge, viaduct), any part of which is intended for use by the general public for the passage of vehicles. In classifying traffic offences, the rules set out in the *Highway Traffic Act* serve to guide human conduct for all circumstances of roadway-based travel.

Jump forward almost a century and in July 2016, the City of Toronto began to implement its Vision Zero Road Safety Plan; *Toronto Road Safety Plan (TRSP) 2017-2021* (City of Toronto, 2017b). The adoption of this plan shifted how the city addressed road traffic safety. Whereas, historically, road traffic safety had centered on reducing all collisions, including property-damage-only collisions, the new plan focused on transforming the City’s transportation infrastructure and traffic-safety culture. One year later, in May 2017, the *Safer School Zones Act* came into effect in

the province of Ontario. This Act was established to address vehicle speed concerns and collision patterns involving automobiles travelling at excessive speeds. Building on these developments, in 2018, the City of Toronto rolled out a pilot program aimed at better understanding the processing and administrative requirements of the automated speed enforcement program (City of Toronto, 2019a). During this four-month pilot program, data about traffic speed and volume was collected 24 hours per day, seven days a week for a period of one month from eight school zones located on local, collector, and arterial roads (City of Toronto, 2018a).

Then, in 2019, the City rolled out its *Vision Zero 2.0 Road Safety Plan* which reiterated that, within Toronto's transportation system human life should be prioritized over all other objectives and, as such, called for the implementing of more extensive, proactive, and targeted safety initiatives than its predecessor (City of Toronto, 2019b). In November of the same year, Ontario Regulation 398/19 allowing municipalities to operate automated speed enforcement in Community Safety Zones was enacted under the *Highway Traffic Act*. Shortly thereafter, a cooperative Request for Proposal (RFP) was prepared by the City of Toronto's Transportation Services in conjunction with Legal Services, the Province of Ontario, and other municipalities to install, operate, and maintain automated speed enforcement systems for a fixed five year term with the option to renew (City of Toronto, 2019a). The RFP was advertised on the City of Toronto's website and proposals were received from Jenoptik-TraffiPax LLC, Redflex Traffic Systems (Canada) Limited, Black & McDonald Ltd, and Tristar Electric Inc (City of Toronto, 2019c). Based on the final technical proposal score and the cost of services score, the City awarded a contract to Redflex Traffic Systems (Canada).¹

¹ Reflex is a global technology company that designs and develops vehicle monitoring and enforcement services for governments, police forces, and traffic departments. It is headquartered in Melbourne Australia. See, <https://redflex.com/>

In early 2020, the City began an education campaign informing residents about the new automated speed enforcement (ASE) program and the implications of speeding. As part of this campaign, some 25,000 warning letters were issued to the registered owners of vehicles recorded speeding at locations hosting ASE installations. The City of Toronto formally began using ASE systems to issue speeding tickets mid 2021. During the first year of enforcement, “from July 6, 2020, to July 5, 2021, the City’s 50 ASE devices issued a total of 227,322 tickets to vehicles travelling in excess of the posted speed limit” (Layton, 2021, p. 2).

In 2022, the *Highway Traffic Act* was amended to allow Ontario municipalities to implement administrative penalties for camera-based traffic enforcement including red light cameras and automated speed enforcement (Government of Ontario, O. Reg. 355/22). Prior to this change, ASE-related disputes were adjudicated through the *Provincial Offences Act* which afforded vehicle owners the opportunity to dispute their traffic offences in court, like any other traffic ticket. In the lead up to the amendment, some municipalities had claimed their Court Services were at full capacity for scheduling disputed ASE charges. For example, a report from York Region stated, “any increase in charges brought about by ASE infractions would add significant pressure on the court system, resulting in unreasonable delays in the time to trial for all charges” (York Region Transportation Services, 2018, p.4). By allowing for the creation of an alternative adjudication arrangement wherein a municipally-designated employee can adjudicate the offence rather than a Justice of the Peace (Ministry of Transportation, 2022), the amendment was intended to lower the cost of settling camera-captured offences, free up government resources, and encourage province wide adoption of ASE. Since the deployment of ASE systems in the City of Toronto, several Ontario municipalities have followed suit, including: City of Brampton (2020), Regional Municipality of Durham (2019), City of Hamilton (2021), City of London (2021), City

of Mississauga (2020), City of Ottawa (2021), Regional Municipality of Waterloo (2020), and York Region (2020).

Various studies have demonstrated that speed cameras, including ASE, are an effective intervention for reducing driver incomppliance with speed limits and fatal and non-fatal accidents (Kang, 2002; Goldenbeld & van Schagen, 2005; Benekohal et al., 2008; Cunningham et al., 2008; Knapp, 2011; Morain et al., 2016; Tankasem et al., 2019; Singichetti et al., 2020; Tilahun, 2022). This, as Carnis (2010, p.2) puts it, is due in part to the fact that automated speed enforcement works as a guide “for human interaction – the user can expect, for example, a certain uniformity of traffic speeds – but also represent[s] constraints, modifying the field of the possible in respect of individual choices.”

According to Kitchin et al (2017), the deployment of various information systems combined with the networking digital infrastructures in urban contexts fosters the creation of new algorithmically mediated socio-spatial arrangements. To this end, he notes the example of Hudson Yards, a smart city development in New York that uses sensors and embedded computation to continually monitor residents, workers, traffic flows (such as congestion and pedestrian flow) across an amalgam of interlinked systems that modulate the performance of an infrastructure and those captured within it. The use of software-enabled urban technologies by governments and private actors, he posits, works to intensify the extent and frequency of monitoring, shifting the governmental logic from “surveillance and discipline to capture and control” (Kitchin et al., 2017, p.3). In other words, through the presence of such software-mediated systems citizens become subject to their behaviours being modulated to produce ‘regulated’ outcomes. According to Carnis (2010) and Kitchin et al., (2017), the information gathered from such surveillance infrastructures

offers new abilities for understanding, managing, and modulating drivers' behaviours toward particular outcomes.

1.2 Presentation of Central Research Questions

In his now classic examination of the relationship between technological change and political power, *The Whale and the Reactor*, Langdon Winner (1986) asks “do artifacts have politics?” His question is anchored in the notion that an important facet of studying technologies is understanding the ways in which political and economic rationalities inform their design and implementation. In responding to this question, he describes how several overpasses along the Robert Moses Parkway in Long Island New York were built to keep city buses away from Jones Beach. The design of both the parkway and the Jones Beach State Park was directed by New York builder Robert Moses who purposefully designed low bridges along the parkway in order to impede its use by buses, thereby limiting access of those most reliant on public transportation - racial minorities and members of low income groups - to Jones Beach State Park. However, 'upper' and 'comfortable middle class' vehicle owners, most of whom at the time were white, would be able to use the parkway for any number of purposes.

According to Winner (1986, p. 22), understanding technological politics “requires pay[ing] attention to the characteristics of technical objects and the meaning of those characteristics.” In the case of the low bridges of the Robert Moses Parkway, these politics are, in his view, exemplified by the manner in which the physical features of the overpasses served to operationalize "arrangements of power and authority in human associations as well as the activities that take place within those arrangements" (Winner 1986, p. 22). Viewed through this lens, automated speed enforcement infrastructure is political insofar as its invention, design, and implementation serve as “a way of settling an issue in the affairs of a particular community” (Winner, 1986, p. 22).

Carnis (2010, p. 9) makes this clear in noting that, ASE cameras work “as guides for human interaction” and provide road users with regularity in terms of traffic speeds on the one hand, and restraints in the form of these cameras modifying individual choices pertaining to speed-related behaviors on the other hand.

With this in mind, the central research question guiding my thesis is: *How does automated speed enforcement (ASE) function as a mechanism of social control?* In seeking to investigate this question, my project was informed by two complementary questions:

1. *What balance does the implementation of ASE strike between disciplining bad driver behaviour versus pricing high-risk thresholds of unwanted behaviours?*
2. *How does the network of governing agencies problematize speeding in the City of Toronto and structure the implementation and administration of ASE?*

To address these three questions, I divided the data collection process into two phases. Phase 1 involved examining information from publicly available open datasets from the City of Toronto, the Toronto Police Service, and Ontario’s Open Data Catalogue pertaining to automated speed enforcement. The findings that emerged from this phase were then used to create protocols to guide interviews with key informants from the City of Toronto, City Councillors, and the Ministry of Transportation during Phase 2. These interviews focused on the role of ASE in reducing vehicular traffic-related risks and the monetization of justice, ASE site prioritization, and the working relationship between road safety actors.

1.3 Thesis Structure

The thesis is divided into five chapters. This first, introductory, chapter has provided a brief overview of the background and context for the discussion presented in the subsequent chapters. Chapter 2 sets out the theoretical and conceptual foundations for my investigation. The discussion presented traces Michel Foucault’s concept of governmentality and considers its suitability as a framework for investigating the deployment and use of automated speed enforcement in the City

of Toronto. In Chapter 3, I offer an overview of the evolution of the City of Toronto's Vision Zero Road Safety Plan and set out the research design and methodology I used for Phase 1 of my project. Chapter 4 sets out the details about Phase 2 of the project including the research design used for key informant interviews and the findings that emerged from these meetings with individuals from the City of Toronto, Toronto City Council, and the Ministry of Transportation. Chapter 5 concludes the thesis. Here, I respond to the two questions that guided the research and comment on the contribution I believe my findings make to advancing knowledge about the intersection of automated speed enforcement and governmentality.

Chapter 2: Literature Review

The discussion in this chapter sets out the theoretical and conceptual foundations for this thesis. This chapter is divided into five sections. The first examines how automated speed enforcement can be understood as an assemblage of hardware, software, and social norms and practices with political properties. The second section traces Michel Foucault's concept of governmentality and considers its suitability as a framework for investigating the deployment and use of automated speed enforcement in the City of Toronto. The discussion in section three centers on how government, understood as the conduct of conduct entails techniques of the self and what this means in terms of how the behaviours of individuals are regulated. In section four, I discuss how new modes of surveillance work to capture information and control individuals' behaviours. Section five wraps up the discussion and sets out the central research question guiding my project.

2.1 Technological Politics

According to Marx (1984, p. 638), the word technology "is used to mean everything from mechanical apparatus to bodies of practical knowledge, to the distinctive activities of professions, to modes of organizing work (along with their embodying institutions), to the idea of technique or know-how in general." For instance, in discussing various technologies spanning from ships to bridges, to computers, to green technologies, to nuclear reactors Winner (1986) focuses on technologies as artifacts. Yet, and as noted by Marx, technologies may also be understood as "assemblages of practices and components" (e.g., procedures, techniques, processes, and behavioral or disciplinary tools) (Arthur 2009, p. 28).

In line with the notion of technology as 'assemblages of practices and components,' Rose (2000) writes of 'technologies of freedom' that govern through the individual's free choice. Rose (2000) defines technologies of freedom as tangible and non-tangible instruments that seek to govern behaviour at a distance by linking forms of judgement, modes of perception, practices of

calculation, and machinery. For instance, Rose (2001, p. 18) cites ethopolitics, or the “ways in which the ethos of human existence – the sentiments, moral nature or guiding beliefs of persons, groups, or institutions – have come to provide the ‘medium’ within which the self-government of the autonomous individual can be connected up with the imperatives of good government” as an example of technologies of freedom. For him, ethopolitics help maintain order and obedience, and to regulate the conduct of individuals “by binding them into shared moral norms and values: governing through the self-steering forces of honour and shame, or propriety, obligation, trust, fidelity, and commitment to others” (Rose 2000, p. 324).

Rose (2000, p. 330) further contends a certain politics of conduct is designed into the fabric of existence itself, into the organization of space, time, visibility, and circuits of communication that wrap individual and collective action such that “control and urban design, architecture and the police apparatus have merged into an integrated programme in the name of security.”² This notion builds on arguments advanced in his earlier writing wherein he claimed that patterns of spatial reconfiguring “inaugurate a virtually endless spiral of amplification of risk - as risk is managed in certain zones and forms of conduct... the perceived riskiness of other unprotected zones is exacerbated” (Rose 1996, p. 342). According to Rose, these types of spatial reconfiguring re-responsibilize individuals to manage their own risk.

According to Rose (2000, p. 324), in advanced liberal societies, control strategies can be divided into two families: “those that seek to regulate conduct by enmeshing individuals within circuits of inclusion and those that seek to act upon pathologies through managing a different set of circuits, circuits of exclusion.” The former seeks to protect individuals/society from risk by capturing all possible information and controlling the environment accordingly whereas the latter

² Rose's description here parallels Arthur's (2009, p. 29) third definition of technology as "the entire collection of devices and engineering practices available to a culture."

constructs individuals as sources of risk. Rose argues that with inclusionary strategies conduct is continually monitored and reshaped by logics immanent within all networks of practice. Comparatively, he maintains that exclusionary practices conceive the individual as a rational agent who chooses to not follow the law in the light of a calculus of potential benefits and costs. These practices work to integrate excluded individuals and reattach them to the circuits of civility.

In terms of my thesis, efforts at re-responsibilization in the domain of road safety is manifest in the various automation-based road safety measures (e.g., enhanced data analysis to track, regulate, and report on risky driving behaviour, passive detection and automated enforcement) that the City of Toronto has implemented since 2017 (City of Toronto, 2017c; 2019b; n.d.-a).

Andrejevic (2020) also notes that the deployment of a growing range of automated systems is used to decide whether individuals are likely to be good (or bad) and whether they can be viewed as risk, opportunities, assets, or liabilities. Seen through this lens, the use of automated systems such as ASE is, in principle at least, meant to shift the management of driver actions away from surveillance and discipline to modulation through the capturing and controlling of driver behaviour.

The concept of technological politics as articulated through the works of both Rose and Andrejevic echoes Foucault's notion of modulating conduct - whether through artefacts and/or social norms and practices - that is central to the concept of governmentality. In the next section, I turn my attention to this concept and Foucault's related ideas of biopolitics.

2.2 Foucault, Governmentality, and Biopolitics

Michel Foucault first introduced the concept of governmentality in a series of lectures he gave at the College de France between 1977 and 1979. In these talks, Foucault elaborated upon his analysis

of power-relations and examined broader governmental issues relating to the application and expansion of power throughout the modern state. In this analysis, he introduced the term ‘governmentality’ which he described as being concerned with the relation between government and thought, or the ‘conduct of conduct’ (Foucault, 2007).

Foucault conceived of governmentality as a style of reasoning about the purposes of the state that emerged in Europe during the mid-16th century. His *On Governmentality* lecture taken from the 1977–1978 lecture series *Security, Territory, Population* examines the concept of governmentality by looking at the logics and purposes of government by the state, how problems of government come to be identified, and the types of solutions imagined possible. In expounding upon this concept, he contrasts the focus of governmentality on discipline, police power, and the management and regulation of individuals and populations on the one hand, with sovereignty’s concern with territory and lineage on the other hand (Foucault, 2009).

Foucault (2007) posited that neoliberal government is characterised by a link between techniques that assure state coercion and procedures through which free individuals govern their own behaviour. To this end, he defines governmentality as an “ensemble formed by the institutions, procedures, analyses and reflections, the calculations and tactics, that allow the exercise of this very specific albeit complex form of power” (Foucault 2007 p. 20). As such, for Foucault, governmentality focuses on the linkages between techniques for regulating conduct and rationalities that justify, legitimise, and push citizens into modifying and constructing themselves. In other words, governmentality focuses one’s attention on the *how* of governance as opposed to the *what*. It is precisely this zoning in on the ‘how’ that draws attention to both the social practices and norms that regulate behaviour, and the political rationalities underpinning them.

Elaborating upon rationalities of governance, Foucault (2007, p. 108) identifies three processes as compromising the core of governmentality. The first involves creating taken-for-granted practices that draw from existing institutions and procedures as well as *de novo* reflections, calculations, and tactics. According to Foucault, these *de novo* practices are not invented by individuals but, rather, are derived from the norms of cultures, societies, and social groups. For example, the CaféTO curb lane program which authorizes the expansion of restaurant seating to curb-side dining areas during the summer months as well as the playing of live music on patios during weekends in certain wards works to localise particular routines, habits, and behaviours.³

The second process involves deploying knowledge via a power/knowledge nexus that includes the state, knowable disciplines, and learned professions. Here, Foucault (2007, p. 108) refers to the “development of a series of specific governmental apparatuses on the one hand, and on the other a development of a series of knowledges.” In this power/knowledge nexus, emergent political knowledge and associated professions become an integral part of the modern state’s capacity to govern. For the purposes of this thesis, a useful example of this nexus is the manner in which the Toronto Police Service contribute to regulating driver behavior by playing a role in enforcing both provincial and municipal traffic laws. Drivers who are caught contravening these laws are then disciplined through a complementary facet of this nexus (i.e., the court system).⁴

The third process of governmentality involves the development of what Foucault labels technologies of the self. He uses the latter phrase in reference to methods and devices – mechanical and otherwise – through which human beings constitute themselves. Examples of technologies of

³ Some of the wards that have participated in this program include the Beaches-East York, Davenport, Parkdale-High Park, Scarborough Centre, Spadina-Fort York, Toronto Centre, Toronto-Danforth and University-Rosedale wards. See, City of Toronto. (2020a).

⁴ These surveillance and discipline practices fall under what Rose (2000) categorizes as exclusionary family of control strategies.

the self are found in cognitive and motor skill activities such as learning how to drive and knowing how to make rapid decisions like braking or signalling while on the road. Technologies of the self can be learned in a formal institutional setting, by informal means such as oral transmission, and through everyday trial and error. The antithesis of technologies of the self are technologies of domination. For Foucault, (1988, p. 18) technologies of domination refer to technologies that “determine the conduct of individuals and submit them to certain ends or domination” and are characterised by the use of coercion (e.g., the *Highway Traffic Act*). In Foucault’s view, both technologies of the self and technologies of domination produce effects that contribute to constituting the self.

Foucault outlines two additional interrelated technologies that, in his view, allow people to understand and transform themselves: technologies of production and technologies of sign systems. According to Foucault (1988, p.18), technologies of production, “permit us to produce, transform or manipulate things.” These technologies, which can be understood as physical objects, transform interpersonal relations. For example, pick-up trucks such as Ford F-150, Chevrolet Silverado, and Ram 1500 are marketed as a work machine that gives the person who drives them almost limitless power rather than simply vehicles to get a driver from one point to another.

Technologies of sign systems “permit us to use signs, meanings, symbols or significations” (Foucault 1988, p.18). For example, the discourse strategies and practices that construct meanings around the City of Toronto’s Vision Zero Plan and its message of “fatalities and serious injuries on our roads are preventable, and we must strive to reduce traffic related deaths and injuries to ZERO” can be seen as falling into this category of technologies (City of Toronto, 2018b).

Foucault (1988) argues that technologies of the self, of domination, of production, and of sign systems rarely function separately and that each is associated with different types of

domination. This taxonomy offers a useful heuristic framework for understanding technology (in its tangible and intangible forms), the processes it influences, and the processes that influence it. Taken together, these four technology types – self, domination, production, and sign systems – comprise the hardware (e.g., red-light cameras and automated speed enforcement), techniques (e.g., piloted enhancements and improvements), practices (e.g., The Vision Zero Road Safety Plan, and knowledge (e.g., road statistics such as traffic volumes and foot traffic) that function as distributed but related elements of an integrated system that seeks to regulate conduct toward the goal of improving pedestrian and vehicular safety.

Foucault viewed the regulating of conduct (i.e., governmentality) as a specific and complex form of power that is affected through a range of *dispositifs* and artefacts that assemble the social and spatial life of people. The French term ‘dispositif’ is most often translated into English as ‘apparatus.’ Consequently, it tends to be understood by English speakers as conveying a strong association with technological devices, or artefacts. Foucault, however, defines *dispositifs* as a “heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions... the said [and] the unsaid” (Foucault, 1980, p. 96). In the Foucauldian sense, then, *dispositif* can be thought of as a network of relationships that organizes the field of power and knowledge.

The concept of *dispositif* is important to the purposes of this thesis precisely because it encompasses both the discursive and non-discursive aspects of institutionalised processes through which social practices are organised and regulated. In terms of automated speed enforcement, this consists of the technology itself (which includes infrastructure, protocols, and retrieval systems)

as well as discursive and non-discursive practices (government discourses, institutionalized discourses, and architectural discourses). In short, the said and the unsaid.

Foucault also introduces the related notion of biopolitics into the discussion of governmentality. He defines biopolitics as referring to “the government of the biological life of a population where the state holds the right to life and death in terms of the power to make live and to let die” (Foucault 2003, p. 254). In simple terms, biopolitics is concerned with the identification, classification, and management of populations to ensure that the dimensions of life that are said to define the population are amenable to specific forms of governance, systems of belief, and cultural propensities or ‘ways of life.’ To this end, Foucault (2007) identifies four social domains in which the techniques of biopolitics are active: (i) birth rate; (ii) mortality rate; (iii) accidents, infirmities, and anomalies; and (iv) the effects of the environment.

According to Foucault (2003), biopolitics achieves its objectives by fomenting new techniques for managing and regulating the circulation of people, commodities, diseases, and crimes. In terms of traffic safety in the City of Toronto, biopolitics is manifest through, for example, the deployment near schools, daycare centres, playgrounds, parks, hospitals, and senior citizen residences of ASE and its related infrastructure for the purpose of reducing the risks associated with the failure of drivers to adhere to speed limits. Seen in this light, the biopolitics of ASE pertains to municipal-level efforts at modulating ways of life to reduce vehicular traffic-related risks.

Within the notion of biopolitics, Foucault identifies three forms of power at the disposal of the state: sovereign power, disciplinary power, and biopower. Foucault (1990) often described sovereign power in terms of its spectacular violence. He conceptualized sovereignty as a particular type of relationship in society that enables the authority in place to differentiate and exclude, and

possibly use 'legitimate' violence. Comparatively, Foucault defined disciplinary power as "comprising a whole set of instruments, techniques, procedures, levels of application, targets; it is a 'physics' or an 'anatomy' of power, a technology" (Foucault, 1977, p. 215). It, he argued, operates systemically within a society, and not from above. Biopower refers to a form of power Foucault suggests emerged in 18th century Europe through which "the ancient right to take life or let live was replaced by a power to foster life or disallow it to the point of death" (Foucault, 1977, p. 138). In other words, biopower is concerned with power *over* the administration of life rather than with decisions about the subject's right to live.

Foucault associates biopower with two governmental techniques of power: 'anatomopolitics of the human body' and the 'biopolitics of the population.' Anatomopolitics are centred on how the human body which, Foucault contends, is made docile through discipline and training in order to be useful in the economic system and social life. It consists of the involvement of a network of institutions inculcating norms of behaviour through discipline and self-regulation. In terms of road safety in the City of Toronto, one can think here of the use of automated speed enforcement, traditional police enforcement, and red-light cameras to manage individual bodies through the precise organisation of time, space, and movement.

By contrast, the biopolitics of the population is anchored in the use of regulatory controls and interventions to manage populations in ways that are directly linked to economic and social issues. It can be seen, for example, as manifest through the use of red-light cameras coupled with driver feedback signs and automated speed enforcement to control driving-related activities and thereby train drivers toward specific behavioural ends.

Taken together, the concepts of governmentality and biopolitics address how dispositifs and artefacts function to make subjects, societies, and populations governable. On the one hand,

governmentality involves political rationalities and techniques for the direction and reform of conduct. Biopolitics functions as a type of population-centric governmentality. In terms of this thesis, the nexus of governmentality, biopolitics, and automated speed enforcement centres around the ways in which roadway safety, people's well-being, and public health, simultaneously function as objects of knowledge and fields of interventions. The discussion in the next section examines the stream of governmentality which focuses on the mentalities and rationalities underlying the notion of capture and control.

2.3 Rationalities of Rule

Discussions about governmentality can be broadly divided into two streams. The first involves looking at dispositifs and artefacts associated with the regulating of conduct (see, for example, Cruikshank, 1993; Lemke, 2001; Joseph, 2010). Here, an onus is placed on the ensemble of institutions, procedures, analyses, reflections, and activities of the state that facilitate the modulating of peoples' behaviour through social power. The second stream of discussions tend to focus on ways in which truth is produced through institutionalised discursive practices (i.e., regimes of truth) and how these processes constitute the social world as governable and administrable (see, for example, Gordon, 1991; Dean, 1999; Miller & Rose, 1990). Here, the focus is placed on the ways in which problems are defined, expertise recognized and enacted, information construed and codified, participants identified and organized, and codes of conduct arranged and circulated.

In his introduction to *The Foucault Effect*, Colin Gordon (1991), whose work I classify as being part of the second stream, critiques the interchangeable manner in which Foucault uses the term 'government.' He points out that, on the one hand, Foucault defined government narrowly as “the way in which one conducts the conduct of men” and as constituting “an analytical grid for

these relations of power” (Foucault, 2008, p. 186). Yet, on the other hand, Foucault also maintained that relations of power do not originate from a specific source such as the state or ruling class but rather is dispersed and circulates through networks to produce the social discourse of all bodies. Bearing this dichotomy in mind, Gordon (1991) contends that, Foucault’s use of ‘art of government’ (i.e., the conduct of conduct) and the ‘rationality of government’ (i.e., a way or system of thinking about the nature of the practice of government) was shorthand for governmental rationality.

Echoing this critique, Dean (1999) expounds on Foucault’s definition of government as the conduct of conduct, arguing that government is:

any more or less calculated and rational activity, undertaken by a multiplicity of authorities and agencies, employing a variety of techniques and forms of knowledge, that seeks to shape conduct by working through the desires, aspirations, interests, and beliefs of various actors, for definite but shifting ends and with a diverse set of relatively unpredictable consequences, effects and outcomes (p.18).

According to this definition, the term ‘government’ pertains to both the power and rules exercised by the state, and a network of governing agencies that seek to influence the actions of others. Additionally, Dean points out that governing consists of implementing various techniques in accord with specific forms of knowledge and rationalities in order to deliberately regulate, control, shape, and direct human conduct to specific ends.

For Dean (1999), then, governmentality refers to “how we think about governing others and ourselves in a wide variety of contexts” (p. 209). Based on this definition, Dean distinguishes between three facets of the conduct of conduct: political subjectification, governmental self-formation, and ethical self-formation. According to Dean, political subjectification involves “practices and discourses that treat individuals as if they were political subjects in their diverse forms, particularly the treatment of individuals as sovereign subjects or citizens within a self-governing political community under the conditions of liberal democracy” (p. 156). This view of

the conduct of conduct suggests that governmentality may be envisaged as taking the form of networks that are not necessarily located within the state but, instead, constructed from practices operating from multiple and heterogeneous locales both within and external to the state.

Dean maintains processes of political subjectification are dependent upon practices of self-formation which he opines, can be divided into governmental self-formation and ethical self-formation. The former consists of organized attempts used by agencies, authorities, organisations, and groups to “shape the conduct, aspirations, needs, desires, and capacities of specified categories of individuals, to enlist them in particular strategies and to seek defined goal” (Dean 1994, p. 156). These practices do not explicitly entail coercion or direct punishment. Instead, they are manifest through indirect strategies that result in an individual self-disciplining or self-censoring. This, in turn, pushes individuals to govern their own choices and behaviors in ways that support the agendas and priorities of larger organizations and governments. In terms of road safety in the City of Toronto, one might consider here the ways in which the provincial government, the municipal government, and the Toronto Police Service regulate the behaviours, dispositions, and aptitudes of drivers to encourage them to drive more safely, and to self-identify practices, behaviours, and actions that place safety at risk.

By contrast, ethical self-formation, refers to what Dean (1994) labels ‘self on self’ governing actions. It consists of the “practices, techniques and discourses of the government of the self by the self, by means of which individuals seek to know, decipher and act on themselves” (p. 156). In simple terms, ethical self-formation consists of the informal monitoring of the actions of the self. An example of ethical self-formation in the City of Toronto is the participation of individuals in education campaigns such as the bicycle safety campaign, the art of distraction campaign, and safe speeds toolkit (to help with problems like road safety or speeding) that cast an

individual's conduct as a problem to be solved (City of Toronto 2018c,d; 2022a).

Examining the practices of governmental self-formation and ethical self-formation enables one to focus on the ways in which authorities and agents seek to conduct the conduct of individuals or the government of self by self. Preceding the arguments advanced by Gordon (1991) and Dean (1999), Miller & Rose (1990, p. 4) argued that “the notion of government highlights the diversity of powers and knowledges entailed in rendering fields practicable and amenable to intervention.” Building on this view, they suggest that an analysis of policy cannot be restricted to the study of different administrative agencies, their interests, finance, and organization precisely because it is “complex and heterogenous assemblage of conditions that make it possible for objects of policy to be problematized and rendered amenable to administration” (Miller & Rose 1990, p. 4). They further posit that a form of thinking characteristic of 'governmentality' consists of evaluating the internal aspects of a phenomena under investigation – e.g., how authorities and experts make decisions, the conclusions they draw, the solutions they recommend, and the motivation that failure provides for the development of new programmes of government.

With this in mind, Rose & Miller (1992) used Foucault's concept of governmentality to examine the complex and varied ways in which modern state authorities have aimed to regulate economic, social, and personal activities. In so doing, they posited that government is “a domain of cognition, calculation, experimentations, and evaluation that is inextricably linked to the activities of experts and their fields of knowledge in which human conduct is analysed, rendered calculable, and administered” (Rose & Miller 1992, p. 175).

Rose and Miller (1992) further argue that government has distinct sides: political rationalities and governmental technologies. This bifurcated view leads them to contend that an analysis of modern governmentality needs to free itself from a focus upon 'the state' and from a

restricted conception of the types of mechanisms through which authorities seek to regulate the activities of a differentiated assembly of social agencies and forces.⁵ They define political rationalities as

the changing discursive fields within which the exercise of power is conceptualized, the moral justifications for particular ways of exercising power by diverse authorities, notions of the appropriate forms, objects and limits of politics, and conceptions of the proper distributions of such tasks among secular, spiritual, military and familial sectors (Miller & Rose, 1990 p. 5).

Of particular interest for them in this regard are languages of items and intentions, the grammar of analyses and prescriptions, the vocabularies of programmes, and the terms in which the legitimacy of government is established.

By contrast, they define governmental technologies as the "complex of mundane programmes, calculations, techniques, apparatuses, documents, and procedures through which authorities seek to embody and give effect to governmental ambitions" (Rose & Miller, 1992, p. 175). For them, governmental technologies enable citizens to instrumentalize the diverse spheres of social life, avoiding what they considered unwelcomed, and achieving what they believe they want. For Miller and Rose, it is through governmental technologies that political rationalities, and the programmes of government that articulate them, become capable of deployment. As they put it, "If political rationalities render reality into the domain of thought, these 'technologies of government' seek to translate thought into the domain of reality, and to establish 'in the world of persons and things' spaces and devices for acting upon those entities of which they dream and scheme" (Miller & Rose, 1990, p. 8). This said, it must be noted that Miller and Rose use the term 'technologies' in a very broad sense, employing it to refer to a

particular approach to the analysis of the activity of ruling; one which pays great attention to the actual mechanisms through which authorities of various sorts have sought to shape, normalize and instrumentalize the conduct, thought, decisions and

⁵ This approach also is adopted in Rose (2000).

aspirations of others in order to achieve the objectives they consider desirable (1990, p. 8).

For example, intellectual technologies such as birth registries, income reporting, registration of driver's licences, and censuses are required for strategy and planning and encourage individuals to make sense of their lives by keeping track of their behaviours. Such intellectual technologies function as an incitement to individuals to construe their lives according to state norms. According to Miller and Rose (1990), intellectual technologies are manifest in programmes of government that, in turn, rely upon a complex net of technologies (in management, in marketing, in advertising, in instructional talks on the mass media of communication) that work to educate individuals in governing themselves. They establish new possibilities for political rule that can be observed with the rise to prominence of political rationalities that place emphasis upon the self-government of individuals (i.e., neoliberalism). As they put it, in this sense, “individuals themselves, as workers, managers, and members of families can be mobilized in alliance with political objectives, in order to deliver economic growth, successful enterprise, and optimum personal happiness” (Miller & Rose, 1990 p. 28). For this reason, political power does not, in their view, take the form of the domination of subjectivity. Instead, political power has, they claim, come to depend upon a web of social norms and practices along with various artefacts to fabricate and maintain self-government.

In sum, political rationalities help ‘constitute’ specific issues (e.g., speeding, aggressive driving, drunk driving) as problems to be made knowable. In terms of road safety in the City of Toronto, such rationalities are found in, for example, the discourse of politicians and in reports of committees. Additionally, programmes of government translate political ideas into practical, feasible, and assessable ambitions and goals. For example, the Vision Zero Road Safety Plan which legitimize specific types of interventions.

It is through governmental technologies that political rationalities and programs of government become capable of deployment. According to Miller and Rose (1990 p. 63),

this is not a matter of implementation of ideal schemes or the extension of control from the seat of power into the minutiae of existence. Rather it is a question of the complex assemblage of diverse forces.

A complex assemblage of forces including legal, architectural, professional, administrative, financial, and judgemental seek to instantiate government and regulate the decisions and actions of individuals, groups, organizations, and populations. In terms of the Vision Zero Road Safety Plan, these mundane governing mechanisms consist of procedures of examination and assessments to determine locations for urban informatic systems, the building and design of road safety interventions, the inauguration of professional specialisms (e.g., data analytics, data collection and management, engineering, project management).

Within governmentality studies, the identities, characteristics, and forms of conduct of individuals are defined and problematized to control and manage the behaviours of individuals. Central to this regulation are forms of knowledge and expertise that motivate governing agents and regulate individuals (their identities, their characteristics, and their forms of conduct). In the next section, I turn my attention to the use of technologies in urban spaces that operate on the basis of risk to capture and control the behaviours of individuals.

2.4 Information, and Control

Jeremy Bentham's concept of the 'panopticon,' which was later popularized by Foucault, has commonly been presented as both an artefact and a metaphor for demonstrating how diverse technologies of surveillance manage bodies. Like the panopticon, the installation and/or presence of speed cameras, and ASE systems more broadly, conveys a message to drivers that they are being watched, thereby compelling them to alter their behaviour accordingly. However, Andrejevic (2020) notes that the mere presence of speed cameras is not always enough to deter drivers from

speeding and other traffic violations (e.g., failure to stop for red lights). Pointing to the use of speed cameras that continuously track drivers over long stretches to determine whether their average speeds indicate adherence to posted speed limits, he posits that the constant level of self-vigilance such types of automation generate reflect a shift in surveillance strategies away from the surveillance and discipline of panopticonism toward strategies of post-panopticonism that are rooted in principles of capture and control.

The shift from surveillance and discipline to capture and control is best understood by references to wider developments in criminological research in the late twentieth century and the early decades of the twenty-first. In the early 1990s, Feeley & Simon (1992, p. 449) argued that a “new language of penology [began to] emerge” shifting focus away from the individual toward managing aggregate populations. According to Feeley & Simon (1992, p. 452) a central feature of this new penology “is the replacement of a moral or clinical description of the individual with an actuarial language of probabilistic calculations and statistical distributions applied to populations.” Put simply, emphasis is placed on targeting suspect populations on the basis of algorithmically mediated actuarial assessments of their likelihood of offending in particular circumstances or when exposed to certain categories of opportunity (Zedner, 2003).

Another change took place in the early 2000s in the wake of the terrorist attacks of 9/11. The emergence of post-9/11 counter-terrorism frameworks, legislation, and strategies by governments focused attention on security, anticipating risks, and acting pre-emptively (Zedner, 2007). The temporal shifts from controlling risks to anticipating and forestalling them, fall within what Zedner (2007, p. 262) labelled a pre-crime framework that is characterized by “calculation, risk and uncertainty, surveillance, precaution, prudentialism, moral hazard, prevention and, arching over all of these, there is the pursuit of security.” According to Zedner (2007, p. 262), the

temporal shift to precrime coincided with an expansion in responsibility for security against risk beyond the State to a wider array of non-state actors.

According to Van Brakel & De Hert (2011) and Sandhu & Fussey (2021), pre-emptive strategies are anchored in using digital technologies to forecast where crimes are likely to occur and who is likely to perpetrate or be impacted by them. As Andrejevic (2020 p. 80), puts it, predictive or algorithmic policing “relies on the automation of data collection and processing to take data from disparate sources, analyzing them and then using results to anticipate, prevent, and respond more effectively to future crime.”⁶ He further posits that this transition has been inspired by developments in the tech industry and a shift in the ways information is thought of and handled. As he sees it, traditional disciplinary practices have not disappeared. Instead, he claims that regimes of monitoring with different logics have emerged to structure relations of power and control. He characterizes the transformation in domestic forms of security and policing as part of a broader automation-based shift from panoptic to post-panoptic modes of surveillance. To this end, Andrejevic posits post-panoptic modes of surveillance “rely not on discipline but on simulation; not on the spectacle of surveillance but on covert monitoring; not on incomplete or partial surveillance but on comprehensive data collection” (Andrejevic, 2020, p.79).

The shift from systems of surveillance and discipline to capture and control is evident in the introduction of distributed software-enabled technologies that mediate road infrastructure, vehicles, and drivers. Dodge & Kitchin (2007), for example, argued that the traditional mode of

⁶ Predictive policing tools, such as PredPol, are based on seismic software used to look at a crime in one area, incorporate it into historical patterns, and predict when and where it might occur next. O’Neil (2016) shows that problems emerge in predictive policing as a direct result of the criminalizing poverty and the equating of lesser infractions such as vagrancy, aggressive panhandling, and selling and consuming small quantities of drugs with more serious and/or violent crimes. As she puts it, while predictive policing tools “deliver a perfectly useful and even high minded software tool,” they also empower police departments to “zero in on the poor, stopping more of them, arresting a portion of them, and sending a subgroup to prison” (O’Neil 2016, p. 84).

traffic enforcement encouraged drivers to comply with the law and regulate their behaviour according to the externally based possibility of encountering a police officer. Software-enabled technologies (e.g., traffic cameras and licence plate registration systems) are hypothesized to instill a stronger regime of self-discipline into drivers than their traditional counterparts insofar as people will, it is claimed, self-regulate their behaviour if they know they are being monitored in manner that ensures enforcement is not contingent upon the physical presence of police (Klauser & Albrechtslund, 2014).

Echoing Zedner (2007), Dodge & Kitchin (2007) claimed the application of various forms of software-enabled technologies in urban spaces represented the beginnings of a new mode of regulation which they labelled automated management. They maintained that “automated management consists of two interlocking sets of regulatory technologies: automated surveillance that seeks to enforce more effective (self) disciplining and capture systems that actively reshape activity” (Dodge & Kitchin, 2007, p.274). Building on Agre’s (1994) capture model, which acknowledges that the mechanisms (including technologies, and software) that gather information are part of the same system that seeks to monitor and regulate, Kitchin & Dodge (2014) later argued that automated management works to create dynamic and exhaustive systems of governmentality that function in real-time. As such, it may be understood as shifting surveillance mechanisms from panoptic arrangements to more oligoptical arrangements. Put simply, automated management is comprised of seeing-recording instruments that are connected and integrated into larger network which is diffused among many institutional actors (McVicar, 2020).

Similarly, Coletta & Kitchin, (2017) examined the socio-spatial effects of smart city⁷ technologies, arguing that they reconfigure the production of space, spatiality, mobility, and how urban space is governed. For example, technologies such as licence plate recognition systems and transponders work to regulate the access of vehicles to different parts of the urban space network (Bibri, 2021), GPS systems monitor a vehicle's position and movement in real-time, and traffic management systems manage the flow of traffic across a road network. Kitchin (2016), and more recently Vadiati (2022), postulate that the intervention of automated management in urban space translates cities and their residents into code that reshapes space, mediates the lives of inhabitants, and reconfigures pre-existing forms of governance (specifically patterns of social and political allocations).

According to Andrejevic (2020), given its concentration of social activity, the urban environment is now perceived as a swamp of information to be organized and sorted by technology companies who play an active role in managing information and are involved in municipal and regional projects; both of which were once the province of public investment and public policy. In terms of the City of Toronto, this can be seen with the variety of different technology companies involved in deploying various urban informatic technologies, hardware, and software and who, in turn, gain access to comprehensive and detailed information about the behavior, preferences, and communications of the inhabitants of the city (City of Toronto 2020b).

2.5 Research Question

Automated speed enforcement programs have been widely applied in cities across Canada⁸ and

⁷ According to Cardullo et al., (2019, p. 2) "the smart city seeks to improve city life through the application of digital technologies to the management and delivery of city services and infrastructures and solving urban issues."

⁸ In Canada, ASE systems have been installed in the following cities: Montreal, Laval, Vaughn, Richmond hill, Markham, Ottawa, Pickering, Hamilton, Brantford, Mississauga, Brampton, Kingston, Oshawa, Cambridge,

countries around the world such as the U.S., France, Russia, Kuwait, and Korea. To date, the large body of literature surrounding the use of ASE in these countries has largely focused on the benefits of these systems, barriers to implementation, and cost effectiveness rather than questions of capture and control.

One domain that seemingly remains under-examined is the revenue streams generated for both governments and private companies by the installation of ASE systems, or what O'Malley (2010) refers to as the "monetization of justice." In the city of Toronto, this can be seen with the use of automated speed enforcement to monitor drivers, calibrate speed, and monetize traffic infractions in the form of fines that are issued through an automated urban management system (i.e., administrative penalties). In turn, fines that are issued need to be paid by the vehicle owner, as opposed to the person driving when the infraction occurred. Viewed through O'Malley's (2011, p. 547) lens, such arrangements may be understood as evidence of how fines "aim at reducing probabilities of action rather than seeking individual punishment or reform as ends in themselves." He further contends that the use of fines in this manner has transformed justice and discipline into monetized apparatuses that enable the expansion of government regulation. According to this view, ASE-based ticketing of traffic violations transforms road safety and justice into an economic transaction.

A second seemingly under-examined domain, and the focus of my thesis, is the governmentality of ASE and, more specifically, how it shifts the basis of governmentality from panoptic to post-panoptic modes of surveillance. In seeking to examine this phenomenon, I look at assemblages of tools, processes, and practices comprising the City of Toronto's ASE systems, and how they work together to regulate, shape, and modify the conduct of drivers in Canada's

Kitchener, Waterloo. Beaumont, Calgary, Camrose, Lethbridge, Lloydminster, Edmonton, St. Albert, Winnipeg, Coquitlam. Surrey, Burnaby, Vancouver, and Richmond.

largest urban centre. With this in mind, the central research question guiding this thesis is: *How does the use of ASE as a mechanism for social control work to influence driver behaviour?* My efforts to address this question were guided by two sub-questions:

1. *What balance does the implementation of ASE strike between disciplining bad driver behaviour versus pricing high-risk thresholds of unwanted behaviours?*
2. *How does the network of governing agencies problematize speeding in the City of Toronto and structure the implementation and administration of ASE?*

2.6 Conclusion

The discussion in this chapter has provided an overview of the main concepts at the core of my project: governmentality, biopolitics, information, and control. These concepts allow me to examine practices and programs aimed at shaping, guiding, and governing the behaviour of others and the self. The discussion in the next chapter focuses on the first phase of my investigation.

Chapter 3: Phase 1 Toward A Methodology for Investigating Road Safety in Toronto

The discussion in this chapter sets out the research design and methods used in Phase 1 of my project. The discussion is divided into five sections. The first provides a historical overview of the City of Toronto's Vision Zero Road Safety Plan. In section two, I set out the research design used to guide my investigation. Section three focuses on how I went about assessing and selecting datasets that would be suitable for my research purposes from the open datasets publicly available from the Toronto Open Data and the Police Service Public Safety Data Portals. The discussion in section four outlines how I organized the selected data for my analysis. Section five concludes the discussion.

3.1 Overview of the Vision Zero Program

Vision Zero is a road safety plan that has been implemented in the City of Toronto and other cities across Canada. Its aim is to eliminate fatalities and serious injuries on the City's roadways (Vision Zero Canada, n.d.). Vision Zero constitutes a particular approach to road traffic safety that was first adopted in Sweden, in 1997, when the country's Road Traffic Safety Bill was passed by the Swedish Parliament. This bill was radically different from all previous road safety policies insofar as it was based on the premise that any death on roads is a preventable occurrence (Kristianssen et al., 2018). To this end, Sweden's Vision Zero plan paved a new direction for road traffic safety by shifting responsibility for safety from road users to all actors within a traffic system. In so doing, it pushed all stakeholders to become more centrally involved in road safety, thereby setting a foundation for the long-term design of safe road transport systems for all users (Kim et al., 2017).

Since the 1997 passing of the Road Traffic Safety Bill, Sweden has consistently reported one of the lowest rates in the world of annual deaths resulting from traffic accidents (International Transport Forum, 2022). Equally notable is the fact that in the intervening years, the principles of Vision Zero have become global, with numerous countries, provinces, states, and cities adopting

and implementing their own versions of the plan – e.g., Netherlands (1997), Australia (2004), United States (2014), Haryana, India (2016) Toronto, Canada (2017), and United Kingdom (2018) (Kim et al., 2017; see also Marshall, 2018; Mor et al., 2020).

In 2005, almost one half of all motor vehicle-related fatalities in Ontario involved drivers who were speeding or who lost control of their vehicle (Ministry of Transportation, 2005). Between 2000 and 2006 the province’s Ministry of Transportation introduced numerous anti-speeding measures that subsequently were incorporated into the *Transportation Statute Law Amendment Act, 2005*.⁹ Over the next four years, the province’s Ministry of Transportation went on to introduce new data collection methods aimed at improving transportation planning and new planning policies, as well as pilot testing of new vehicle types (Ministry of Transportation, 2019).

In July 2016, The City of Toronto adopted its Vision Zero Road Safety Plan (City of Toronto 2016a); *Toronto Road Safety Plan (TRSP) 2017-2021* (City of Toronto 2017c). The implementation of this plan shifted how the City addressed road traffic safety. Whereas, historically, road traffic safety centered on reducing all collisions, including property-damage-only collisions, the new plan focused on transforming the City’s transportation infrastructure and traffic-safety culture and outlined improvements relating to engineering, enforcement, education, engagement, and evaluation (the so-called 5 Es) (City of Toronto, 2019b). Throughout the first two years of the plan’s implementation, the number of traffic-related fatalities in Toronto fell from a record high of 78 in 2016 to 66 in 2018 (City of Toronto, 2019b,d). During the same period, the City of Toronto’s Transportation Services made progress in implementing some forty traffic

⁹ These measures included increasing fines for speeding 30–34 km/h over the posted limit, suspending the licences of repeat offenders who speed 50 km/h or more over the posted limit, and doubling fines for speeding in a construction zone when workers are present.

countermeasures including, adding pedestrian head start features¹⁰ to over eighty signalized intersections and designating over 100 School Safety Zones¹¹ (City of Toronto, 2019b).¹² The most notable “acceleration and expansion was approved in 2018 when City Council authorized up to \$22 million in additional 2018 funding to improve and accelerate the implementation of road safety measures” (City of Toronto, 2019b, p. 17).

In 2019, the City rolled out its *Vision Zero 2.0 Road Safety Plan Update* which reiterated that, within Toronto’s transportation system human life should be prioritized over all other objectives (City of Toronto, 2019b). Not surprisingly, then, the *Vision Zero 2.0 Road Safety Plan Update* recommended more extensive, proactive, and targeted initiatives than its predecessor which, according to the new Plan’s authors, was “oriented toward a large set of mostly shorter-term improvements” (City of Toronto, 2019b, p. 12). For example, in supporting additional measures targeting specific emphasis areas, efforts to increase the number of School Safety Zones from 20 to 80 schools per year were specified as well as the installing of enhanced pavement markings and signage for all elementary and secondary schools in the City.

A notable feature of the Vision Zero 2.0 Road Safety Plan is the emphasis it places on prioritizing data-driven decision making. As set out in this document, the latter involves: (i) using predictive analytics; (ii) working with other public and private sector partners¹³ to acquire better data; and (iii) implementing performance monitoring and evaluation to measure the impact of

¹⁰ Pedestrian head start features are features of traffic signals that provide pedestrians the opportunity to begin crossing the street prior to vehicles being permitted to proceed.

¹¹ A School Safety Zone is “a designated stretch of roadway which includes school safety zone signs and a variety of measures such as watch your speed signs, improved pavement makings, flashing beacons, among other possible improvements” (City of Toronto 2019d).

¹² For a full listing of the countermeasures set out in the *Toronto Road Safety Plan (TRSP) 2017-2021* see, City of Toronto (2017d).

¹³ Identified partners include: the Toronto Police Service, Toronto Public Health, the Toronto Transit Commission, the Toronto District School Board, and the Toronto Catholic District School Board, Toronto Hydro, and other levels of government.

safety programs (City of Toronto, 2019b). For instance, the plan specifies that collision data will be analyzed alongside supporting data (including road characteristics, traffic volumes, pedestrian and cyclist volumes, and demographics) to identify the underlying causes of fatal and serious injury collisions impacting schoolchildren, older adults, pedestrians, and cyclists (i.e., vulnerable road users). In line with this initiative, the plan calls for expanding the use of traffic cameras to increase safety.

Like its predecessor, the proposed solutions and programs set out in the *Vision Zero 2.0 Road Safety Plan Update* draw upon the benefits afforded by applying the so-called 5Es – engineering, enforcement, education, engagement, and evaluation – in different settings. Specifically, the 5Es are meant to be applied in relation to six groups of roadway users – pedestrians, cyclists, motorcyclists, school-aged children (aged 4 to 19), older adults (age 65 and over), and aggressive and distracted drivers – in six ‘key focus areas’ identified for improvement (see, Table 1).

In terms of my research project, ASE aligns most closely with the *Vision Zero 2.0 Road Safety Plan Update*'s speed management strategy focus area insofar as the implementing of this technology is viewed as offering a potentially viable means of contributing to reducing vehicle speeds as well as the numbers and severity of traffic collisions. Moreover, and as specified in this document, the use of ASE is seen to help augment the work of police officers in a sustained and equitable way by broadly enforcing safe speed across all road users. To this end, the document states, “the most effective way to prevent unintentional bias in police speed enforcement is through the use of automated speed enforcement, according to consistent deployment guidelines” (City of Toronto, 2019b, p. 25).

Table 1: Vision Zero 2.0 Road Safety Plan Update – Key Focus Areas

Focus area	Tools and Practices Applied
1. Speed management strategy	<ul style="list-style-type: none">• Revised speed limit setting practices• Road design improvements• Enhanced police enforcement• Proactive deployment of Watch Your Speed signs• Speed limit reductions• Public education• Automated speed enforcement
2. Road design improvements	<ul style="list-style-type: none">• Geometric road safety modifications• Alternative approaches to delivering the Traffic Calming program• Measures to complete the sidewalk network• Improved night-time visibility• Cultural corridors safety review• Community Safety Zone designations
3. High-risk mid-block crossings	<ul style="list-style-type: none">• Updated traffic control warrants• TTC stop consolidations• A systemic review of high-risk mid-block segments• Review of Pedestrian Refuge Islands
4. Turning collisions at signalized intersections	<ul style="list-style-type: none">• Pedestrian head start signals proactively implemented at most signalized intersections across the city as a default safety feature.• Bicycle head start signals implemented where feasible.• Right-turn-on-red prohibitions deployed at intersections with known relevant collision patterns.
5. Education and engagement	<ul style="list-style-type: none">• Launching major road safety education campaigns such as the Art of Distraction safety campaign.¹⁴• Requiring all City staff who drive for work purposes to acquire a City driving permit by passing a one day in-class and on the road training and assessment of their driving skills.

Source: Information summarised from, City of Toronto (2019b).

Having reviewed the antecedents to, and implementation of, Toronto’s Vision Zero plans, I now turn the reader’s attention to the research design I used to investigate the governmentality of ASE.

¹⁴ Launched in late 2018, Art of Distraction was an awareness campaign aimed at bringing public attention to road safety by showcasing real stories of tragedy and loss on Toronto's roads. See, City of Toronto (2018d).

3.2 Research Design

The reader will recall that the central research question guiding this project is: *How does automated speed enforcement (ASE) function as a mechanism of social control?* In seeking to address this question, I divided the data collection process into two phases, both of which relied upon the use of qualitative research techniques to assess how: (i) road safety problems are defined, (ii) vulnerable road users are identified and organized, and (iii) codes of conduct arranged and circulated.

According to Sandelowski (2000),¹⁵ descriptive qualitative research is a well-developed, under-appreciated compendium of research techniques that can be used to provide a “comprehensive summary of an event in the everyday terms of those events” (p. 336). According to her, studies anchored in qualitative description produce findings closer to the data as given, or data-near, precisely because this approach does not require deep interpretation by the researcher. As such, in her view, qualitative description allows less room for interpretation than high-inference qualitative approaches such as phenomenology¹⁶ and grounded theory.¹⁷ Echoing this view, Thomas (2006) argues that the forms of interpretation associated with qualitative descriptions can be advantageous precisely because they allow for findings to emerge from the raw data without being constrained by imposed methodologies or predetermined theories.

Green et al., (2022) applied a qualitative descriptive approach to identify the conceptual

¹⁵ Sandelowski (2010) responds to misconceptions about qualitative description supposedly not requiring data interpretation to which her 2000 article gave rise by countering that qualitative description is not atheoretical and in no way legitimates the failure to analyze and interpret data. She further argues that it is challenges associated with naming and differentiating qualitative methods (i.e., classification) that, ultimately are responsible for the misconceptions.

¹⁶ Phenomenology is a form of qualitative research focusing on the study of an individual’s lived experiences within the world. See, Clark (1998).

¹⁷ Grounded theory is a research method which is ‘grounded’ in data that has been systematically collected and analysed to generate novel concepts and emergent theory. See, Glaser & Strauss (1967).

origins of Safe System in Victoria, Australia and to uncover how the concept is intended to be understood. To do so, they proceeded by conducting key informant interviews with ten Australian and international experts who were either directly involved in the development of the Safe System or who possessed a detailed understanding of the initiative.¹⁸ According to Green et al., (2022), this approach served as a valuable tool because it enabled them to obtain a detailed understanding of the adoption and development of Safe System, the decision-making processes associated with this undertaking, and the challenges and opportunities associated with its implementation. They, in turn, examined the terminology used by the key informants to ascertain how they interpreted Safe System. According to the authors, this technique “helped explore a range of perspectives on Safe System, by allowing participants to describe their experiences and perceptions of initial conceptualisation, development, and implementation of Safe System” (Green et al., 2022, p.172). Their findings suggest that the original intentions and outcomes of Safe System are not uniform across road safety experts. This leads Green et al., (2022) to conclude that there is not one, accepted view as to what Safe System is meant to achieve or its intended outcomes.

In their investigation of the relationship between the built environment and physical activity in rural settings, Coghill et al., (2015) also opted to use key informant interviews. In this instance, the researchers conducted twelve semi-structured interviews with rural public health practitioners and managers to uncover how public health practitioners are integrating the built environment into public health interventions aimed at improving physical activity in chronic disease prevention programs. Based on the information gathered from these interviews, Coghill et al., (2015) found that health unit staff relied on five categories of activities to address the built

¹⁸ Australia’s Safe System is a holistic approach to road safety with the overarching goal of preventing road crashes or at least minimising their severity. It uses principles from Sweden’s Vision Zero and the Netherlands’ Sustainable Safety approaches. See, VicRoads. (n.d.).

environment: 1) engagement with policy work at a municipal level; 2) building and working with community partners, committees, and coalitions; 3) gathering and providing evidence; 4) developing and implementing program development; and 5) enhancing social marketing and awareness raising.

Given my interest in understanding perspectives regarding the use of tools to mitigate road safety risks (i.e., technologies, programs, legislations) and webs of meaning around these tools, the use of key informant interviews was deemed an appropriate means by which to proceed. Before proceeding with interviews, however, it was crucially important that I be able to understand and describe what the existing evidence indicated about the place and efficacy of automated speed enforcement within the context of road safety in the City of Toronto. Therefore, I elected to divide my research into two phases.

Phase 1, which is the focus of discussion in the remainder of this chapter, was desk-based. It involved examining information from publicly available open datasets pertaining to ASE in the City of Toronto. The datasets I accessed for this part of the project are available at the City of Toronto's Open Data Portal (<https://open.toronto.ca>), the Toronto Police Service's Public Safety Data Portal (<https://data.torontopolice.on.ca/pages/open-data>), and Ontario's Open Data Catalogue (<https://data.ontario.ca>). I used these data portals to source data about speeding, the City of Toronto's Vision Zero Safety Measures, and the cost/revenue associated with implementing ASE. My rationale for doing so was premised on the idea that, if available and accessible, analysis of such information would enable me to formulate questions about the role of data in identify road safety risks, developing and implementing safety measures aimed at protecting vulnerable road users, and the function of ASE systems in terms of regulating driver behaviour.

The discussion in the next section zeros in on how I went about gathering relevant information from these portals.

3.3 Data Gathering

Phase 1 of the project began with my searching the City of Toronto Open Data portal for information about ASE. I began my search using a process of trial and error. I was motivated, in part, to proceed in this manner because I wanted to approach this search in a manner corresponding with how I envisage an average resident of Toronto who is interested in this topic might. Put simply, in addition to seeking to discover if such information was available online, I wanted to experience how easily it could be accessed and, once accessed, how user-friendly it was for someone who is neither a data specialist nor statistician. To this end, my approach can be understood as having been loosely influenced by the so-called ‘persona method’ that is anchored in the field of Human-Computer Interaction (HCI) insofar as I wanted to get a sense of how well the information available at the Open Data portal aligned with my sense of an average user’s needs, experience, and objectives (Nielsen 2014; Dam and Siang 2022).

I began by conducting a search for the term ‘Automated Speed Enforcement.’ This returned a link to a webpage titled Automated Speed Enforcement Locations <<https://open.toronto.ca/dataset/automated-speed-enforcement-locations/>>. At this page, data about ASE locations are provided as a visualization in the form of a map. Visitors to the page have the option of downloading the dataset, which includes the active and planned locations (latitude and longitude) of the City of Toronto's automated speed enforcement systems.

I then searched for the abbreviation ‘ASE.’ This returned ten results including the previously mentioned dataset. The nine other returns had nothing to do with automated speed enforcement. Two were datasets pertaining to housing, five were health-related, another had to do

with archives names authorities, and the last dataset contained a list and summary of information about competitive call documents for the purchase of various goods and services.

For the third search, I entered the term ‘transportation.’ This returned 28 results, of which I retained four for further examination because they pertained to the speed management strategy and road design improvement focus areas in the *Vision Zero 2.0 Road Safety Plan Update* (see, Table 2).

Table 2: Retained Transportation Data Sets

Name	Description	Source
Traffic Volumes at Intersections for All Modes	All available Turning Movement Count traffic volume data observed at locations across the City of Toronto.	https://open.toronto.ca/dataset/traffic-volumes-at-intersections-for-all-modes/
Traffic Cameras	Locations (latitude, longitude) and associated/reference URLs of traffic cameras within the City of Toronto.	https://open.toronto.ca/dataset/traffic-cameras/
School Safety Zone Watch Your Speed Program – Locations	Locations and operating parameters for installed speed display and driver feedback signs.	https://open.toronto.ca/dataset/school-safety-zone-watch-your-speed-program-locations/
School Safety Zone Watch Your Speed Program – Detailed Speed Counts	Hourly aggregation of observed speeds for each speed display and driver feedback sign installation.	https://open.toronto.ca/dataset/school-safety-zone-watch-your-speed-program-detailed-speed-counts/

The *Traffic Volumes at Intersections for All Modes* dataset contained information about the total volumes of vehicles observed at specific intersections. These data were provided in one of two forms: Automatic Traffic Recorder (ATR) Counts¹⁹ and Turning Movement Counts (TMCs).²⁰ Given my principal interest was not traffic volumes, but rather speeding infraction volumes, location of the infractions, and resultant injuries, these data were deemed not suitable for my

¹⁹ Automatic Traffic Recorder (ATR) are segment-level measures of volume reflecting the total volume of vehicles on a specific street moving in a specific direction (e.g., the total number of cyclists observed on Queen Street, heading Eastbound, just west of Dufferin Street)

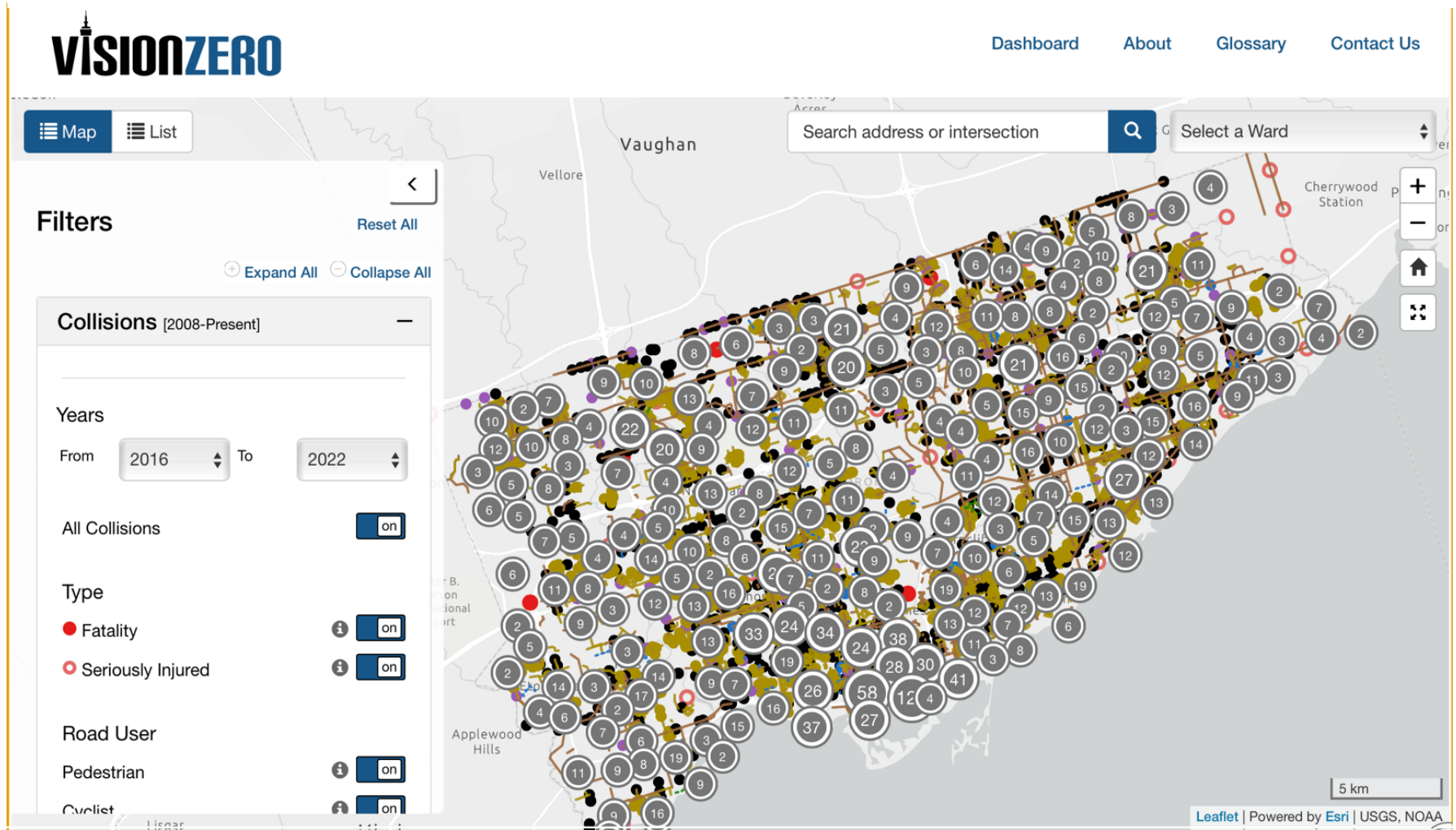
²⁰ Turning Movement Counts (TMCs) are movements observed at a specific intersection, typically indicating the total volume observed at each leg (i.e., North, South, East, or West) of the intersection and, if applicable, the observed turning movement by mode.

purposes. Likewise, the *Traffic Cameras* dataset which contained information about the camera number, name, location information (latitude, longitude), comparison directions (1- Looking North, 2-Looking East, 3-Looking South, and 4-Looking West), and camera group) although useful for others, these were not necessary here because I already had ASE location information from the Automated Speed Enforcement Locations dataset. The contents of the *School Safety Zone Watch Your Speed Program – Locations* dataset were limited to the locations and site details for each permanent ‘Watch Your Speed’ program sign installation. As such, it too was not suitable for my purposes. The *School Safety Zone Watch Your Speed Program – Detailed Speed Counts*, dataset contained aggregations of observed speeds at intersections where a ‘Watch Your Speed’ program sign was installed. Using this dataset, I was able to map 43 of 199 ASE sites in proximity to the ‘Watch Your Speed’ program signs. For each of these 43 ASE sites, I was able to ascertain the traffic volume at each, the count of vehicles travelling at or below the posted speed limit, and the count of vehicles going above the posted speed limit. It merits noting I was not able to obtain the latter information for the other 156 ASE sites that were not in the proximity of a ‘Watch Your Speed’ program sign

For a fourth search, I used the term ‘Vision Zero.’ This also proved to be futile, returning two datasets I had previously examined and put aside.

Frustrated, and keeping in mind my ‘average resident’ inspired approach, I opted to conduct three additional searches using Google. In each instance I used the phrase ‘Toronto Vision Zero’ along with one of the three following file extensions: pdf., docx., and xlsx. The first search ‘Toronto Vision Zero pdf’ returned 6,490,000 results. The second, ‘Toronto Vision Zero docx’ returned 99,600 results. The third, ‘Toronto Vision Zero xlsx’ returned 26,300 results.

Figure 1: Vision Zero Mapping Tool



Source: Screen capture of *Vision Zero Mapping Tool* from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-measures-and-mapping/>. Accessed November 22, 2022

Table 3: Safety Measures Implemented Between 2016-2022

Improvements	Activities
Engineering improvements	<ul style="list-style-type: none"> • Traffic Calming: Physical features such as speed humps, pinch-points, and chicanes that are installed on roads; • Transportation Safety and Local Improvements Program: A local improvements program that implements minor road and intersection design changes to address safety and operational issues; • Local Geometric Safety Improvements: A program that proactively identifies and implements safety enhancements (such as bulb-outs, reduced lane widths, reduced curb radii, etc.) in planned Capital Works Program projects; 4) New sidewalks installed
Automated enforcement	<ul style="list-style-type: none"> • Red light cameras and automated speed enforcement cameras;
Speed limit reductions	<ul style="list-style-type: none"> • Current: Streets where speed limits have been reduced from 50 km/h to 40 km/h and in some places from 40 km/h to 30 km/h) • Approved Speed Limit Reductions: City Council approved reducing speed limits on 50 streets, signs will be changed from 70 km/h to 60 km/h, 60 km/h to 50 km/h, and 50 km/h to 40 km/h.
Traffic control	<ul style="list-style-type: none"> • Accessible Pedestrian Signal (APS): A signal that advises pedestrians who are blind, visually impaired, or deaf-blind when they have the right-of-way to cross at a signalized intersection with an audible chirp or chime to indicate when the pedestrian signal is currently active. • Pedestrian Head Start Signal: A traffic signal that provides an advanced walk signal to pedestrians allowing them to cross the street before vehicles get a green signal.
Safety zones	<ul style="list-style-type: none"> • Senior Safety Zones: A designated stretch of roadway which includes senior safety zone signs and a variety of measures. • Driver Feedback Sign: Digital displays that are equipped with radar technology to measure the speeds of oncoming vehicles and an LED sign to display their speeds to passing motorists. • Flashing Beacons: A traffic beacon with a single flashing light hung over an intersection or placed over signs or on obstacles in the road. • Pedestrian Safety Corridors: Designated stretches of roadway which includes a variety of measures such as targeted speed limit reductions, signal timing adjustments, and enhanced pedestrian crosswalk markings (zebra markings), among other possible improvements. • Community Safety Zones: A designated stretch of roadway marked with Community Safety Zone signs which are recognized under provincial legislation and allow the doubling of fines associated with speeding within the Community Safety Zone and, once the applicable sections of Bill 65, Safer School Zones Act, 2017 are proclaimed in force, the use of an automated speed enforcement system will be permitted within the zone as well.

Table 3: cont'd

Cycling infrastructure	<ul style="list-style-type: none">• Cycle Tracks: A dedicated cycling lane on the road, marked with a diamond symbol next to the lane line, which includes a separator (i.e. bollard) between the cyclists and the adjacent traffic lane.• Bike Lanes: A cycling lane on the road, marked with a diamond symbol next to the lane line. This lane is reserved for the use of cyclists only.• Sharrows (Shared Road): A shared lane on the road marked with a bike and arrows used to indicate a shared environment for cyclists and motor vehicles.• Multi-Use Trails: Trails found in Parks, Ravines, Hydro Corridors or similar green spaces. These trails are for cyclists and pedestrians only, not motor vehicles.• Upgraded Infrastructure: Upgrades to existing bike infrastructure such as new paint, bollards, signage, etc.
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Source: Information summarised from, City of Toronto (n.d.-b).

For each item, I followed up on each of the returned items listed in the first three pages of the Google search results. These items were comprised mostly of City reports, council documents, and datasets I had already examined, or items not directly relating to ASE.

At this point, I opted to conduct one final search using the term ‘Vision Zero + map.’ My rationale was that having seen several landing pages with maps such as School Safety Zone Watch Your Speed Program Locations and Red Light Camera Locations, perhaps, something similar would turn up for Vision Zero. The first result returned was titled *Vision Zero Mapping Tool* ([City of Toronto, n.d.-b](#)). It included information spanning from 2008 to 2022 about collisions (e.g., types of collisions (fatal or serious injury), road users, and the ages of those involved that is presented as different layers on a base map (see, Figure 1). It also includes safety measures implemented between 2016-2022 (see, Table 3). In taking on the ‘average resident’ approach, I had mistakenly assumed one would be able to find this type of map and the related data in the City of Toronto Open Data Portal

During my searches, I observed that each dataset available at the City of Toronto Open

Data portal included the name and contact details of a representative affiliated with the set.²¹ I gathered the names of four representatives whose contact information was available on the four transportation related datasets I had retained and reached out to these individuals through email. In my message, I identified myself as a graduate student conducting research for a Master's thesis at the University of Ottawa, provided an overview of my project, and indicated that in addition to the ASE map, I was looking for data about ASE-related ticketing, ASE location data, and traffic collisions. Three of four representatives responded, with two of these three advising that I regularly check the portal for updates. The individual listed as the representative for the Automated Speed Enforcement Locations dataset, responded to my request and shared with me the *Automated Speed Enforcement (ASE) Charges* dataset which, at the time, was not publicly available but has since been made so.²² This dataset contained information about the number of ASE tickets issued each month in the City of Toronto as well as data about:

- Site codes (i.e., four-digit numbers that identify specific ASE cameras with specific locations);
- ASE locations (i.e., main intersections and whether the camera is facing northward, southward, eastward, or westward);
- Enforcement start date (i.e., date when ASE camera installed at specific locations); and
- Enforcement end date (i.e., date when ASE camera was last used at the specific location).

The individual who shared this dataset with me indicated that it was expected to be available via the Open Data Portal by the end of October 2021 and that from then on it would then be updated monthly.

I then turned my attention to ASE ticket data and related financial statistics. During this phase of my research, I could not find information regarding operational costs and revenue from

²¹ When I last checked transportation related datasets in June 2022, the individual contact information that appeared next to each set was replaced with a generic email and contact information.

²² The dataset forwarded to me spanned the period of July 2020 to August 2021.

finer issued. The Ontario Court of Justice makes publicly available information about provincial offences court statistics, activity, and fines paid in excel and pdf formats (Ontario Court of Justice, n.d.). However, information about ASE related fines is not made public. Instead, all speeding offences issued by police officers and through ASE systems are combined into one category. The only finance-related information about ASE I was able to uncover was the contract details between the ASE vendor, Redflex Traffic Systems (Canada), and the City of Toronto. A 2019 report outlines that a contract in the amount of \$12.34 million was signed with the ASE vendor, and that,²³

the total estimated costs to operate the ASE program including the contract award, additional staffing, court related costs, and the Joint Processing Centre (JPC) are expected to be fully offset by fine revenue from tickets issued during the operation of the program and JPC fees collected through cost sharing agreements with the other partnering municipalities (City of Toronto, 2019c, p. 3).

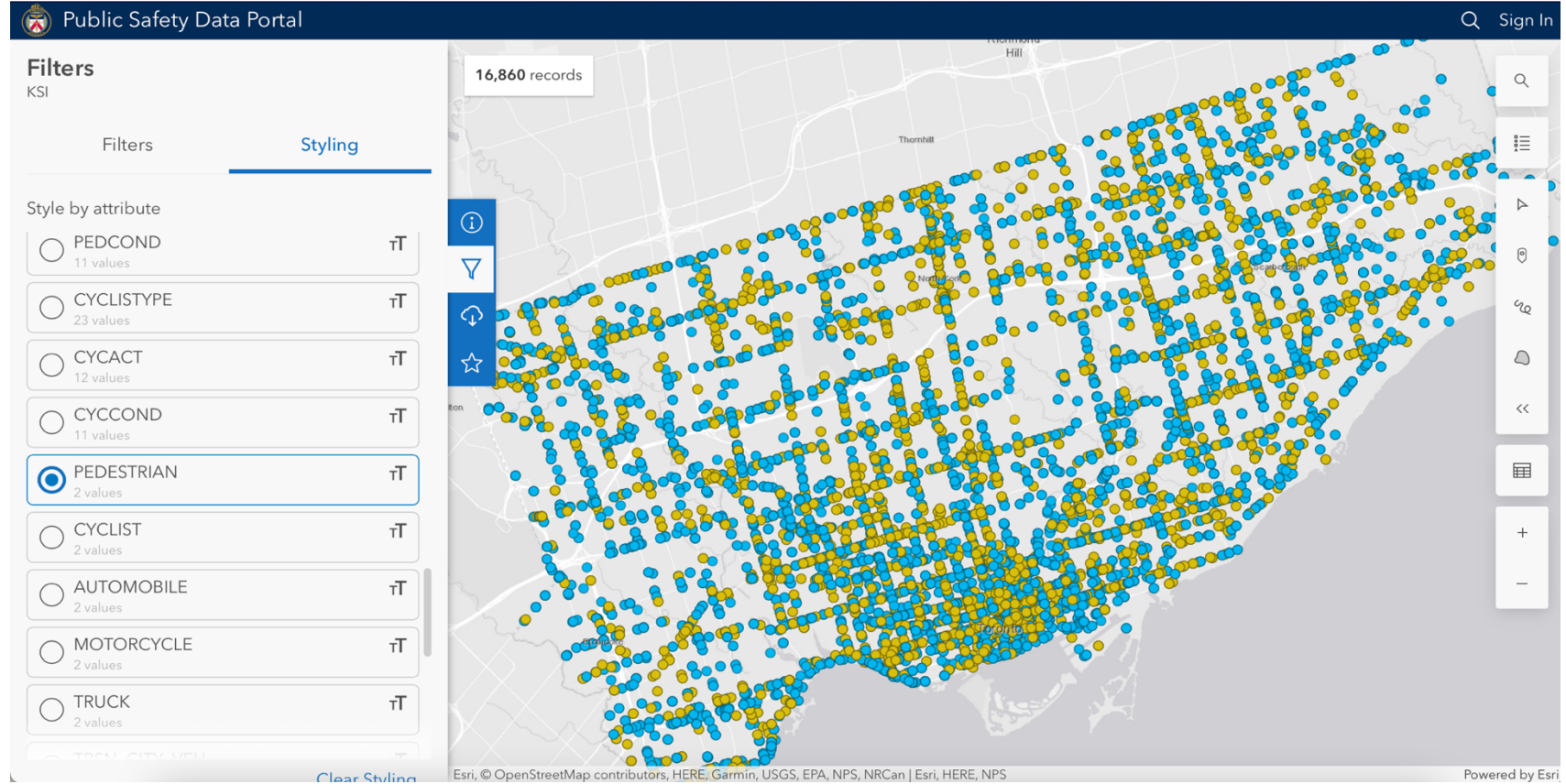
The report then goes on to note:

it is anticipated that the projected revenue that will be collected through the program is \$18,740,000 in 2020. The net revenue for the city is estimated to be approximately \$4,520,000 in 2020 (City of Toronto, 2019c, p. 3).

Once I was satisfied that I had sourced all the suitable information I could from the City of Toronto's Open Data Portal and Google, I turned my attention to the Toronto Police Service (TPS) Public Safety Data Portal. There were two complementary reasons as to why I opted to examine data provided by the Toronto Police Service. First, the TPS is responsible for the enforcement of all applicable laws in the City of Toronto including Provincial Offences, the Highway Traffic Act, and City bylaws. Second, wearing my 'average resident' hat, it seemed plausible that, given the

²³ The Joint Processing Centre (JPC) is operated by the City of Toronto and processes all ASE infractions in Ontario (City of Toronto, 2016b).

Figure 3: Killed or Seriously Injured (KSI) Traffic Collisions from 2006 – 2020



Source: Screen capture of KSI Map, from <https://data.torontopolice.on.ca/datasets/TorontoPS::ksi/explore?> Accessed November 20, 2022

The 15 road user sublayers within this are:

- | | | | | |
|-----------------------------|-----------------------|--------------------|------------------|-------------------|
| Speeding | TTC Municipal Vehicle | Automobile | Red Light | Cyclists |
| Trucks | Motorcyclists | Aggressive Driving | KSI | Emergency Vehicle |
| Physical Medical Disability | Alcohol Related | Passenger | Fatal Collisions | Pedestrians |

latter, the TPS might make publicly available more detailed transportation-related data than the City of Toronto.

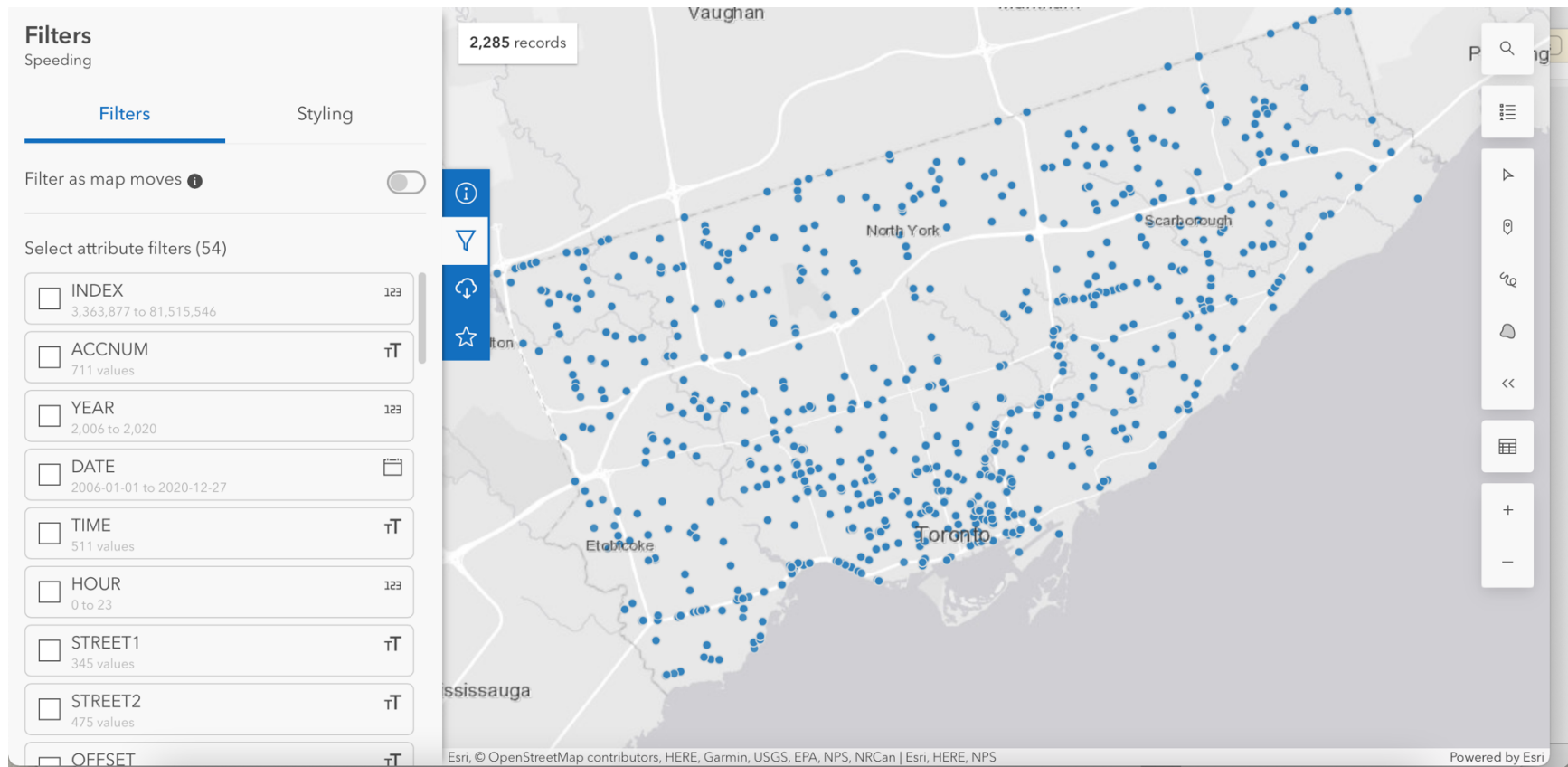
My first search at the TPS Public Safety Data Portal was for the term ‘Automated Speed Enforcement.’ It returned 15 results. I quickly realized these results were all subsets of one larger ‘Killed or Seriously Injured’ (KSI) dataset, <<https://data.torontopolice.on.ca/datasets/TorontoPS::ksi/explore>> and that each was offered as visualizations that appear as different layers on a base KSI map (see, Figure 2).

I looked at the individual data subset corresponding to each layer of the KSI dataset starting with the one titled *Speeding* <<https://data.torontopolice.on.ca/datasets/TorontoPS::speeding/explore?>>. I had assumed this subset of the KSI dataset would contain information relating to speed enforcement such as numbers of infractions. However, it contained no such resources providing, instead, information (e.g., date, time, hour, street, road class, and district) about serious and fatal collisions where speeding played a role (see, Figure 3). This was not what I was looking for insofar as it lacked any information about the speeding infractions – e.g., vehicle counts of cars speeding or average speeds at intersections.

I then examined the subset titled *Aggressive Driving* <<https://data.torontopolice.on.ca/datasets/TorontoPS::aggressive-driving/explore?>>. This subset²⁴ of the KSI dataset provided collision information (e.g., date, time, hour, street, road class, and district) about serious and fatal collisions where aggressive driving played a role. It too was not suitable for my purposes.

²⁴ In data science terms, each of these data subsets is, in fact, considered to be a data set. However, for reasons of coherence I have opted to use the same terminology as that used on the TPS portal. Hence, my use of the term data subset.

Figure 4: Speeding Data (subset of the Killed and Seriously Injured (KSI) dataset, 2006-2020)



Source: Screen capture of *Speeding Map*, from <https://data.torontopolice.on.ca/datasets/TorontoPS::speeding/explore>. Accessed November 20, 2022

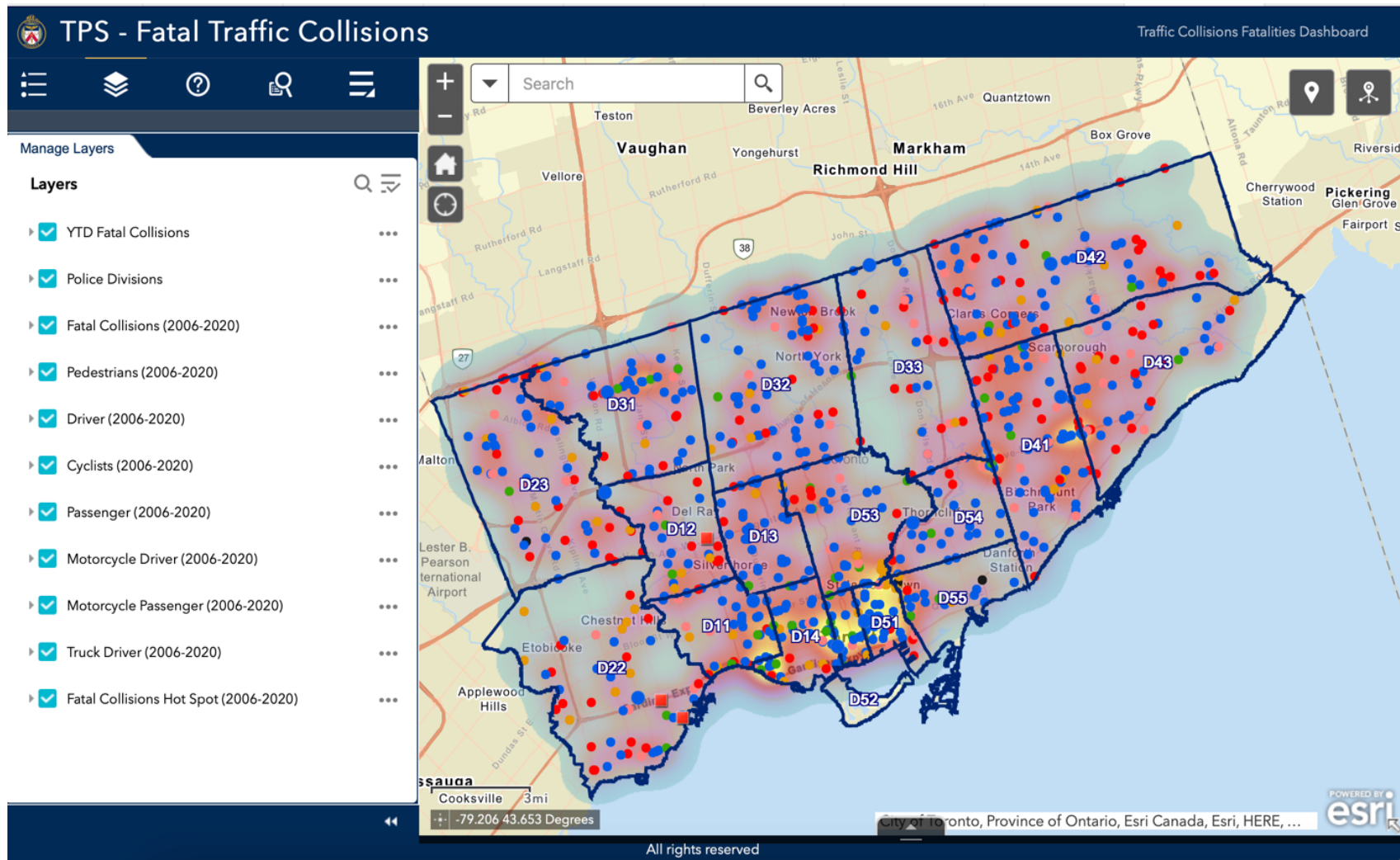
I then examined the following KSI data subsets:

- *Truck* <<https://data.torontopolice.on.ca/pages/truck>>,
- *Motorcyclists* <<https://data.torontopolice.on.ca/pages/motorcyclist>>,
- *Automobile* <<https://data.torontopolice.on.ca/pages/automobile>>,
- *Cyclists* <<https://data.torontopolice.on.ca/pages/cyclists>>, and
- *Pedestrians* <<https://data.torontopolice.on.ca/pages/pedestrians>>.

The contents of the above KSI subsets paralleled those of the two data subsets I had previously looked at and, as such, were also deemed not suitable for my purposes.

It merits noting that, in examining the KSI dataset I noticed that each data subset had a blue vertical sidebar menu with icons representing different items (this included more info, filter, download, and add to favourites). I selected the more information item which consisted of a lower-case letter 'i' with a circle wrapped around. This took me to a landing page that included a data summary, data attributes, details, and a recommendation menu with links to four related datasets. I looked at the recommendation menu for each of the examined search results (speeding, aggressive driving, truck, motorcyclists, automobiles, cyclists, and pedestrians subsets) and found that three of the related datasets were items that had already appeared in my key word search for “automated speed enforcement.” However, one of the items titled ‘TPS Fatal Collisions’ had not appeared in my initial search. As such, I took a closer look to see what it might reveal.

Figure 5: Map of Fatal Traffic Collisions



Source: Screen capture of *Fatal Traffic Collisions (Year-to-Date)*, from <https://experience.arcgis.com/experience/aecae32bd83844028162a46fa17a83fc/page/Main-Page/?views=Legend>. Accessed November 18, 2022

At first glance, this dataset and corresponding map seemed similar to the City of Toronto's Vision Zero mapping tool. The TPS Fatal Collisions dataset – which also is a subset of the KSI dataset – offers a visualization of TPS reported collisions that appear as 11 different layers on a base Fatal Collisions Map (Toronto Police Service, 2019i). The 11 layers are:

- year-to-date (YTD) fatal collisions
- police divisions
- fatal collisions from 2006-2020
- pedestrians
- drivers
- cyclists
- passengers
- motorcycle drivers
- motorcycle passengers
- truck drivers
- fatal collisions hot spot

This dataset and its corresponding map centralize all fatal collisions into one map interface thereby making it easier to track all types of collisions to specific ASE locations rather than providing separate layers like the Killed and Seriously Injured (KSI) dataset. As for the map itself, it includes colour coded dots representing fatal collisions (see, Figure 4). When a dot is clicked, additional information about each incident is provided (e.g., date, time, hour, age of individual involved in incident).

This Fatal Collisions Map was the only dataset I was able to find at the Toronto Police Safety Data Portal that was suitable for my research purposes.

In sum, I retained three datasets from the City of Toronto Open Data Portal:

1. Automated Speed Enforcement (ASE) Charges dataset;
2. The School Safety Zone Watch Your Speed Program – Detailed Speed Counts; and
3. Vision Zero Mapping Tool.

Together, these datasets provided me with information about the locations of ASE sites, enforcement dates, number of speeding infractions, speed counts, and vision zero safety measures.

From the TPS Public Safety Data Portal I retained the Fatal Collision Map. Its data and

visualizations offered information about reported collisions similar to that provided with the Vision Zero mapping tool.

The next step was to organize the data I had collected in a manner that would facilitate my analysis. How I went about doing this is the focus of discussion in the next section.

3.4 Data Organization

Using the information gathered from the City of Toronto Open Data and Toronto Police Service Public Safety Data, I compiled an excel spreadsheet to bring together the needed information about the City's 199 ASE sites.

I structured the spreadsheet in accord with the structure used for the ASE Monthly charges dataset that had been shared with me by a representative from the City of Toronto. Specifically, I replicated its column structure which used the following labels: site code, location, enforcement start date, enforcement end date, and every month from July 2020 to August 2021. It is important to note that although the ASE Monthly charges dataset includes ASE data gathered over the span of approximately one year, ASE data specific to each site only spans a period of three-to-four-months. This is because ASE installations are not permanent; they are regularly relocated to different areas of the city on three- to four-month cycles.

To the spreadsheet columns mentioned above, I added another column that I labelled 'location description.' Here, I entered information about the surroundings of each ASE installation location I gathered using the street view feature of Google Maps. During this process, I looked for four things:

- **Community Safety Zone Features:** schools, daycare centres, playgrounds, parks, hospitals, and assisted living residences.
- **School Safety Zone Features:** flashing beacons, school zone pavement stencils, 'Watch your speed' driver feedback signs, and zebra markings at crosswalks.

- **Vision Zero Safety Measures:** engineering features,²⁵ traffic control, and cycling infrastructure (as outlined in Table 3).
- **Notable Road Features:** sharp turns, street parking, highway locations, etc.²⁶

For example, when looking at the Google Maps street view of A118, Concord Ave. Northbound North of College St (see, Figure 5), one observes the following:

three-way street, multiple shops, and restaurants with street parking. Located near a childcare center and church

This is the description I entered into my spreadsheet. When filling in the location description column of the 199 sites, I made sure to colour code sites located near childcare centres, elementary schools, and/or high schools. My rationale for doing so was to facilitate a planned subsequent analysis of the extent to which locations with ASE installations met the automated speed enforcement prioritization criteria stipulated in the *2021 Report for Action: Update on Vision Zero Speed Management Strategy and Related Initiatives* (City of Toronto, 2021b) and on the City of Toronto Automated Speed Enforcement website (City of Toronto, 2018a). According to the information contained in these sources, these installations are to be located only on local, collector, and arterial roads in Community Safety Zones near schools.

²⁵ Given that I did not have baseline data to assess ‘improvements,’ I focused on identifying the engineering features of the sites I examined. For my purposes, the term engineering features refers to traffic calming, transportation safety, local geometric safety, and presence of sidewalks. Using google maps I focused on two aspects of engineering features: 1) traffic calming measures (consisting of physical features such as speed humps, pinch-points, and chicanes that are installed on roads to reduce the speeds at which vehicles travel); and 2) local geometric safety features: such as bulb-outs, reduced lane widths, and reduced curb radii.

²⁶ I identified notable road features as distinct road characteristics that impact or alter how a driver uses the road. For example, highway off-ramps lend themselves to drivers speeding as they enter an intersection whereas the presence of narrow lanes and speed bumps lend themselves reductions in drivers speeding.

Figure 6: Google Maps Street View of Concord Ave., Northbound, North of College Street (ASE Site A118)



Source: Screen capture of Google Maps, from https://www.google.com/maps/@43.6541546,-79.4239301,3a,75y,61.96h,89.64t/data=!3m7!1e1!3m5!1sd6RYMVBLtPqNh2wwtXBtng!2e0!6shhttps:%2F%2Fstreetviewpixels-pa.googleapis.com%2Fv1%2Fthumbnail%3Fpanoid%3Dd6RYMVBLtPqNh2wwtXBtng%26cb_client%3Dmaps_sv.tactile.gps%26w%3D203%26h%3D100%26yaw%3D34.209503%26pitch%3D0%26thumbfov%3D100!7i16384!8i8192?entry=ttu. Accessed November 23, 2022

Figure 7: Excerpt from Location Based Analysis Spreadsheet

Site Code	Location	Location Description	Start Date (ASE install)	End Date (ASE install)	Vision zero safety zones mapping (July 2016-present)	Vision zero safety zones measures (July 2016-present)	Vision zero Safety Measures Engineering Improvements (2016-present)	Vision zero Safety Measures Speed Limit Reductions (2016-present)	Vision zero Safety Measures Traffic Control (2016-present)	Vision zero Safety Measures Cycling Infrastructure (2016-present)	Fatal Traffic Collisions (2006-2020) TPS	Vision zero collisions (2008-2022)
A001	Royalcrest Rd. Westbound Near Cabernet Circle	3 way street facing the back of houses. Near Monsignor John Corrigan Catholic Elementary School	06-Jul-20	11-Nov-20	Community Safety Zone	No	No	No	No	No	No	No
A002	Harefield Dr. Northbound Near Barford Rd.	3 way residential street with houses near Rivercrest Junior Public School	06-Jul-20	25-Oct-20	Community Safety Zone	No	No	No	No	No	No	No
A003	Renforth Dr. Northbound Near Lafferty St.	3 way street near a fire station close to Michael Power Saint Joseph High School	06-Jul-20	25-Oct-20	Community Safety Zone	Driver Feedback Sign	No	No	No	Bike Lanes on Renforth Dr (Eglinton Ave W to Rathburn Rd both directions) installed in 2017	No	No
A004	Trehorne Dr. Eastbound Near Duffield Rd.	3 way residential street with houses near York Memorial Collegiate Institute	06-Jul-20	25-Oct-20	Community Safety Zone/School Safety Zone	Flashing Beacons	No	No	Pedestrian Head Start Signal (Royal York Rd and Trehorne Dr) October 24, 2019 and Pedestrian Head Start Signal (Royal	No	No	Seriously Injured Motorist (age 40-44) at 3 Duffield Rd on August 5, 2009
A005	Horner Ave. Westbound Near Orianna Dr.	3 way street near Sir Adam Beck Junior School Toronto Public School and church close to some housing and buildings	06-Jul-20	25-Oct-20	Community Safety Zone	No	No	No	Pedestrian Head Start Signal (Browns Line and Horner Ave) August 19, 2021	No	No	1) Seriously Injured Motorist (age 30-34) at Browns Line/Horner

Legend

- Yellow– School Safety Zone
- Purple– Community Safety Zone
- Dark Blue - Senior Safety Zone
- Orange - Pedestrian Safety Corridor
- Pink– Passenger Collision
- Bright – Pedestrian Collision
- Green– Cyclist Collision
- Light Blue - Driver Feedback Sign
- Mustard - Flashing Beacons
- Red– Fatality

I then added an additional seven columns to my spreadsheet that I labelled in accord with the seven safety measure layer present on the Vision Zero Mapping tool (see, Figure 1): Vision Zero collisions (2008-2022), Vision Zero safety zones mapping (July 2016-present), Vision Zero safety zones measures (July 2016-present), Vision Zero Safety Measures Engineering Improvements (2016-present), Vision Zero Safety Measures Speed Limit Reductions (2016-present), Vision Zero Safety Measures Traffic Control (2016-present), and Vision Zero Safety Measures Cycling Infrastructure (2016-present). The information I entered in these columns was all sourced from the Vision Zero Mapping tool.

Once I had inputted into my spreadsheet all the suitable information from the three datasets I had retained from the City of Toronto Open Data Portal, I then moved my attention to adding the suitable information from the TPS Public Safety Data Portal's Fatal Collision Map. For this, I added a column to the spreadsheet titled Fatal Traffic Collisions (2006-2020) in which I recorded whether any fatal traffic collisions had occurred at the intersections hosting ASE installations. By the time I had consolidated the data from the City of Toronto and the Toronto Police Service, the spreadsheet had 13 columns for 199 ASE sites. An excerpt from the spreadsheet is provided in Figure 6 (see also, Appendix 1).

3.5 Findings

I went into the Phase 1 research hoping to source data about ASE locations, Vision Zero Safety Measures, ASE charges, road related deaths and serious injuries, ASE reported driver speeds, speed threshold for tickets, and amounts paid in fines. However, I was only able to find only two ASE-related datasets at the City of Toronto's open data portal (ASE charges and ASE locations) and five datasets associated with the *Watch Your Speed* Program. Put simply, the material I, as an average resident, was actually able to source was limited to information about ASE locations,

Vision Zero Safety measures, The monetary value of fines issued via ASE, and road related deaths and serious injuries.

3.5.1 Stakeholders Involved in Road Safety Reporting

One of the main focuses I had set for Phase 1 was to uncover how so-called ‘vulnerable road users’ are identified. Among the 199 ASE locations listed in the City of Toronto’s Vision Zero Mapping tool, fatalities and serious injuries were listed for 20 motorists, 39 pedestrians, 11 cyclists, and 5 motorcyclists for the period spanning from 2008 to 2020. Moreover, 43 of the 63 sites at which fatalities and serious injuries were reported had additional Vision Zero safety measures (e.g., engineering improvements, speed limit reductions, traffic control, and cycling infrastructure) in place. In cross referencing the City of Toronto collision data with the TPS fatal collision data, I found that for the same 199 ASE sites, the TPS reported 29 fatal traffic collisions between 2006 and 2020: 24 passenger collisions, 1 passenger, 3 drivers, and 1 cyclist.²⁷ In examining the two datasets, I noticed that there were 10 fatalities and serious injuries reported by both the Toronto Police Service and the City of Toronto, however, certain fatalities and serious injuries were only reported by one entity. This raised questions for me about the formal and informal arrangements among a network of governing agencies that are involved in problematizing speeding and the implementation and administration of road safety initiatives in the City as well as questions about the ways and extent to which evidence was informing decision making about road safety.

3.5.2 Vision Zero Safety Zones

I then focused my attention on data pertaining to Safety Zones. Officially, the latter refers to stretches of roadway with this specific designation and for which a variety of measures are put in place to encourage driver compliance to specific traffic-related regulations. Some examples

²⁷ The Vision Zero mapping tool defines a motorist as a driver or passenger of an automobile whereas Toronto Police Service data use the term driver. See, City of Toronto (n.d.-b).

include, School Safety Zones, Community Safety Zones, Pedestrian corridors, and Senior Safety Zones (City of Toronto, 2018e). During this process I found 82 ASE sites that were located in intersections zoned to more than one safety zone, 81 were located in Community Safety Zones, 16 were located in un-zoned areas, 12 were zoned to three or more safety zones, 5 intersections were located in School Safety Zones, and 3 were located in a Pedestrian Safety Corridor.²⁸

In examining the zoning of each intersection equipped with an ASE installation, I found that 126 were located near schools with only 87 intersections actually located in School Safety Zones. This suggests that not all schools are in designated School Safety Zones which, in turn, raises questions about the designation of these zones.

In conducting this analysis, I noticed that 24 locations with ASE installations seemingly did not adhere to the City's ASE prioritization criteria. In the City of Toronto, the selection of ASE sites consists of a two-staged process. As set out in the *Report for Action: Update on Vision Zero Speed Management Strategy and Related Initiatives* (City of Toronto, 2021b, p.16) and the City of Toronto Automated Speed Enforcement website (City of Toronto, 2018a), the two stages are:

Stage 1: An initial screening which identifies and prioritizes all CSZ locations²⁹ based on the following data:

- Collisions involving children;
- Collisions where a vulnerable road user (pedestrian, senior, cyclist etc.) was killed or seriously injured;
- Vehicle speed data;
- 24-hour traffic volume;
- Percent of students within walking distance; and
- Requests from Police and the public.

²⁸ Some ASE installation sites mapped to more than one zone depending on the location of each site.

²⁹ In May 2018, Toronto City Council lifted a moratorium on the creation of new Community Safety Zones (CSZs) and designated the frontages of all schools in Toronto as Community Safety Zones. This made all schools eligible to receive ASE systems compared to School Safety Zones where the limit had to be within 150 meters from the school boundary. CSZs provided more flexibility in determining those limits. See, City of Toronto (2018f).

Stage 2: Once the sites are prioritized, a manual review of the site is conducted to ensure that the site conditions support accurate data collection.³⁰ A site review includes the following considerations:

- No obstructions or impediments to the equipment;
- Adequate boulevard space to accommodate the equipment;
- No planned road work, as construction can impact the ASE system due to reduced space to accommodate the camera unit and potential lane reductions or realignments that will affect the system's operation;
- No sharp curves or extreme grading changes that may reduce the range of operation for the speed measurement device;
- No planned speed limit reductions in order to give motorists enough time to adjust to the change;
- Adequate distance from speed limit transitions in order to give motorists enough time to adjust to the change; and
- Cannot have the presence of a flashing 40km/h speed limit reduction sign, as the speed limit change is in effect only when the sign is flashing and the system is unable to see or detect whether the sign is flashing.

Once the sites are assessed, operational considerations may result in minor adjustments to Stage 1 prioritization.

Of the 24 sites that seemingly did not hold a Community Safety Zone designation, 11 were *not* near schools, and 16 were *not* zoned as Pedestrian Safety Corridors, Senior Safety Zones, or School Safety Zones. When I subsequently looked at the killed and serious injury data reported by the City of Toronto and the Toronto Police Service, I found there were no reported deaths or serious injuries at 15 of these 24 locations. However, one or more reported deaths (three pedestrian and one cyclist deaths) or serious injury (three pedestrians, one motorcyclist, one cyclist, and three motorists seriously injured) were reported for the other nine locations.

3.5.3 ASE Fines and Revenue

I then looked at the Vision Zero safety measures that work alongside ASE to decrease speeding and increase safety. I found that 103 of 129 intersections hosting ASE installations that were located in designated Community Safety Zones reported also having been subject to engineering

³⁰ Once the sites are assessed, operational considerations may result in minor adjustments to the Stage 1 prioritization.

improvements, speed limit reductions, traffic control, and cycling infrastructure improvements. Some 71 of 87 School Safety Zones likewise reported, in addition to ASE installations being present, having been subject to engineering improvements, speed limit reductions, traffic control, and cycling infrastructure. Additionally, 61 of 87 intersections located in School Safety Zones that housed ASE installations had safety measures in the form of either a driver feedback sign (e.g., Watch Your Speed Signs), flashing beacons, or both. This use of an assemblage of hardware, software, and infrastructure to regulate driver behaviour by linking forms of judgement, modes of perception, practices of calculation, and machinery is illustrative of Rose's notion of technologies of freedom insofar as this assemblage is used to decrease the speed of drivers and increase safety.

I then focused on the information relating to the fines issued by the City of Toronto's ASE installations. During the first year of enforcement (July 2020 to July 2021), 50 ASE installations issued a total of 227,322 tickets to vehicles travelling in excess of the posted speed limit (Layton, 2021). Using the information provided in the *Automated Speed Enforcement (ASE)* dataset I was able to calculate that in the subsequent six months, July 2021 to December 2021, some 108,914 tickets were issued in the City of Toronto (City of Toronto n.d.-e). I had hoped to be able to calculate the total revenue generated from these tickets, but the data required to do so (e.g., how many km/h the driver was going over the speed limit as well as the specific fine amount paid) is not publicly available from either the City of Toronto or the Toronto Police Service. Indeed, I could not find any information regarding the operational costs associated with the ASE installations or the revenues generated from the fines issued. As was previously noted, in the information it makes publicly available online, the Ontario Court of Justice conflates all speeding infractions issued by police officers and through ASE systems into one combined category.

The lack of public information about the revenue generated by ASE installations appears to be illustrative of O'Malley's notion of the monetization of justice insofar as this demonstrates that justice and discipline facilitated through ASE is a monetized practice and does not fall into the regular reporting standards of traditional justice and discipline practices.

The lack of ASE financial-related information combined with the availability of revenue related information hints toward a focus on the exercise of governance as revenue-raising rather than as justice and discipline per se insofar as policing is seemingly translated into an economic transaction.

3.6 Conclusion

The discussion in this chapter set out the methodology used and the findings emerging from the first phase of my investigation. My analysis of the available open data and other relevant documentation, points toward discrepancies in traffic reporting standards between stakeholders and, very importantly, the publicly stated priorities for installing ASE systems in particular locations and the actual location of 24 current ASE sites. The absence of information about the financial aspects of ASE from the available open data marks another notable gap in the information to which members of the public currently have access. It was the ambiguities regarding the latter issues that served to inform the key informant interviews conducted in Phase 2 of my project.

Chapter 4: Phase 2 Key Informant Interviews

The discussion in this chapter sets out the research methodology used for the key informant interviews with individuals from the City of Toronto, Toronto City Council, and the Ministry of Transportation along with the findings that emerged from these meetings. The chapter is divided into four sections. The first sets out the parameters of the interview design. The discussion in the second section traces the participant selection process. The discussion in section three elaborates on how the information gathered from the interviews was analyzed. The fourth section presents the findings that emerged from the interviews. Section five concludes.

4.1 Interview Design

Phase 2 of my project involved conducting key informant interviews aimed at:

1. identifying how the monetization of justice factors into the operation and deployment ASE systems;
2. ascertaining why ASE systems were installed at 24 sites, across the City of Toronto despite their seeming failure to meet the criteria set out in the *Report for Action: Update on Vision Zero Speed Management Strategy and Related Initiatives report* (City of Toronto, 2021b), and at the City of Toronto Automated Speed Enforcement website (City of Toronto 2018a); and
3. tracing, if possible, the data sharing networks in place between the City of Toronto, the Toronto Police Service, the Ministry of Transportation, and the ASE vendor.

According to Tremblay (1957), the characteristics of an ideal key informant are contingent upon their role within a particular community, their access to information, their willingness to cooperate, their communicability, and their impartiality. With this in mind, I set about to identify individuals working in senior transportation, related positions at the City of Toronto, the Toronto City Council, the Toronto Police Service, and the Ontario Ministry of Transportation. Continuing with my ‘average resident’ persona, the guiding premise for this decision was an assumption that such individuals would possess expert knowledge about the implementation and operation of ASE and related traffic safety programming in the City of Toronto.

The approach adopted for conducting the interviews was largely based on combining exploratory and standard interview research techniques in the form of semi-structured discussions. For Oppenheim (1992), exploratory interview techniques are designed to develop ideas and extract the interviewees' opinions, views, and reactions regarding a specific subject matter. Standard interview techniques, on the other hand, consist of discussions that are oriented toward measuring attitudes and collecting other types of quantitative data.

Semi-structured interviews were conducted with 12 key informants. The meetings took place between March and May 2022 using Zoom (n=9), Microsoft Teams (n=2), and WebEx (n=1). Each interview lasted between 45 to 60 minutes. During the opening questions of the meeting, participants were asked to outline their day-to-day job activities, duties, and responsibilities in relation to the deployment of Vision Zero program and ASE systems. The objective here was to align the interview questions with their stated job functions (See Appendix 2).

4.2 Recruiting Key Informants

Purposive sampling was used to identify key informants working in transportation-related positions directly associated with ASE and traffic safety programs in the City of Toronto, Toronto City Council, the Toronto Police Service, and Ontario Ministry of Transportation.

This process involved identifying and selecting participants on the basis of publicly available information pertaining to their job, organization, and department. The latter were used as proxies for ascertaining the subject matter expertise of potential interview candidates. The initial sample was comprised of 14 individuals including two key informants from the Toronto Police Service. However, the TPS later withdrew its participation; a matter I discuss in more detail below. Bearing this in mind, the final sample for my study was comprised of 12 people (see Table 4).

Table 4: Key Informants per Organization

	City of Toronto	Toronto City Council	Ontario Ministry of Transportation
No. of key informants	4	4	4

In seeking to identify potential key informants from the TPS, my search had been guided by the following inclusion criteria:

1. Individuals working within the Analytics & Innovation team and responsible for the publication of official statistics including in the form of open datasets.
2. Individuals working within one of the TPS's 22 Police Divisions whose job focuses on community policing and traffic safety.
3. Individuals working within the Parking Enforcement Unit specifically focusing on enforcing the *Highway Traffic Act*, investigating serious and fatal collisions as well as working to prevent collisions.

I first looked at publicly available online organizational directories (see, City of Toronto, 2017e) and assessed the suitability of potential candidates by cross-referencing the directory information with their LinkedIn profiles.³¹ Through this process, I identified and then, contacted eight potential candidates whose professional details met the selection criteria specified above. Only one of the eight responded, referring me to two of their peers who subsequently agreed to be part of my study.

In the lead up to my planned meeting with these two individuals, I shared with them my interview consent form (See Appendix 3). In turn, they both informed me that prior to speaking with anyone working for the TPS for research purposes, I needed to submit an application to conduct research to the TPS. I then promptly completed the research application process (see, Toronto Police Service, n.d.). This involved submitting a research application letter, the interview guide, the interview consent letter, and the University of Ottawa ethics approval certificate (see,

³¹ LinkedIn was used because it focuses on professional networking and career development. As such, it allows users share job summaries, work experience, education, notable achievements, and other information similar to that which one might expect to find in traditional resumes.

Appendixes 2, 3, 4). My application package was submitted to the Toronto Police Service in March 2022. Four months later, in August 2022, I was informed that the Chief's Office had declined my application. No reason was given for the decision.

When I connected with the person assigned to my application to follow-up on this decision, I was informed that all matters relating to ASE were, as a matter of course, redirected to the City of Toronto. Despite my specifying that it was three representatives from the City of Toronto whom I had interviewed in the preceding months who had recommended I speak with representatives of the TPS, my application was not re-considered. As a result, perspectives from law enforcement representatives are absent from my study.

4.2.1. City of Toronto

In seeking to recruit participants from the City of Toronto, my search was guided by the following criteria for inclusion:

1. Individuals who deal with the oversight of major transit infrastructure projects including ASE, or who are involved in the development or review of transportation plans.
2. Individuals whose work focuses on executing aspects of the Vision Zero Road Safety Plan or Vision Zero 2.0, or who are working in some capacity on related Vision Zero projects to improve safety across the city.
3. Individuals whose job is centered on deploying ASE.
4. Individuals that deal with the collection, management, and digital innovation for the Infrastructure and Development Services department.
5. Individuals whose names appeared as the contact for the datasets from the City of Toronto's Open Data Portal.

I began my search by looking at the Toronto Transportation Services Infrastructure and Development Services directory (see, City of Toronto, n.d.-c). Upon completion of this first round of triage, I identified 52 potential interview candidates. I then conducted LinkedIn searches for each person with the aim of getting a better sense of their day-to-day job activities and duties. This second round of triage served to narrow my list to 39 individuals. I reached out to each of these

potential participants using their publicly posted email addresses. The responses received fell into six categories:

- 1) No response (n=16);
- 2) Responded and referred me to someone else (n=8);
- 3) Responded and stated they did not have any additional information (n=5);
- 4) Responded and scheduled an interview (n=4);
- 5) Responded indicating I should wait for the researchers from The Hospital for Sick Children³² to publish their findings (n=4); and
- 6) Responded and scheduled an interview but subsequently cancelled (n=2).

The person with whom I connected first was one of eight individuals to respond to my email query by referring me to someone else. They, COT 5, responded stating:

Please reach out to our Transportation team. You can try contacting [COT 1] who may be able to point you in the right direction.

Despite my responding by specifying that I wanted to hear their views and perspectives given the role in which they worked, I did not hear back.

I then heard from COT 6 who responded:

My title is a little misleading for what I do. My advice would be to reach out to the following individuals independently [COT 4] and [COT 1].

Although the information posted to COT 6's LinkedIn page suggested their day-to-day job activities likely were closely related to the focus of my research, they too did not respond to my follow-up message.

I then reached out to COT 7 who responded to my email stating, "*I recommend connecting with [COT 1], they would be better suited to answer your questions.*" I replied by informing them that I had indeed reached out to COT 1, and that I also wanted to hear their perspectives about

³² When I first began working on this project I was unaware that its timing overlapped with a study being conducted by a team of researchers at The Hospital for Sick Children (SickKids) investigating the effects of speed limit reduction before and after the implementation of ASE in the City of Toronto (see, SickKids, 2020). When I reached out to members of the SickKids research team in November 2021, I was given a not-so-polite brush off and told I could read their finding and cite their work in my thesis once they had published their results.

ASE. I did not receive any other response.

I then emailed COT 8 who responded with:

I am not in a position to participate in your study. I would suggest you reach out to someone in the Automated Speed Enforcement team.

For their part, COT 9 responded to my request writing:

Thank you for your interest in the Automated Speed Enforcement program. Although I am a XXXX in this department, I deal more with XXXX and XXX. I would recommend you reach out to [COT 1].

As I had done with the previous respondents, I responded by noting that I had already reached out to COT 1 and that I was equally interested in hearing what they had to say. And, as with the previous respondents, there was no reply to my follow-up.

I then connected with COT 10 who responded, “*It’s best if you contact [COT 1] with this request.*” Like the others, COT 10 did not respond to my follow-up.

I then emailed COT 11 who wrote back with:

I am currently working in another area of Traffic Services and forwarded your request to [COT 1]. [They] should be connecting with you.

COT 11 also ignored my follow-up.

I then communicated with COT 12 who responded:

You may actually find yourself finding additional value in communicating directly with the Permits and Enforcement team on some of these topics. The Vision Zero Road Safety Team may be able to provide more context in their decision-making around what they look for in selecting sites for ASE. I am looping in my contact COT 4 who may or may not have answers to some of these questions but can at least point you in the right direction within the City of Toronto for further discussions.

In line with COT 12's suggestion, I once again reached out to COT 4 and, once again, received no response to my query. I then re-contacted COT 12 informing them that COT 4 was unresponsive and tried again to schedule a meeting. However, I never heard back from COT 12.

COT 1, who five other potential participants had identified as a person with whom I should speak, responded to my email some 3 weeks after my initial request for an interview noting that,

The Hospital for Sick Children here in Toronto has been retained to conduct an evaluation of our ASE program. Since the evaluation is still ongoing, we will not be able to share any data outside of what we release on the City's Open Data Portal or through regular new releases, until the evaluation has been completed. The evaluation is expected to be completed at the end of this year at which time we would be happy to discuss and share any available data.³³

I informed COT 1 that I would not be asking for any new data and that our discussion would be based solely on open data currently available at the portal. With this clarification, they agreed to speak with me and scheduled an interview for the following month.

I then connected with COT 2 as their name and contact details appeared on two traffic related datasets within the City of Toronto Open Data portal. COT 2 also agreed to meet with me. During our interview, they offered to share additional datasets not yet available on the City of Toronto Open Data Portal and which were scheduled to go live shortly. After the interview, COT 2 emailed me two zip files containing:

1. *The IE27.8 - Update on Vision Zero Speed Management Strategy and Related Initiatives* report which outlines the Council decision to increase the number of ASE units by 25 (City of Toronto, 2022b).³⁴
2. Two excel spreadsheets containing information about ASE collision locations.
3. Two excel spreadsheets containing information about vehicle speeds by direction for different locations with ASE installations.
4. Two excel spreadsheets containing information about percentile speed (for different locations with ASE installations).
5. Two excel spreadsheets ASE containing information about speed volume for different locations with ASE installations.

³³ On July 11, 2023, approximately three weeks prior to my submitting this thesis for evaluation, the findings of the evaluation conducted by the researchers from the Hospital for Sick Children (SickKids) was made publicly available. See, City of Toronto (2023a,b).

³⁴ At the time, I already was aware of, and had read, this particular report.

With the exception of the Council report, it was exceedingly difficult to piece together the data contained in the excel spreadsheets as the column subheadings in each spreadsheet used uncommon abbreviations I could not decode. When I reached out to COT 2 to ask about this, they offered only a vague response. Given my inability to decipher the meanings of the spreadsheet contents, I was not able to make use of the information provided.³⁵

During our meeting, COT 2 had also recommended I speak with four other individuals, two of whom were employed at the Toronto Police Service and who, for the reasons noted above, I was not able to connect with. The other two individuals were contacts within the City of Toronto – COT 3 and COT 4 – who had previously failed to respond to my request for an interview. When I reached out to COT 3 this second time, they responded:

The best person to answer questions on what you're particularly interested in (planning, designing, and operation of ASE systems) is [COT 1], with whom I understand you've spoken already. Can you clarify what you're interested in learning about, beyond the specifics of ASE, so that I can make sure I'm the right person for this or direct you to the right folks?

I responded by explaining that I had specific questions about the Vision Zero program that COT 1 was unable to answer during our interview. With this clarification, COT 3 agreed to meet with me. I then reached out one last time to COT 4, indicating that in my meeting with COT 2 they had suggested that they would have valuable insights to share. COT 4 responded positively to this query, and we scheduled an interview.

There were two other individuals, who despite initially agreeing to meet with me, subsequently cancelled. The first, COT 13, emailed me the day prior to our planned meeting indicating:

³⁵ After my exchange with COT 2 (February 2022) I checked the City of Toronto's Open Data Portal to see if the files had been uploaded in the hopes this might help me to make better sense of the data. As of June 2023, the files had yet to be uploaded to the portal.

In speaking with other ASE team members, I understand that you had a call set up with [COT 1]. [They] would be better suited to answer your questions so I think we could cancel our call tomorrow.

COT 14, also cancelled one day prior to our planned meeting, stating:

Apparently, you already interviewed [COT 1] and will be interviewing [COT 2] There is no need to interview me as well – I will not be able to give you any more information that you cannot get from them.

As the preceding discussion makes clear, throughout the recruitment process I was consistently referred back to the same individual who seemed to function as the point person – COT 1 – for ASE-related matters. Indeed, their apparent centrality within the City of Toronto’s ASE initiative, combined with the seeming wall of silence emanating from the SickKids project, were notable constraints on recruiting participants from the City of Toronto to speak with me.

4.2.2. City Council

Thinking as an ‘average resident,’ I chose to conduct interviews with Toronto City Councillors because the holders of these positions are members of the legislative branch of city government and, as such, play a role in making decisions about municipal financing and services. I anticipated that, at minimum, Toronto City Councillors would be able to answer questions about any inconsistencies in the application of the prioritisation criteria used in determining the location of ASE sites specific to their respective wards.

In looking for a directory of Toronto City Councillors, I located a webpage titled *Ward Profiles* that provides contact information for each of the City's 25 Ward Councillors (City of Toronto, 2018g). Of the 25 emails I sent out, I received four categories of responses:

- 1) No response (n=12);
- 2) Responded declining to be interviewed (n=5);
- 3) Member of councillor’s team responded stating the Councillor is not willing to participate (n=4); and
- 4) Responded and scheduled an interview (n=4).

The meetings with the four Councillors who agreed to speak with me took place between March and April 2022. During the interviews, these participants responded to questions using ward-specific examples. However, none were able to specify why certain sites within their respective wards were home to ASE installations despite their seemingly not corresponding with the priority selection criteria set out in the *Report for Action: Update on Vision Zero Speed Management Strategy and Related Initiatives* (City of Toronto, 2021b), and the City of Toronto Automated Speed Enforcement website (City of Toronto, 2018b).

4.2.3. Ministry of Transportation

In speaking with informants from the City of Toronto and the Toronto City Council I learned that the Government of Ontario functioned as a key stakeholder when ASE was rolled out across the city. Specifically, the Ministry of Transportation (MTO) established the legislation that governs and regulates the use of ASE.

With this in mind, I used the Ministry of Transportation Employee and Organization online Directory to locate employee contact information (see, Government of Ontario, n.d.). I conducted three separate searches using the terms ‘transportation’, ‘traffic,’ and ‘urban informatics,’ which led to my compiling a list of 67 potential interviewees who met the following criteria.

1. Individuals whose work includes investment planning and strategies, contract management and operational issues, and standards related to the design, construction, and maintenance of highways.
2. Individuals who deal with the operation, maintenance, and integration of tools and data to support transportation management centres.
3. Individuals whose primary tasks consist of developing operational policies, providing end-user focused services for transportation networks, and maintaining and operating assets for infrastructure and services.

I then cross-referenced the directory information with the profiles of these 67 individuals on LinkedIn to familiarize myself with their day-to-day job activities and duties, and to ascertain whether their experience might assist in contributing to answering my research questions. This

process allowed me to narrow my list to ten possible interviewees. I reached out to these individuals using their publicly listed email addresses. The responses fell into three categories.

- 1) No response (n=6);
- 2) Responded stating ASE was not their area of expertise (n=2); and
- 3) Responded by connecting me with someone else (n=2).

I first contacted MTO 5. This individual responded stating:

I have reached out to my counterparts and we will have someone from the program area reach out to you who can best answer your questions. If you don't hear from anyone within the next week, please feel free to reach out to me again.

I did not hear back from MTO 5 and followed up two weeks later. MTO 5 then provided me with the contact details for MTO 1 and MTO 2. I emailed these two individuals and was able to schedule a joint interview with them. Upon completing this joint meeting, MTO 1 followed up with me via email sharing the contact information of MTO 3 and MTO 4. MTO 1 suggested they would likely be able to help answer some of my questions that fell outside the job scope of MTO 1 and MTO 2.

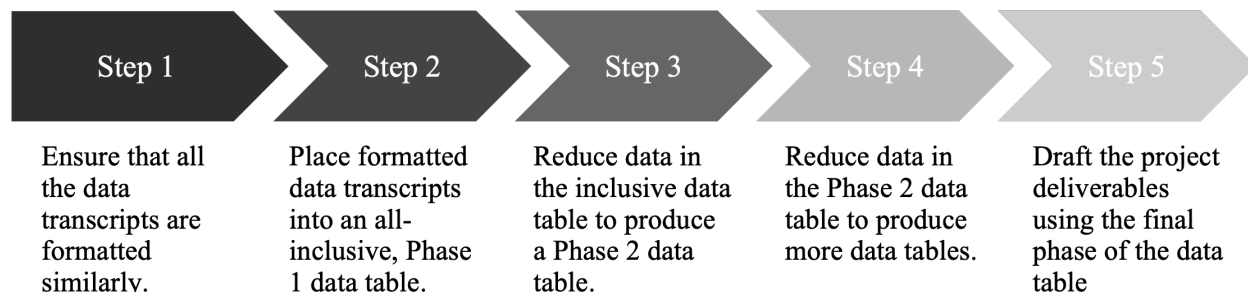
When I reached out to MTO 3 and MTO 4 via email, they responded indicating they were both only comfortable with audio recording our meeting and, as such, declined to participate until such time as my consent letter was modified to specifically exclude the video recording of our meeting. I altered the consent statement in accord with their request, shared it with them and they, in turn, agreed to be interviewed.

4.3 Analyzing the Interviews

Watkins' (2017) Rigorous and Accelerated Data Reduction (RADaR) framework was used to guide my collecting, reducing, and analysing the interview materials (see, Figure 7). The RADaR technique involves using tables and spreadsheets to organize, reduce, code, and analyze qualitative data into shorter tables of condensed textual data. While completing the semi-structured interviews

I both recorded the meetings and took note of the participant responses in as much detail as possible using Microsoft Word. After each interview, I reviewed these notes for inconsistencies and fixed any errors and typos. During this revision process, I also highlighted important comments and added any questions that came up as a result of the interview.

Figure 8: Rigorous and Accelerated Data Reduction Technique, Watkins (2017)



To facilitate my analysis of the interview materials I uploaded the audio recordings into the Trint transcription platform.³⁶ I opted to use this platform because it is freeware and allowed me to convert both audio and video files into text that could be easily exported into a Word document. Once a transcript was generated, I downloaded the file to my computer and did an initial read-through to correct any typos or errors by comparing the transcript against the actual recording.

I then re-read each file and organized the key informant responses into one spreadsheet in accord with each interview question (see Table 5 and Appendix 1). This allowed me to uncover similarities and differences between key informant responses. I then reorganized the responses in a new spreadsheet with separate pages for each organization (City of Toronto, City Council, and the Ministry of Transportation) (see Table 6 and Appendix 1). This second spreadsheet allowed me to focus on the interview responses at an organizational level and to identify points of convergence and divergence between participants working within the same organization.

³⁶ See, trint transcription software <https://trint.com>

Table 5: Spreadsheet Excerpt

<i>Question</i>	<i>Informant</i>	<i>Response</i>
<i>How safety considerations, operating costs, and revenue generation factor into the operation and deployment of ASE</i>	COT 1	<i>The collection of fines is done through court services, so we don't really have any involvement in the revenue side of things. Our primary focus is delivering the programme and laying the charges. Once those tickets are mailed out the matter is out of our hands. We would like the revenue to offset the programme costs so that there is no burden on the taxpayers, but our primary focus is on improving safety in the city and specifically in Community Safety Zones near schools</i>
	COT 3	<i>I know for a fact that revenue generation is definitely not a deciding factor of the program. I actually would like for the program to be set up in such a way that any revenue generated through the ASE program goes directly towards road safety improvements. But that's not the case. Instead, it goes towards the same pot that property taxes, parking tickets, and fines go into which then gets redistributed at the end of the year to different areas of cities e.g., housing programs.</i>
	CC 1	<i>I hope we don't make any money on it because that would mean people are behaving well.</i>
	CC 2	<i>The reason why we need this technology is because people are speeding, so the people speeding should be the ones that have to pay for it. But we shouldn't depend on it as a source of revenue because we want it to be zero. Unfortunately, we probably have to build up some infrastructure in order to keep people following the rules.</i>
	CC 3	<i>...I think the use of the word cash grab is a smokescreen. I think it's a communications tool from those that want to limit the size and scope of government...</i>
	CC 4	<i>We operate a government that spends \$13 billion a year and a few million dollars in ticket revenue is insignificant</i>
	MTO 1	<i>Municipalities are not here to make money off us, or at least that's how it communicated to us, However, that being said, it can't also be negative, right? It can't be doing these road safety programs to and just continually losing money Revenue and the cost of the cameras is a key considering how we further expand this program across OntarioIt cost a lot of money to purchase and administer ASE as you need to hire someone to review the tickets which also then need to be sent through court... Administrative penalties are used for parking tickets which have been very successful in a bunch of jurisdictions, to save money as they did not have to use the course to issue tickets. York Region submitted a report that said when the province implements administrative penalties it would save about \$8 million a year. A Judge/Justice of Peace won't have to adjudicate tickets and tickets issued as a result of ASE would basically look like a parking ticket, which is not a ticket in a lot of jurisdictions, it's just a penalty you can contest online. We've heard a lot of feedback from municipalities that charging people at lower thresholds actually costs them more money after accounting for the cost of the camera, the cost of the person reviewing, and the cost of court,</i>
	MTO 2	<i>There's no question that there's revenue generated</i>

Table 6: Example Summary Spreadsheet: City of Toronto Interview Response

	<i>What do ASE installations bring?</i>	<i>Is risk mediation principal consideration?</i>	<i>Safety operating costs, and revenue generation factor into ASE?</i>	<i>Measuring efficacy decreasing speed and increasing safety?</i>	<i>Why are 24 sites hosts of ASE despite falling outside selection criteria?</i>	<i>Underlying technical processes at play?</i>	<i>Meaning of 'data-driven approach' and how manifest in ASE infrastructures?</i>	<i>Connection between data-driven approaches and risk reduction?</i>	<i>Relationship between COT and TPS?</i>
<i>COT 1</i>									
<i>COT 2</i>									
<i>COT 3</i>									
<i>COT 4</i>									

Table 7: Interview Categories Spreadsheet Excerpt

Informant	Question	Response	Theme
COT 1	Please can you elaborate on how safety considerations, operating costs, and revenue generation factor into the operation and deployment of ASE	<i>The collection of fines is done through court services, so we don't really have any involvement in the revenue side of things. Our primary focus is delivering the programme and laying the charges. Once those tickets are mailed out the matter is out of our hands. We would like the revenue to offset the programme costs so that there is no burden on the taxpayers, but our primary focus is on improving safety in the city and specifically in Community Safety Zones near schools</i>	Monetization of Justice
COT 2	How do safety considerations, operating costs, and revenue generation factor into the operation and deployment Vision Zero programs	<i>...I think everyone's also still very conscious of wanting ASE to be here for achieving the goals of Vision Zero, it is not about revenue generation...</i>	Monetization of Justice
COT 2	Can you elaborate on the nature of the relationship between the City of Toronto and the Toronto Police Service in this particular context?	<i>...apparently there is a separate entity that deals with for-profit companies who have exclusive right to sell collision and traffic data with insurance companies."</i>	Monetization of Justice
COT 3	Please can you elaborate on how safety considerations, operating costs, and revenue generation factor into the operation and deployment of ASE	<i>I know for a fact that revenue generation is definitely not a deciding factor of the program. I actually would like for the program to be set up in such a way that any revenue generated through the ASE program goes directly towards road safety improvements. But that's not the case. Instead, it goes towards the same pot that property taxes, parking tickets, and fines go into which then gets redistributed at the end of the year to different areas of cities e.g., housing programs.</i>	Monetization of Justice
COT 3	With all these programs in place, what do ASE installations bring to these types of initiatives?	<i>For a direct consequence, ASE is cost effective way to issue tickets, and our goal ultimately is to have as few tickets issued as possible.</i>	Monetization of Justice
COT 3	How does the city goes about assessing whether Vision zero programs are helping and/or meeting this objective? Is there regular monitoring and evaluation of this? Some other assessment mechanism?	<i>...Nowadays, pedestrian head start signals are very much understood and studied and accepted in the transportation industry as a sort of good bang for the buck kind of initiative. This is because it's very low cost compared to the safety benefits that it brings....</i>	Monetization of Justice

In reviewing the information inputted into the second spreadsheet, I colour coded sentences/phrases from each key informant response to the issue areas around which the interviews were structured. For example, COT 2's response "*My understanding is all of the technologies essentially pay for themselves at least from considering the vendor cost,*" and COT 3s response "*I mean, at the end of the day, the way we decide how to spend the dollars and where to spend them is about where are we going to get the biggest bang for our buck? And in our case it's to reduce serious injuries and fatalities*" were both coded to the same theme because they each focus on the monetization of justice. Once I had read through and colour coded all the responses, I created another spreadsheet that I used to collate the sentences/phrases into groups in accord to the issue areas around which the interviews were structured (See Table 7 and Appendix 1).

4.4 Interview Findings

During the interviews, the key informants were asked to expound upon three issue areas, monetization of justice, the implementing of ASE installations in locations that seemingly did not correspond with the publicly posted site selection criteria, and differences in the traffic-related data publicly reported by the City of Toronto and the Toronto Police Service via their respective open data portals. Together, the responses shed light on the focused outcomes of ASE systems (i.e., improved traffic safety) as well as how information is selected, evaluated, used, and acted upon to influence driver behaviour. Seen through the lens of governmentality and biopolitics, the findings emerging from these conversations are suggestive of how the municipal government conducts the conduct of individuals through the use of ASE and, in so doing, structures social relations and arrangements of power.

4.4.1 Monetization of Justice in ASE

The participants from the City of Toronto and Toronto City Council were asked how safety considerations, operating costs, and revenue generation factor into the operation and deployment of ASE. All four City of Toronto representatives maintained that considerations of revenue generation do not play a role in the deployment and use of ASE.

In their response, COT 1 drew a distinction between the City of Toronto and the management of paid fines and potential revenue, stating:

The collection of fines is done through court services, so we don't really have any involvement in the revenue side of things. Our primary focus is delivering the program and laying the charges. Once those tickets are mailed out, the matter is out of our hands. We would like the revenue to offset the program costs so that there is no burden on the taxpayers, but our primary focus is on improving safety in the city and, specifically, in Community Safety Zones near schools... We also want to ensure that we are maintaining the public's trust, so we post warning signs 90 days in advance of the devices being activated.

COT 2, COT 3, and COT 4 all averred that revenue generation was trivial. COT 3's response captures the essence of the claims advanced by all three participants in this regard:

I know for a fact that revenue generation is definitely not a deciding factor of the program. I actually would like for the program to be set up in such a way that any revenue generated through the ASE program goes directly towards road safety improvements. But that's not the case. Instead, it goes towards the same pot that property taxes, parking tickets, and fines go into which then gets redistributed at the end of the year to different areas of cities e.g., housing programs.

All four City Councillors also claimed revenue generation is not a factor in the deployment and operation of ASE systems. CC 1 went so far as to state, "I hope we don't make any money on it because that would mean people are behaving well." CC 2 indicated that revenue generation is not a deciding factor for this program, adding that the technology was paying for itself. As this individual put it,

The reason why we need this technology is because people are speeding, so the people speeding should be the ones that have to pay for it. But we shouldn't

depend on it as a source of revenue because we want it to be zero. Unfortunately, we probably have to build up some infrastructure in order to keep people following the rules.

In contrast to the views set out above, CC 3, claimed councillors do not receive much information about fees and fines, stating:

It's very hard for us to get data about how many tickets are issued, driver speeds, and ASE reported speeds for the City of Toronto vehicles. This is because the City of Toronto does not want people to know what is the threshold to trigger a ticket.

The shared message from the City of Toronto and City Council participants was that operational costs and revenue do not factor into the deployment of ASE systems. This, however, was not the view of two of the interviewees from the Ministry of Transportation who had been involved with the setting up and rolling out of ASE to municipalities. In their view, operational costs and revenue was a key consideration in the deployment of ASE. According to MTO 1:

Municipalities have always said traffic safety is their main goal. They're not here to make money off us, or at least that's how it communicated to us. However, that being said, it can't also be negative, right? Municipalities can't be doing these road safety programs and just continually losing money.

MTO 1 went on to add:

revenue and the cost of the cameras is a key considering how we further expand this program across Ontario... we have not seen much adoption because these cameras cost a lot of money to purchase and administer as you need to hire someone to review the tickets which also then need to be sent through court.

Similarly, MTO 2 stated that “*there's no question that there's revenue generated.*” MTO 1 and 2 further shared that at the Ministry, there have been some efforts to further reduce costs through the implementation of administrative penalties. In the words of MTO 1:

Administrative penalties are used for parking tickets which have been very successful in a bunch of jurisdictions, to save money as they did not have to use the course to issue tickets... In fact, York Region submitted a report that said when the province implements administrative penalties it would save about \$8 million a year.

The reader will recall that the use of administrative penalties removes the adjudication of parking by-law matters from courts, placing this responsibility in the hands of municipal authorities. The use of administrative penalties to resolve parking by-law violations came into effect on August 28, 2017 (City of Toronto, 2017f). This change in process was the product of an amendment to *Ontario Regulation 611/06: Administrative Penalties* which replaced the *Provincial Offences Act* (POA) Part II procedures for parking ticket trials with a new dispute resolution process for parking by-law violations under the *City of Toronto Act, 2006*. In 2022, the *Highway Traffic Act* was amended to allow municipalities to also implement administrative penalties for camera-based traffic enforcement including red light cameras and ASE. According to MTO 1, these changes mean that “*A Judge/Justice of Peace won’t have to adjudicate tickets*” and tickets issued as a result of ASE, “*would basically look like a parking ticket, which is not a ticket in a lot of jurisdictions; it’s just a penalty you can contest online.*” It also merits noting that administrative penalties do not affect drivers’ insurance rates because infractions that are dealt with at this level are not reported to the Ministry of Transportation.

MTO 1 also shared how the city of Toronto works in partnership with several municipalities to bring down the costs of processing data and issuing tickets. As they put it,

Any municipality that joins the Joint Processing Center (JPC) partnership will set up a camera in its own region. Data from these cameras is then pulled by the vendor and taken to the JPC to be reviewed by a provincial offenses officer. Once this process is complete, information is then sent to the court to process the ticket. This model is in place to save on cost as opposed to each individual municipality hiring their own officers to process infractions.

When I asked MTO 1 why speeding infractions captured by ASE systems do not impact a driver’s insurance rates or demerit points,³⁷ they stressed that this is because the ASE program

³⁷ Demerit points function as a quantum of measurable risk in which drivers receive a corresponding tally of points for the traffic violations of which they are convicted. In turn, the accumulation of these points beyond a certain threshold limit results in the automatic suspension or cancellation of one’s driving licence.

focuses on ticketing the vehicle owner rather than the driver. As they put it, this was, in part, because “*there are privacy issues associated with proving a specific individual was driving a car as ASE cameras are not capturing the faces of drivers.*”

MTO 3 and MTO 4 declined to answer the question about revenue generation. However, in speaking with MTO 3 about risk mediation and traffic safety, they stated:

Our primary goal has always been road safety, not to make money because the province doesn't even make money upfront. We just recover whatever costs we incurred.

The above comments from COT 1 and COT 3 regarding the flow of ASE revenues are suggestive of O'Malley's notion of the monetization of justice insofar as the views they put forth suggest that, within the City of Toronto, certain categories of infractions (i.e., parking tickets and tickets issued through red light cameras and ASE systems) are treated as a separate, perhaps less serious, category of traffic violation.

Contrary to the views advanced by City of Toronto representatives and City Councillors about the intention underpinning the rollout of ASE resting foremost with a desire to improve traffic and pedestrian safety by reducing rates of speeding, the observations of MTO 1 regarding ASE fines being designated to vehicle owners implies that pecuniary-oriented motivations may also be at play. It also merits noting that with offending drivers being *ipso facto* equated to the vehicle owner (who is registered and coded in government systems), it is the vehicle owner's coded self – or statistical representation – that is deemed liable for having committed a speeding infringement regardless of whether they actually were driving the vehicle when the captured offense was committed.

It also merits noting that the shift to camera-based traffic enforcement including red light cameras, ASE, and the adjudication of certain types of traffic-related infractions via the imposition of administrative penalties that can be paid online marks a convergence of sentencing and

disciplining into a pecuniary relationship that is predominantly administered through digital infrastructures. To this end, it seems plausible that these processes of depersonalizing and anonymizing justice may be understood as contributing, in the eyes of some observers, to the marginalization of policing and the court system.

The notion advanced by some of the interviewees that vehicle owners caught speeding should have to pay a monetary penalty for these infractions – as opposed to being subject to some other type of discipline (e.g., community service) – implies a recognition that fines for certain types of traffic-related infractions (e.g., speeding) do not eradicate unwanted action, but may, in fact, serve to license unwanted actions through a price mechanism. Such an interpretation is seemingly reinforced by the City’s reluctance to make information about speeding thresholds public lest drivers come to internalize a transaction-based view of traffic safety. Put simply, if individuals are willing and able to pay a monetary price for certain traffic infractions based on some internal cost/benefit analysis, there is little to prevent them from repeatedly engaging in the undesired behaviour. Bearing this in mind, it seems plausible that if the focus of ASE was to reduce speeding, then tickets issued by ASE systems would – as with other traffic-related infractions that are registered with the Ministry of Transportation – directly impact a driver’s demerit points and automobile insurance rates. Alternatively, and as is the case in Finland, fines for the captured infractions could be linked to drivers’ daily disposable income (i.e., half of one’s daily net salary) wherein the more a driver exceeds the limit, the greater the number of fines levied (see, McKenna, 2018; Henley, 2023).

4.4.2 Site Selection Criteria

As reported in Chapter 3, my analysis of the three open datasets pertaining to automated speed enforcement identified 24 locations with ASE installations that seemingly fell outside the ASE site selection parameters set out in the Report for Action: Update on Vision Zero Speed

Management Strategy and Related Initiatives (City of Toronto, 2021b, p.16) and the City of Toronto Automated Speed Enforcement website (City of Toronto, 2018b). Specifically, the sites in question are recorded as not being located in designated Community Safety Zones.

Additionally, 11 of the 24 sites were not near schools, and 16 were not zoned as Pedestrian Safety Corridors, Senior Safety Zones, or School Safety Zones.

When asked about what lay behind this state of affairs, the responses of the interviewees from the City of Toronto and Toronto City Council largely centred on how historical transportation statistics are used by the municipality to justify and allocate road safety interventions. They also, revealed that despite established prioritization variables being in place to guide ASE site decision making, these variables are not always adhered to.

In their response, COT 1 focused on the connection between operational considerations and site prioritization. As they put it,

It could be for a multitude of reasons... we look at the collision data (of the previous five years)... we also prioritize locations where it's been flagged that vehicles are travelling well in excess of the speed limit. We also consider volume or the percentage of students who walk to school. It could also be relative to maybe other Community Safety Zones in that ward. Maybe there weren't many collisions across the ward specifically. It could be a case where maybe a higher-ranking site that may have had more collisions also had something that prevented us from going there (Like maybe there was construction going on or maybe there was a recent speed limit change). Maybe the road environment didn't allow us to install the equipment. So, we moved to the next location down the list.

I then provided COT 1 with examples of certain sites that were not in Community Safety Zones and which nonetheless hosted ASE installations and asked why they had been included in Stage 1 of the prioritization process. COT 1 was not able to explain this situation, stating:

When we developed site selection criteria, we looked at what other jurisdictions are doing around the world and in North America. Specifically, we looked at their best practices and lessons and catered it to our focus. We also looked at schools to bring more of a focus on collisions that involve children and other

users, pedestrians, and senior citizens. This is because risk is greater for vulnerable citizens.

When COT 2 and COT 3 were asked about these sites they, too, had no substantive explanation to offer. COT 2 stated that “*maybe the Community Safety Zone data is wrong or not up to date.*” COT 3 went one step further, asking me to send a list of the sites in question and informed me that:

With this [ASE] program, there's been a bunch of changes to designate Community Safety Zones. It's quite possible that the data is not up to date, there might be more information about zone changes in city council meeting agendas or minutes.

Unfortunately, when I followed up on this possibility by examining road safety related City Council meeting agendas and minutes for the period spanning from 2019 to 2021 (n=32 meetings), I did not find any information about zone changes (City of Toronto, n.d.-d).

COT 4's initial response to my query about the 24 sites was that “*there might have been a more recent bylaw change or something to turn them into Community Safety Zones.*” When I let them know that I could not find any documentation outlining any changes to these zones, they added:

My team has a role in maintaining this information. Can you send me a list of the ones that you've seen that haven't shown up? That'd be really helpful.

Upon completing the interview with COT 4, I sent them the list of 24 sites but did not hear back. I also checked the Vision Zero mapping tool five months after our March 2022 meeting and observed no changes or updates had been made reflecting the information I had shared with them. As of June 2023, only two sites from the list I shared with COT 4 had been updated in the Vision Zero Mapping tool with one zoned as a Community Safety Zone and the other zoned as a School Safety Zone

The four City Councillors offered a somewhat different view than their City of Toronto

counterparts. Whereas the latter's responses primarily focused on the connection between operational considerations and site prioritization, the Councillors' responses tended to focus on the site selection process itself. For instance, CC 2, CC 3, and CC 4 all claimed not to know why ASE installations had been approved for locations that seemingly fell outside the publicly stipulated selection criteria. CC 2 stated:

I don't know. That's a question for city staff. You know, I've been told we can't put them in non-Community Safety Zones, so I'm not sure what allows them to get an exception.

CC 1 likewise claimed,

I don't know. But I have a high degree of confidence that the sites in the area that I represent in XXX are clearly places where there are schools, vulnerable road users and a history of driver behavior.

When I asked CC 2, CC 3, and CC 4 about how ASE sites were prioritized at a ward level, they each indicated that despite their having no formal involvement in the process, they did have the authority to submit site-specific requests to the City of Toronto if their constituents have complaints or concerns about speeding in any specific location(s). CC 2 added that this extended to the Toronto Police Service, with councillors having the ability to direct the TPS to conduct traffic enforcement at specific locations in accord with citizen complaints and/or requests.

CC 4 pointed out that the responsibility for site selection and prioritization mostly fell to the General Manager of Transportation. They specified that, in spite of City Councillors not being formally involved in the process, "*the General Manager knows that local councillors know their neighborhoods better, so they confer with us.*"

The City Councillors also shared that two ASE devices are allocated per ward (City of Toronto, 2022c). Here, CC 4 poignantly added that this practice makes the ASE program:

a highly political neighborhood versus neighborhood battle. It's about political power. It isn't about safety.

The informants from the Ministry of Transportation (MTO) also were not able to provide any explanation as to why the 24 sites I had identified were home to ASE installations despite not being in Community Safety Zones. MTO 1 posited that the explanation might rest with the fact that the delineation of ASE rules and roadways falls to municipalities. As they put it:

This program has a narrow scope of only being used in Community Safety Zones as there was a lot of public backlash in the 1990s regarding the photo radar program... When this new ASE program was pitched, politicians had to consider the public reaction and how they are going to win votes for this.

This explanation echoed the view expressed COT 1 about the installing of ASE devices in locations not designated as Community Safety Zones insofar as both responses alluded to municipal decision-making about ASE possibly not adhering to the formal prioritisation process if/when circumstances lead to a site being deemed of particular importance.

The responses to my queries about the City's publicly stated claim of ASE locations being selected through a data-driven approach³⁸ that considers vehicle speed and collision data also failed to shed much light on the seeming discrepancy between the location of 24 ASE installations and the apparent absence of the appropriate zoning designation. When asked what a data-driven approach means and how it is manifest in decision-making about ASE infrastructures, COT 1 responded:

When we developed this program we looked at speed data (for school areas and almost 1100 Community Safety Zones), volume of foot traffic, vehicle traffic, percent of students that walk to school (living within walking distance which is given to us from our school board partners), and we factor in requests from the public and the police that are areas of concern which we fed into analytics.

COT 2 responded by focusing on fairness, noting:

³⁸ Recall that as per the City's definition, a data-driven approach involves: (i) using predictive analytics; (ii) working with other public and private sector partners to acquire better data; and (iii) implementing performance monitoring and evaluation to measure the impact of safety programs. See, City of Toronto (2019b).

I would presume there's an element of fairness and responding to the need of making streets safe. There is also the public perception that ASE is a cash grab.

COT 3 and COT 4 provided more concrete answers. According to COT 3:

Toronto is one of the luckiest cities in North America in terms of the amount of collision data we have. It's pretty comprehensive, and it's a large database. We [the City of Toronto] have developed some basic predictive modelling which identifies the type of environmental factors that might contribute to a specific collision type and then allows us to pay attention to specific sites with these factors... For us, it's as simple as looking at that data and the different types of collisions combined with a lot of geospatial analysis to figure out where we should be deploying things.

COT 4 stated:

I think for a program like this you need transparency. You could use a predictive model but one of the issues with that is it turns into a lot more of a black box. So, I think a multi-criteria [sic] scoring tool is better. In my team, we've done some work on building predictive models to figure out the most dangerous streets in the city.

In sum, the four City of Toronto informants provided varied and non-specific responses about what exactly 'data-driven' means in the context of ASE related decision-making.

By contrast, the City Councillors' responses to questions about the City's data-driven approach, zeroed-in on the importance of looking at different speed and traffic statistics within the City of Toronto. For example, CC 2 stated,

from my view, that means statistics around killed or seriously injured. Those are paramount.

CC 2 elaborated further, noting "collision data in Toronto is pretty widely used for both prioritizing interventions and also validating these interventions." Similarly, CC 3 stated:

We look at traffic volume, Killed or Seriously Injured (KSI) statistics, and some of the other data around speed. We have pretty good data, particularly in downtown areas.

This said, two of the Councillors critiqued the notion of the ASE site selection process being foremost data driven. Elaborating upon the City of Toronto's regulating of the rotation of ASE devices to ensure two installations are allocated per ward per rotation, CC 1 commented that:

I think the fact that there are two allocated per ward is actually more political than anything else. Maybe it's equity of access to service over geography, but in my opinion, it strays from the purity of being data driven.

CC 4 had a similar response, pointing out:

I don't agree that the allocation system is a data driven approach to begin with. There's a restriction on where the automated speed enforcement cameras go based on them having to be in these Community Safety Zones. So already you've thrown out most of the city from consideration. Secondly, the mayor and others on council wanted a slow roll out of automated speed enforcement and restricted it to one or two per ward. Then traffic data, collision deaths, and serious injuries can be looked at after these restrictions. We need these systems to be safe for vulnerable road users from the beginning.

The participants from the Ministry of Transportation were not asked about the meaning of data-driven within the context of the City of Toronto's ASE activities as this is a topic that fell outside of the scope of their expertise.

However, all 12 informants were asked about the connection between data driven approaches to traffic safety. Five responded by elaborating upon how the ASE program was deployed to ensure safety for 'vulnerable road users.' In line with my observations from Phase 1, their responses also alluded to a lack of clarity as to what constitutes a vulnerable road user. COT 1, for instance, stated it consists of "adults, senior citizens, or cyclists." COT 2 defined vulnerable road users as "pedestrians, cyclists, or motorcyclists." Both COT 4 and CC 4 claimed the term refers to "pedestrians, cyclists, and kids."

According to the representative from the City of Toronto, basic predictive modeling and data analytics are being applied to understand the environmental factors of Toronto roadways that make them prone to speeding and traffic accidents. This said, the City's approach reportedly relies

heavily upon historical patterns in transportation data, traffic statistics, and collecting as much information as possible in order to justify and allocate road safety interventions. This suggests a focus, in theory at least, on identifying potential and actual threats and intervening on the basis of capture and control as opposed to surveillance and discipline.. This is not quite the type of 'pre-crime' fighting through predictive analytics envisaged by Zedner (2007), but it does bear some resemblances, at least conceptually, to both the perspective she set out and that advanced by Andrejevic (2020), Kitchin et. al., (2017), Kitchin (2016), and Kitchin and Dodge (2014).

The process for selecting ASE sites in the City of Toronto also appears to parallel elements of inclusionary strategies of control à la Rose (2000). On the one hand, and despite ambiguities surrounding just how 'data driven' the City's approach is, the experience of ASE implementation in this urban center can be characterised as reflecting an effort to shape policies and interventions by incorporating a wide range of data and considerations. In the case of site selection, this is manifest through a two staged process in which an array of variables is considered in accord with available data and, seemingly, a few less tangible considerations in the rendering of site selection decisions.

4.4.3 Data Sharing Networks

The responses of the participants from the City of Toronto and Toronto City Council to questions about the nature of the relationship between the City of Toronto, the Toronto Police Service, and Ministry of Transportation sheds light on the formal and informal arrangements among a network of governing agencies that are involved with problematizing speeding and the implementation and administration of ASE in the city.

In speaking with key informants about data sharing among stakeholders I first asked City of Toronto informants about the nature of the relationship between the City and TPS in terms of

the interactive maps published online. All four COT informants stated there is a close working relationship between the two entities. According to COT 1

The Toronto Police Services work closely with the Vision Zero team primarily. [TPS] does have its own road safety focused unit which supports the Vision Zero team. I can't comment too much on that relationship. That's probably something better to discuss with Vision Zero contacts.

Unfortunately, when I queried the Vision Zero contact, this individual declined to comment on the relationship between their team and the TPS. Noting that their department worked closely with individuals from the TPS, COT 4 shared that the City receives a flow of collision and transportation data on a regular basis from both the TPS and collision reporting centers. As they put it:

We clean, manage, and validate data. Once this is done, we then pass the data back to TPS which they publish. It's kind of bouncing back and forth, which maybe it's not the best way of doing things.

COT 2 added, “*apparently there is a separate entity that deals with for-profit companies who have the exclusive right to sell collision and traffic data with insurance companies.*” However, COT 2 could not provide any other information about data sharing with this for-profit company, nor were any other key informants able to substantiate this claim.

None of the four City Councillors with whom I spoke were able to discuss the data sharing relationship between the City and the TPS. All four claimed to not be familiar with how individuals from these two organizations work together in relation to this topic.

MTO 3 and MTO 4 were able to provide some information about the relationship between the City of Toronto and the TPS insofar as both noted the presence of informal data sharing practices between the two entities. According to MTO 3,

When we were developing the [automated speed enforcement] program the police were involved and played a role. Now, this is all municipally run. The data gathered by the city can be shared with their local police services, but that's a question to ask them.

During my conversations with the participants about data sharing networks some pointed out that ASE is a vendor provided solution wherein the vendor is responsible for everything relating to the program except for the selection of sites, processing of images, and issuing tickets.

According to COT 1,

When a vehicle is detected speeding, that incident image is captured on the device. The devices are not connected to any outside network for data security and privacy reasons... vendor technicians physically go out to the site and retrieve that data from the device. The data is put into an encrypted storage unit storage device which is put into a locked transport container. That transport container can only be opened in our office at the Joint Processing Center (JPC) by our staff.

When speaking with COT 2, they stated:

My understanding is that the ASE and red light camera are similar in how they operate. I would love for you to actually figure this out, but there's a hard requirement that around the chain of custody of who has access to these images and who actually handles them.

COT 2 also discussed mandated data reporting requirements put in place by the MTO, noting:

We [the City of Toronto] have like mandated reporting requirements to the Ministry of Transportation. My team has been proving the MTO with collision data and any speed volume counts that happen along the stretch that the ASE unit is installed for a period of six months after.

COT 3 declined to respond on the grounds that they did not deal with reporting requirements of this program or the ASE vendor. COT 4, provided a similar answer to COT, outlining that:

It's all done by the city, but it's through a contract with a private company. There was a bidding process from a few vendors to supply the automated speed enforcement cameras and to maintain the equipment and to deploy them.

City Councillors were unable to share information about the ASE vendor. However, they were able to discuss the request for proposal process. CC 2 shared that “city staff and the procurement process select the vendor which comes to City Council for authorization.” CC 4 stated:

We have a regulated system that keeps us away from evaluating and picking vendors. All we can do is say we want somebody who does X, and then the purchasing department goes and gets that vendor.

Individuals from the Ministry of Transportation were able to provide more information about this matter. As per MTO 1,

A key difference with the ASE program is that we have specified a specific camera technology/vendor in regulation. This means that municipalities can only use those specific cameras that are outlined in the regulation. We sort of felt that the process maybe wasn't fair to all businesses even though they'd compete fairly through the RFP process.

In my conversation about data sharing networks with MTO1, they concurred with COT 1's assertion about there currently being a manual process in place wherein only the vendor can extract ASE data. MTO1 then added that:

Eleven municipalities have joined together to use the same processing center. They've done that because that model saves on cost as opposed to each individual municipality hiring their own people to be able to process just a little bit of tickets... People who actually issue out the tickets have to be a Provincial Offenses Officer in Ontario and that's someone designated by the Minister of Transportation. They could be either a police officer/peace officer or they can be a municipal designated employee by the MTO, which is usually the latter.

MTO 2 added that when it comes to issuing tickets, municipalities are reliant on the MTO.

According to this individual:

Every time municipalities want to issue an ASE ticket, they need to use our [Ministry of Transportation] systems to look up someone's address to mail the notice. In exchange for us providing them with the plate information data, they share with us transportation related data and statistics.

Although in no way a dominant theme, it merits noting that during the interviews some individuals intimated that a wide range of actors and organizations – including technology vendors and third party stakeholders – are involved in the deployment and operation of road safety related initiatives in the City of Toronto. The presence of such interconnections between public and private actors appears, at least on the surface, to parallel Dean's notion of governmentality insofar as the engagement of diverse actors in the ASE context seemingly takes the form of networks that are not necessarily located within the municipal government per se. Rather, they appear to be

constructed, at least in part, from practices operating from multiple and heterogeneous locales both within and external to the municipal government. If this is indeed the case, it would indicate that the governing of road safety in the City of Toronto is not solely confined to the municipal government or formal practices of government and, instead, extends to various complementary techniques and institutions outside traditional government.

4.5 Conclusion

The discussion in this chapter set out the methodology used to conduct semi-structured key informant interviews during the second phase of my project. In speaking with individuals from the City of Toronto, Toronto City Council, and the Ministry of Transportation I uncovered a difference of opinion between those working at municipal and provincial levels about the extent to which the monetization of justice is perceived as playing a role in the deployment and use of ASE. While I recognise the limitations associated with formulating conclusions on the basis of small samples, the view emerging from my interviews suggests that despite the presence of guidelines specifying the variables that are meant to be given priority when decisions are made about where ASE installations are to be located, the guidelines are not always followed. The validity of this claim is, of course, subject to further empirical scrutiny. Lastly, the information emerging from the interviews shed some admittedly dim light on the informal and formal data sharing practices between the City of Toronto, the Toronto Police Service, the Ministry of Transportation, and other third parties. Here too, further and more elaborate research would be needed to actually map out these data sharing practices and the networks of which they are part. In the next, concluding, chapter I discuss what this means with regard to social control.

Chapter 5: Conclusion

The introductory chapter to this thesis provided an short overview of the context for investigating automated speed enforcement (ASE) as an artefact with politics. Chapter 2 set out the theoretical foundations informing the study. In so doing, it traced Michel Foucault's concept of governmentality and considered its suitability as a framework for investigating the deployment and use of automated speed enforcement in the City of Toronto. Chapter 3 provided a brief overview of the evolution of the Vision Zero Road Safety Plan in the City of Toronto as well as the research design used for Phase 1 of my project. Chapter 4 set out the research methodology used to conduct the key informant interviews that made up Phase 2 of my project and presented the findings that emerged from these meetings.

The discussion, in this concluding chapter, is divided into five sections. In the first, I revisit the three research questions that guided my investigation. In section two, I expound upon the key contributions emerging from this project. In the third section, I discuss the limitations of this study and in section four I propose potential directions for future research. Section 5 wraps up the thesis with a concluding thought.

5.1 Addressing the Central Research Questions

I arrived at my central research questions via a rather circuitous route. My innate interest in scholarship about governmentality, rationalities of rule, information, and control led me to research that investigated linkages between techniques for regulating conduct and the rationalities that justify and push citizens into modifying and constructing themselves. By examining the assemblages of tools, processes, and practices comprising the City of Toronto's ASE systems, I aimed to understand how the latter work together to regulate, shape, and function as a tool of social control in the City of Toronto. As such, the central research question guiding this project asked:

How does automated speed enforcement (ASE) function as a mechanism of social control?

In addressing this question, I first looked at the technical components of ASE, such as the hardware, software, infrastructure, and techniques that push drivers to alter their driving habits toward practices that increase road safety. I was specifically interested in how images captured by ASE systems are stored, analyzed, processed, and tickets issued to vehicle owners whose vehicles are captured committing traffic infractions. In seeking to uncover the administrative and technical processes at play that allow tickets to be issued to vehicle owners through automated processes, I realized that in addition to the technical components of ASE there were social components meriting further study.

In completing Phase 1 of my project, I found that ASE functions as one of a range of methods employed to reduce vehicle speeds and the number and severity of traffic collisions under the auspices of the City of Toronto's Vision Zero Road Safety Plan. It also became clear that this Plan involves the City working in partnership with other public and private sector actors.

In seeking to combat specific road safety concerns, the Vision Zero Road Safety Plan circulates and arranges various codes of conduct to legitimize the deployment of specific types of interventions, programs, and initiatives including ASE, Watch Your Speed Program, red light camera programs, and road safety education campaigns. The key informant interviews revealed that with the Vision Zero Road Safety Plan architecture, enforcement, infrastructure, and design have merged into an integrated program seeking to augment both traffic and pedestrian safety. This, in turn, suggests that a certain politics of conduct is designed into the fabric of the Vision Zero Road Safety Plan to encompass both individual and collective action. To this end, Vision Zero initiatives, including the deployment and use of ASE, can be viewed as manifest of both the inclusionary and exclusionary strategies of control set out by Rose (1996, 2000, 2001). In terms of the deployment of ASE in the City of Toronto, it is the knowledge generated through these

systems of capture and control that align with the types of inclusionary strategies he outlines. By contrast, other Vision Zero initiatives such as education programs can be viewed as reflecting, at least in part, exclusionary strategies of control insofar as they aim to manage citizens by neutralizing the ‘danger’ they are seen pose.

In sum, the umbrella of the Vision Zero Road Safety Plan has merged road safety, architecture, disciplinary procedures, and infrastructure into an integrated programme in the name of traffic and pedestrian safety. Within this plan, the social and technical features of road safety programs (including ASE) allow authorities to manage and control the behavior of the population as a whole, promoting safety and reducing driving related fatalities which also speaks to the biopolitics of ASE. The City of Toronto uses ASE systems to increase safety and reduce the speed of drivers through managing and processing bodies directly by using this technology.

5.1.1 Regulating Driver Behaviour Through the Monetization of Justice

The second research question guiding my project focused on the monetization of justice. It asked:

What balance does the implementation of ASE strike between disciplining bad driver behaviour versus pricing high-risk thresholds of unwanted behaviours?

In completing the first phase of research I found only very limited information was publicly available about ASE fines, potential revenue from charges, and the cost of maintenance and operation of these systems. Nor was I able to find information about ASE reported driver speeds, speed threshold for tickets, and amounts paid for ASE issued fines. The absence of this seemingly important aspect of the ASE equation sparked my interest and was further investigated in Phase 2 of my research.

Key informants working at the municipal level stressed that monetary considerations did not play a role in the deployment of ASE in the City of Toronto. This view, however, differed from that of key informants working at the provincial level who suggested such considerations were a

factor in rolling out ASE across municipalities. Additionally, the four participant City Councillors shared that individuals driving over the speed limit should be required to pay a monetary penalty for their infractions.

The secrecy surrounding the threshold(s) for issuing speeding fines suggests that the City may be strategically leveraging this lack of transparency to enhance the control aspect of ASE insofar drivers are more likely to comply with speed limits if they are unaware of the margin for flexibility. This said, the reliance of monetary fines for tickets issues by ASE rather than standard disciplinary measures imposed for (which impact demerit points and insurance rates) provincial traffic violations leaves open questions about the overall goal of implementing ASE systems. Specifically, is the primary objective to increase traffic and pedestrian safety or to monetize high-risk behaviors.

Taken together, the perspectives I encountered during the key informant interviews give pause to reflect on whether and how the deployment and use of ASE in the City of Toronto and other municipalities may be illustrative of a process of monetizing justice as set out by O'Malley (2010, 2011).

5.1.2 Structure of Governance Network

The third research question guiding my project focused on data sharing between governmental actors. It asked:

How does the network of governing agencies problematize speeding in the City of Toronto and structure the implementation and administration of ASE?

Data are at the heart of the ASE system. According to some of the individuals who participated in my project, the data extraction process for ASE installations requires that vendor technicians physically visit these ASE installations to retrieve the data they have gathered. These data are put into an encrypted storage unit that is then placed in a locked transport container that

can only be opened by City of Toronto staff employed at the Joint Processing Centre. However, it was what I learned about how and with whom ASE gather data are shared that came as a surprise to me.

City of Toronto informants stated that ASE is regularly shared with other stakeholders including the MTO, the TPS, motor vehicle insurance companies, and third-party vendors. In return, the City of Toronto likewise receives data from these actors. However, the informants stated there are some inefficiencies in how these data are validated and used, especially if/when it was slated to be made public as open data. For example, data collected by the City of Toronto and the TPS that is made public is first shared between, reviewed, and examined, by the two entities before being shared on their respective open data portals.

The levels of interconnectedness between public and private actors alluded to by the participants in my study parallels Dean's notion of governmentality which, he argues, takes the form of networks that are not located within the state and instead are an interconnected web of actors that interrelate civil associations and governmental agencies. The interviewees' observations about data sharing networks in the context of ASE suggests that the governmentality of road safety is not confined to the municipal government or formal practices of government but extends to various techniques and institutions outside traditional government. Additionally, the conversations with the key informants suggest these data sharing networks are not held together by specific legislation, regulation, and contracts but rather through an amalgamation of discursive practices.

In sum, a complex assemblage of forces including judicial, legislative, architectural, professional, organisational, and financial materialize government and regulate road safety decision making in the City of Toronto. These various stakeholders utilize a variety of professional

specialisations (e.g., data analytics, data collection and management, engineering, project management) to problematize speeding in the City of Toronto and to structure the implementation and administration of ASE.

5.2 Key Contribution of Work

This thesis was organized around Michel Foucault's concept of governmentality and sought to assess its suitability as a framework for investigating the deployment and use of ASE in the City of Toronto. However, in conducting this research project I came to realize that the concept of governmentality appears to reduce politics/social relations to a 'mentality of rule.' In other words, despite the fact that governmentality recognizes there are a variety of discourses subject to government, the notion of governmentality seemingly fails to acknowledge the array of voices within rule itself. The concept of biopolitics, on the other hand, does seemingly retain merit within the context of examining ASE in the city of Toronto insofar as ASE ultimately is about managing a particular facet of the residents' lives. In terms of road safety, a biopolitical analysis captures the role and operation of regulatory mechanisms (such as ASE) deployed in the name of increasing safety and reducing deaths.

Indeed, my findings appear to support Rose's contention that the conduct of conduct depends on the wide social context and cannot be reduced to the 'how' of government practices, techniques, or the means and ends precisely because government programs are distinct in their implementation. Put simply, my thesis serves as an example of how ASE exists both in and as a consequence of the messiness of the processes associated with its implementation. My tentative findings are also seemingly supportive of Andrejevic's claim regarding the ways in which media automation is shifting the basis of governmentality away from panoptic to post-panoptic modes of surveillance insofar as the ASE experience in the city of Toronto hints toward a technologically

enabled shift from discipline to pre-emption. For example, with ASE serving as a basis for speed infraction decision making, speeding is no longer prevented by convincing drivers to follow the law. Rather, such infractions are seemingly pre-empted by an external intervention. And, very importantly, there are seemingly plausible grounds for hypothesizing that this shift may be motivated more by monetary considerations than justice per se.

5.3 Limitations

There are some limitations that must be acknowledged in interpreting the evidence presented and the arguments advanced in this thesis. The first pertains to the small pool of key informants. In recruiting key informants from the City of Toronto, many of the individuals to whom I reached out declined to speak with me, cancelled our planned meeting on short notice, or continually referred me to one specific person. The sensitivity and apparent secrecy surrounding the subject matter took me by surprise as did the frequency with which responses to my interview requests with representatives from the City of Toronto directed me toward one individual. I also was disappointed by the fact that so few City Councilors agreed to meet with me. Ultimately, the conducting of my project at the same time as another ASE-related project was being conducted by researchers at the Hospital for Sick Children served as a major impediment to my fieldwork. Likewise, the refusal of representatives from the Toronto Police Service to participate means that my findings – tentative though they may be – resulted in my having to omit the views of a key ASE stakeholder.

Another limitation pertains to the format of the key informant interviews. Due to the Covid-19 pandemic, these interviews were conducted virtually via Zoom, Microsoft Teams, and WebEx. The reliance on these platforms to conduct the interviews presented some problems. On multiple occasions, the participants had poor-quality internet connections resulting in a delayed response

or calls dropping. Additionally, due to the remote nature of these interviews, there were several occurrences where key informants would mute themselves or step away from our call to attend to their work. It is likely that conducting the interviews in-person would have improved engagement, limited pauses, and helped build relationships.

An additional limitation pertains to the publicly available data about ASE in the City of Toronto. I was disappointed that there were only two ASE related datasets on the City of Toronto's open data portal (ASE charges and ASE locations). There are, by contrast, a greater number of datasets for other, perhaps less politically sensitive, Vision Zero road safety programs. Likewise, and bearing in mind my average resident approach, I was rather disappointed with the completeness, timeliness, coverage and discoverability of the data that I sourced from both the City of Toronto's Open Data Portal and the Toronto Police Service's Public Safety Data Portal. For example, the Vision Zero Mapping tool was not discoverable using various transportation related search terms on either open data portal. Instead, I had to rely on a Google search to track it down. As an average resident, one would assume that maps and related data would be searchable within the open data portal as opposed to being hosted on a separate web page.

5.4 Future Research Directions

This project was designed to investigate how ASE functions as a tool of social control. The findings that have emerged and the domains that have remained unexamined point to a few possible areas deserving of future research. Below I offer three possible avenues for work.

1. Public perception of automated speed enforcement – City Councillors stressed the importance of deploying road safety initiatives that decrease speeding and increase safety while also maintaining the support of the public. This is of particular importance considering the public's negative perception of the 1990s photo radar program which was widely seen as little more than

a 'cash grab.' Bearing this in mind, future research could assess the public's views of ASE with regard to how ASE systems are deployed, the location of these systems, their efficacy in meeting stated road safety objectives, and the resulting fines issued. The findings of such an endeavor could help provide recommendations on future deployment of ASE and assist the government in addressing public concerns and misconceptions about related safety initiatives.

2. *Private public relationships in transportation decision making* – My research identified, albeit only at a surface level, the presence of formal and informal data sharing relationships among public and private entities. One can certainly envisage future research that both investigates and seeks to map such interconnections. For example, within the ASE context, it would be important to ascertain how automated license plate registration, sensors, traffic cameras, are used by private companies and public agencies as tools of knowledge production and the extent to which such knowledge informs policy making in the urban transportation sector.
3. *Driver Privacy and Automated Speed Enforcement* –I believe it would be fruitful to investigate the technical and administrative processes in place that allow governments to automatically mail tickets to car owners. Such research could adopt methods similar to those I used in my study to determine what measures governments and traditional police services use to reprimand bad behaviour while also preserving driver privacy. Cities across Canada have begun to integrate sophisticated urban informatic systems and technical infrastructure to ensure road safety, this proposed study could provide bureaucratic, legal, and infrastructure recommendations to ensure personal information about drivers is secure across all governmental stakeholders.

5.5 Concluding remarks

When I first started my thesis my focus was foremost, if not entirely, on the technological aspects of ASE systems in the City of Toronto. In completing this project I came to learn that ASE functions as an assemblage of technologies in a broader network of forces including institutions, actors, organization, policies, procedures, and programs as a specific and complex form of power that regulates conduct under Vision Zero. Further, the challenges I encountered and the details I uncovered have led me to conclude that this bundle of heterogeneous socio-material components is held together by desires related to economy and safety, and work to steer individuals in particular directions.

Throughout the past five years, the City of Toronto has increasingly implemented various road safety programs, tools, technologies and initiatives as part of the Vision Zero Road Safety Plan. The City of Toronto is continually working to deploy improvements and programs to accomplish the goals of Vision Zero. This master's thesis has shown these material and discursive processes enable complex relationships and agency in response to certain desired outcomes or concerns.

References

- Agre, P. E. (1994). Surveillance and capture: Two models of privacy. *The Information Society*, 10(2), 101-127. <https://doi.org/10.1080/01972243.1994.9960162>
- Andrejevic, M. (2020). *Automated media*. Routledge
- Arthur, W. B. (2009). *The nature of technology: What it is and how it evolves*. Penguin UK.
- Benekohal, R. F., Chitturi, M. V., Hajbabaie, A., Wang, M., & Medina, J. C. (2008). Automated speed photo enforcement effects on speeds in work zones. *Transportation Research Record: Journal of the Transportation Research Board*, 2055(1), 11-20. <https://doi.org/10.3141/2055-02>
- Bibri, S. E. (2021). The anatomy of the data-driven smart sustainable city: Instrumentation, datafication, computerization and related applications. *Journal of Big Data*, 6(1), 2-43. <https://doi.org/10.1186/s40537-019-0221-4>
- Cardullo, P., Felicianantonio, C. D., & Kitchin, R. (2019). *The right to the smart city*. Emerald Publishing.
- Carnis, L. (2010). A Neo-institutional economic approach to automated speed enforcement systems. *European Transport Research Review*, 2(1), 1-12. <https://doi.org/10.1007/s12544-010-0023-4>
- City of Brampton. (2020, July 8). *Minutes: City Council, The Corporation of the City of Brampton*. Retrieved September 10, 2022, from <https://www.brampton.ca/EN/City-Hall/meetings-agendas/City%20Council%202010/20200708ccmn.pdf>
- City of Hamilton. (2021, September 20). *Public Works Committee Minutes*. Retrieved September 10, 2022, from <https://pub-hamilton.escribemeetings.com/FileStream.ashx?DocumentId=306422>
- City of London. (2021, April 13). *Council Minutes*. Retrieved September 10, 2022, from <https://pub-london.escribemeetings.com/FileStream.ashx?DocumentId=80828>
- City of Mississauga. (2020, June 24). *Council Minutes*. Retrieved September 19, 2022, from https://www7.mississauga.ca/documents/committees/council/2020/2020_06_24_Council_Agenda.pdf
- City of Ottawa. (2021, October 13). *Ottawa City Council Minutes 61*. Retrieved September 10, 2022, from <https://pub-ottawa.escribemeetings.com/FileStream.ashx?DocumentId=76775>
- City of Toronto. (2016a, July 12-15). *Minutes: City Council*. Retrieved September 9, 2022, from <https://secure.toronto.ca/council/report.do?meeting=2016.CC20&type=minutes>
- City of Toronto. (2016b). *Report for Action: Amendments to the Red Light Camera Processing Centre Agreement to include the City of London*. Retrieved September 16, 2022, from <https://www.toronto.ca/legdocs/mmis/2016/pw/bgrd/backgroundfile-97917.pdf>
- City of Toronto. (2017a). *Update to the Road Classification System*. Retrieved September 5, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/traffic-management/road-classification-system/2012-update-to-the-road-classification-system/>
- City of Toronto. (2017b). *Vision Zero Plan Overview*. Retrieved November 10, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/vision-zero-plan-overview/>
- City of Toronto. (2017c). *Toronto's Road Safety Plan: Vision Zero Road Safety Plan (2017-2021)*. Retrieved September 5, 2022, from https://www.toronto.ca/wp-content/uploads/2017/11/990f-2017-Vision-Zero-Road-Safety-Plan_June1.pdf

- City of Toronto. (2017d). *Vision Zero Road Safety Plan (2017-2021) Update*. Retrieved September 5, 2022, from <https://www.toronto.ca/legdocs/mmis/2017/pw/bgrd/backgroundfile-109445.pdf>
- City of Toronto. (2017e). *Staff Directory, Divisions & Customer Service*. Retrieved September 10, 2022, from <https://www.toronto.ca/city-government/accountability-operations-customer-service/city-administration/staff-directory-divisions-and-customer-service/>
- City of Toronto (2017f). *Administrative Penalty System: Financial Control and Reporting Policy*. Retrieved September 10, 2022, from <https://www.toronto.ca/services-payments/tickets-fines-penalties/dispute/new-parking-violation-dispute-process/administrative-penalty-system-financial-control-and-reporting-policy/>
- City of Toronto. (2018a). *Automated Speed Enforcement*. Retrieved September 10, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-initiatives/automated-speed-enforcement/>
- City of Toronto. (2018b). *Vision Zero Plan Overview*. <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/vision-zero-plan-overview/#:~:text=is%20a%20comprehensive%20action%20plan,targeted%20and%20data%20driven%20initiatives>
- City of Toronto. (2018c). *Bicycle Safety Campaign*. <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/educational-campaigns/bicycle-safety-campaign/>
- City of Toronto. (2018d). *The Art of Distraction*. Retrieved October 29, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/educational-campaigns/the-art-of-distraction-campaign/>
- City of Toronto. (2018e). *Safety Zones*. Retrieved October 1, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-initiatives/safety-zones/>
- City of Toronto. (2018f). *Report for Action: Vision Zero Road Safety Plan: Designation of Community Safety Zones around Schools*. PW30.5. Retrieved September 18, 2022, from <https://www.toronto.ca/legdocs/mmis/2018/pw/bgrd/backgroundfile-115774.pdf>
- City of Toronto. (2018g). *Ward Profiles*. Retrieved September 20, 2022, from <https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/ward-profiles/>
- City of Toronto. (2019a). *Automated Speed Enforcement Update and Results of the Request for Proposal 9148-19-0048 for the Provision of Automated Speed Enforcement Services* (IE6.10). Retrieved September 7, 2022, from <https://www.toronto.ca/legdocs/mmis/2019/ie/bgrd/backgroundfile-135477.pdf>
- City of Toronto. (2019b). *Vision Zero 2.0—Road Safety Plan Update* (IE6.8; pp. 1–52). Retrieved September 9, 2022, from <https://www.toronto.ca/legdocs/mmis/2019/ie/bgrd/backgroundfile-134964.pdf>
- City of Toronto. (2019c, July 12). *Report for Action: Supplementary Report—Automated Speed Enforcement Update and Results of the Request for Proposal 9148-19-0048 for the Provision of Automated Speed Enforcement Services* (IE6.10a). Retrieved September 21, 2022, from <https://www.toronto.ca/legdocs/mmis/2019/cc/bgrd/backgroundfile-135946.pdf>
- City of Toronto. (2019d). *School Safety Zones - Vision Zero*. Retrieved September 5, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/vision-zero-dashboard/school-safety-zones-vision-zero/>

- City of Toronto. (2019e). *Fatalities - Vision Zero*. Retrieved September 24, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/vision-zero-dashboard/fatalities-vision-zero/>
- City of Toronto. (2020a). *CaféTO – Outdoor Dining*. Retrieved September 19, 2022, from <https://www.toronto.ca/business-economy/business-operation-growth/business-support/cafeto-outdoor-dining/>
- City of Toronto. (2020b). *Renewal of Proprietary Technology Maintenance Contracts supporting the City Services from 2021- 2025*. Retrieved September 27, 2022, from <https://www.toronto.ca/legdocs/mmis/2020/gl/bgrd/backgroundfile-157139.pdf>
- City of Toronto. (2021a). *Salt Management Plan*. Retrieved September 5, 2022, from https://www.toronto.ca/wp-content/uploads/2017/11/9111-Salt-Management-Plan_2016_Summary.pdf
- City of Toronto. (2021b, December 20). *Report for Action: Update on Vision Zero Speed Management Strategy and Related Initiatives* Retrieved September 8, 2022, from. <https://www.toronto.ca/legdocs/mmis/2022/ie/bgrd/backgroundfile-174622.pdf>
- City of Toronto. (2022a). *Safe Speeds Toolkit*. <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/educational-campaigns/safe-speeds-toolkit/>
- City of Toronto. (2022b). *Item – 2022.IE27.8 Update on Vision Zero Speed Management Strategy and Related Initiatives*. Retrieved September 16, 2022, from <https://secure.toronto.ca/council/agenda-item.do?item=2022.IE27.8>
- City of Toronto. (2022c, November 2). *City of Toronto announces locations for 25 new automated speed enforcement devices*. Retrieved September 16, 2022, from <https://www.toronto.ca/news/city-of-toronto-announces-locations-for-25-new-automated-speed-enforcement-devices/>
- City of Toronto. (2023a, July 11). *Automated Speed Enforcement data highlight significant speed reduction impact*. Retrieved August 3, 2023, from <https://www.toronto.ca/news/automated-speed-enforcement-data-highlight-significant-speed-reduction-impact/>
- City of Toronto. (2023b). *City of Toronto Automated Speed Enforcement Program Evaluation Final Report 2023*, March 28. Retrieved August 5, 2023, from <https://www.toronto.ca/wp-content/uploads/2023/07/96cc-Automated-Speed-Enforcement-Program-Evaluation.pdf>
- City of Toronto. (n.d.-a). *Road Safety and Security*. Retrieved September 18, 2022, from https://www.toronto.ca/wp-content/uploads/2019/05/9034-TS_Road-Safety-Security.pdf
- City of Toronto. (n.d.-b). *Vision Zero Mapping Tool*. Retrieved September 4, 2022, from <https://www.toronto.ca/services-payments/streets-parking-transportation/road-safety/vision-zero/safety-measures-and-mapping/>
- City of Toronto. (n.d.-c). *Transportation Services: Infrastructure and Development Services*. Retrieved September 6, 2022, from https://www.toronto.ca/wp-content/uploads/2017/12/864c-transportation_services.pdf
- City of Toronto. (n.d.-d). *Council & Committee Meetings / Schedule, Agendas & Minutes / Advanced Search*. <https://secure.toronto.ca/council/#/advancedSearch>
- City of Toronto. (n.d.-e). *Automated Speed Enforcement (ASE). [Dataset]*. Accessed September 17, 2022 <https://open.toronto.ca/dataset/automated-speed-enforcement-ase-charges/>

- Clark, A. M. (1998). The qualitative-quantitative debate: Moving from positivism and confrontation to post-positivism and reconciliation. *Journal of Advanced Nursing*, 27(6), 1242-1249. <https://doi.org/10.1046/j.1365-2648.1998.00651.x>
- Coghill, C., Valaitis, R. K., & Eyles, J. D. (2015). Built environment interventions aimed at improving physical activity levels in rural Ontario health units: A descriptive qualitative study. *BMC Public Health*, 15(1), 1-16. <https://doi.org/10.1186/s12889-015-1786-2>
- Coletta, C., & Kitchin, R. (2017). Algorhythmic governance: Regulating the 'heartbeat' of a city using the Internet of things. *Big Data & Society*, 4(2), 1-25. <https://doi.org/10.1177/2053951717742418>
- Cruikshank, B. (1993). Revolutions within: Self-government and self-esteem. *Economy and Society*, 22(3), 327-344. <https://doi.org/10.1080/03085149300000022>
- Cunningham, C. M., Hummer, J. E., & Moon, J. (2008). Analysis of automated speed enforcement cameras in Charlotte, North Carolina. *Transportation Research Record: Journal of the Transportation Research Board*, 2078(1), 127-134. <https://doi.org/10.3141/2078-17>
- Dam, R. F., and Siang, T. Y. (2022). Personas – A simple introduction. The Interaction Design Foundation. <https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them>
- Dean, M. (1994). "A social structure of many souls": Moral regulation, government, and self-formation. *Canadian Journal of Sociology / Cahiers canadiens de sociologie*, 19(2), 145-168. <https://doi.org/10.2307/3341342>
- Dean, M. (1999). *Governmentality: Power and rule in modern society*. SAGE.
- Dodge, M., & Kitchin, R. (2007). The automatic management of drivers and driving spaces. *Geoforum*, 38(2), 264-275. <https://doi.org/10.1016/j.geoforum.2006.08.004>
- Feeley, M. M., & Simon, J. (1992). The new penology: Notes on the emerging strategy of corrections and its implications. *Criminology*, 30(4), 449-474. <https://doi.org/10.1111/j.1745-9125.1992.tb01112.x>
- Foucault, M. (1977). *Discipline and Punish: The birth of the prison*. Vintage.
- Foucault, M. (1980). *Power/Knowledge: Selected interviews and other writings, 1972-1977*. Pantheon Books.
- Foucault, M. (1988). *Technologies of the Self: A seminar with Michel Foucault*. Taylor & Francis.
- Foucault, M. (1990). *The history of sexuality: An introduction*. Vintage.
- Foucault, M. (2003). *The essential Foucault: Selections from essential works of Foucault, 1954-1984*.
- Foucault, M. (2007). *Security, territory, population: Lectures at the college de France, 1977-78*. Springer.
- Foucault, M. (2008). *The birth of biopolitics: Lectures at the college de France, 1978-1979*. Springer.
- Foucault, M. (2009). Alternatives to the prison. *Theory, Culture & Society*, 26(6), 12-24. <https://doi.org/10.1177/0263276409353775>
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Aldine Publishing.
- Goldenbeld, C., & Van Schagen, I. (2005). The effects of speed enforcement with mobile radar on speed and accidents. *Accident Analysis & Prevention*, 37(6), 1135-1144. <https://doi.org/10.1016/j.aap.2005.06.011>

- Gordon, C. (1991). Governmental rationality: An Introduction. In G. Burchell, C. Gordon, & P. Miller (Eds.), *The Foucault Effect: Studies in Governmentality* (pp. 1-51). The University of Chicago Press.
- Government of Ontario. (2016). *Signs*. Retrieved April 5, 2022, from <https://www.ontario.ca/document/official-mto-drivers-handbook/signs>
- Government of Ontario. (n.d.). *INFO-GO Employee and organization directory*. <https://www.infogo.gov.on.ca>
- Government of Ontario, *Highway Traffic Act*, R.S.O. 1990, c. H.8. Retrieved September 14, 2022, from <https://www.ontario.ca/laws/statute/90h08>
- Government of Ontario, *Provincial Offences Act*, R.S.O. 1990, c. P.33. Retrieved September 22, 2022, from <https://www.ontario.ca/laws/statute/90p33>
- Government of Ontario, *Transportation Statute Law Amendment Act*, 2005, S.O. 2005, c. 26 - Bill 169. Retrieved September 10, 2022, from <https://www.ontario.ca/laws/statute/s05026>
- Government of Ontario, O. Reg. 398/19: Automated Speed Enforcement, *Highway Traffic Act, R.S.O. 1990, c. H.8*. Retrieved September 6, 2022, from <https://www.ontario.ca/laws/regulation/r19398>
- Government of Ontario, O. Reg. 355/22 Administrative Penalties for Contraventions Detected Using Camera Systems, *Highway Traffic Act, R.S.O. 1990, c. H.8*. Retrieved September 27, 2022, from <https://www.ontario.ca/laws/regulation/220355/v1>
- Government of Ontario, *Safer Schools Act*, 2017, S.O. 2017, c.9 – Bill 65. Retrieved September 10, 2022, from <https://www.ontario.ca/laws/statute/s17009>
- Government of Ontario, O. Reg. 611/06 Administrative Penalties under *City of Toronto Act, 2006, c 11, Sched. A*. Retrieved September 10, 2022, from <https://www.ontario.ca/laws/regulation/060611>
- Green, M., Muir, C., Oxley, J., & Sobhani, A. (2022). Safe system in road safety public policy: A case study from Victoria, Australia. *IATSS Research*, 46(2), 171-180. <https://doi.org/10.1016/j.iatssr.2021.11.006>
- Henley, J. (2023, June 6). Finnish businessman hit with €121,000 speeding fine. *Guardian online*. Retrieved September 7, 2023, from <https://www.theguardian.com/world/2023/jun/06/finnish-businessman-hit-with-121000-speeding-fine>
- International Transport Forum. (2022). *The Safe System Approach in Action*. OECD Publishing. Retrieved September 10, 2022, from https://read.oecd-ilibrary.org/transport/the-safe-system-approach-in-action_ad5d82f0-en#page1
- Joseph, J. (2010). The limits of governmentality: Social theory and the international. *European Journal of International Relations*, 16(2), 223-246. <https://doi.org/10.1177/1354066109346886>
- Kang, J. (2002). Changes of speed and safety by automated speed enforcement systems. *IATSS Research*, 26(2), 38-44. [https://doi.org/10.1016/s0386-1112\(14\)60041-8](https://doi.org/10.1016/s0386-1112(14)60041-8)
- Kim, E., Muennig, P., & Rosen, Z. (2017). Vision zero: A toolkit for road safety in the modern era. *Injury Epidemiology*, 4(1), 1-9. <https://doi.org/10.1186/s40621-016-0098-z>
- Kitchin, R. (2016). From a single line of code to an entire city: Reframing the conceptual terrain of code/space. In R. Kitchin & S. Pong (Eds.), (pp. 15–26). *Code and the city*. Routledge.
- Kitchin, R., Coletta, C., & McArdle, G. (2017, February 9). Urban informatics, governmentality and the logics of urban control. *SocArXiv*. <https://doi.org/10.31235/osf.io/27hz8>
- Kitchin, R., & Dodge, M. (2014). *Code/Space: Software and everyday life*. MIT Press.

- Klauser, F. R., & Albrechtslund, A. (2014). From self-tracking to smart urban infrastructures: Towards an interdisciplinary research agenda on big data. *Surveillance & Society*, *12*(2), 273-286. <https://doi.org/10.24908/ss.v12i2.4605>
- Knapp, K. K. (2011). Reducing crash fatalities on rural roadways. *Transportation Research Record: Journal of the Transportation Research Board*, *2213*(1), 29-36. <https://doi.org/10.3141/2213-05>
- Kristianssen, A., Andersson, R., Belin, M., & Nilsen, P. (2018). Swedish vision zero policies for safety – A comparative policy content analysis. *Safety Science*, *103*, 260-269. <https://doi.org/10.1016/j.ssci.2017.11.005>
- Layton, M. (2021, September 14). *Automated Speed Enforcement Program Expansion* [Council Report]. Retrieved September 17, 2022, from <https://www.toronto.ca/legdocs/mmis/2021/ie/bgrd/backgroundfile-170772.pdf>
- Lemke, T. (2001). 'The birth of bio-politics': Michel Foucault's lecture at the college de France on Neo-liberal governmentality. *Economy and Society*, *30*(2), 190-207. <https://doi.org/10.1080/03085140120042271>
- Los, C. (2014). A danger and a nuisance. *Ontario History*, *106*(2), 143-164. <https://doi.org/10.7202/1050691ar>
- Marshall, W. E. (2018). Understanding international road safety disparities: Why is Australia so much safer than the United States? *Accident Analysis & Prevention*, *111*, 251-265. <https://doi.org/10.1016/j.aap.2017.11.031>
- Marx, L. (1984). On Heidegger's Conception of "Technology" and Its Historical Validity. *The Massachusetts Review*, *25*(4), 638–652.
- McKenna, J. (2018, June 15). In Finland, speeding tickets are linked to your income. Global Governance, World Economic Forum. Retrieved September 7, 2023, from <https://www.weforum.org/agenda/2018/06/in-finland-speeding-tickets-are-linked-to-your-income/>
- McVicar, M. J. (2020). Charts, Indexes, and Files: Surveillance, Information Management, and the Visualization of Subversion in Mainline Protestantism. *Religion and American Culture*, *30*(3), 307-360. <https://doi.org/10.1017/rac.2020.13>
- Miller, P., & Rose, N. (1990). Governing economic life. *Economy and Society*, *19*(1), 1-31. <https://doi.org/10.1080/03085149000000001>
- Ministry of Transportation. (2005). *Ontario Road Safety Annual Report 2005* (pp. 1–103). Retrieved September 14, 2022, from <http://www.mto.gov.on.ca/documents/english/safety/orsar/orsar05/orsar05.pdf>
- Ministry of Transportation. (2019). *Ontario Road Safety* (pp. 1–85). Retrieved September 24, 2022, from https://files.ontario.ca/pdf-2_0/mto-orsar-final-2019-en-pdf-2022-08-09.pdf
- Ministry of Transportation. (2022). *Administrative Monetary Penalties for Vehicle-Based Infractions Captured by Automated Cameras*. Retrieved September 14, 2022, from <https://www.ontariocanada.com/registry/showAttachment.do?postingId=41047&attachmentId=53316>
- Morain, S. R., Gielen, A. C., & Bhalla, K. (2016). Automated speed enforcement systems to reduce traffic-related injuries: Closing the policy implementation gap: Table 1. *Injury Prevention*, *22*(1), 79-83. <https://doi.org/10.1136/injuryprev-2014-041507>

- Mor, N., Sood, H., & Goyal, T. (2020). Application of machine learning technique for prediction of road accidents in Haryana-A novel approach. *Journal of Intelligent & Fuzzy Systems*, 38(5), 6627-6636. <https://doi.org/10.3233/jifs-179742>
- Nielsen. L. (2014). Personas. In M. Soegaard, & R. Friis-Dam (Eds.), *The Encyclopedia of Human-Computer Interaction* (2nd ed., Chapter 30). The Interaction Design Foundation. <https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/personas>
- O'Malley, P. (2010). Simulated Justice: Risk, Money and Telemetric Policing. *British Journal of Criminology*, 50(5), 795-807. <https://doi.org/10.1093/bjc/azq036>
- O'Malley, P. (2011). The currency of freedom. *Social & Legal Studies*, 20(4), 546–556. <https://doi.org/10.1177/1609406917712131>
- O'Neil, C. (2016). *Weapons of Math Destruction: How Big data increases inequality and threatens democracy*. Crown.
- Ontario Court of Justice (n.d.). *Provincial Offences Court Statistics: Part I and Part III charges only*. Retrieved September 4, 2022, from <https://www.ontariocourts.ca/ocj/stats-prov/>
- Oppenheim, A. (1992). *Questionnaire Design, Interviewing and Attitude Measurement*. Pinter Publishers.
- Petryshyn, J. (2000). *Made up to a standard: Thomas Alexander Russell and the Russell motor car company*. GeneralStore PublishingHouse.
- Redflex. (2021). Redflex Traffic Systems. <https://redflex.com>
- Regional Municipality of Durham. (2019, October 2). *The Municipality of Durham Works Committee Agenda*. Retrieved September 10, 2022, from <https://calendar.durham.ca/meetings/Detail/2019-10-02-0930-Works-Committee-Meeting/015e1660-1989-4afa-bd40-aadc00cc0bc9>
- Regional Municipality of Waterloo. (2020, July 15). *Regional Municipality of Waterloo Committee of the Whole Minutes*. Retrieved September 9, 2022, from <https://calendar.regionofwaterloo.ca/Council/Detail/2020-07-15-0900-Special-Committee-of-the-Whole/f55667bf-85d1-4899-9167-ac160110ec0e>
- Rose, N. (1996). The death of the social? re-figuring the territory of government. *Economy and Society*, 25(3), 327-356. <https://doi.org/10.1080/03085149600000018>
- Rose, N. (2000). Government and control. *British Journal of Criminology*, 40(2), 321-339.
- Rose, N. (2001). The politics of life itself. *Theory, Culture & Society*, 18(6), 1-30. <https://doi.org/10.1177/02632760122052020>
- Rose and Miller (1992). Political power beyond the state: Problematics of government. *The British Journal of Sociology*, 43(2), 173-205. <https://doi.org/10.2307/591464>
- Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing & Health*, 23(4), 334-340. [https://doi.org/10.1002/1098-240x\(200008\)23:4<334::aid-nur9>3.0.co;2-g](https://doi.org/10.1002/1098-240x(200008)23:4<334::aid-nur9>3.0.co;2-g)
- Sandelowski, M. (2010). What's in a name? Qualitative description revisited. *Research in Nursing & Health*, 33(1), 77-84. <https://doi.org/10.1002/nur.20362>
- Sandhu, A., & Fussey, P. (2021). The 'uberization of policing'? How police negotiate and operationalise predictive policing technology. *Policing and Society*, 3(1), 1-60. <https://doi.org/10.32920/23656788.v1>

- SickKids. (2020, February 10). *SickKids study finds speed limit reduction made Toronto roads safer for pedestrians*. Retrieved September 13, 2022, from <https://www.sickkids.ca/en/news/archive/2020/sickkids-study-finds-speed-limit-reduction-made-toronto-roads-safer-for-pedestrians/>
- Singichetti, B., Naumann, R. B., Sauber-Schatz, E., Proescholdbell, S., & Marshall, S. W. (2020). Potential injuries and costs averted by increased use of evidence-based behavioral road safety policies in North Carolina. *Traffic Injury Prevention, 21*(8), 545-551. <https://doi.org/10.1080/15389588.2020.1824066>
- Statistics Canada. (2019). *Census Profile, 2016 census – Toronto [Census metropolitan area], Ontario and Ontario [Province]*. Retrieved September 5, 2022, from <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CMACA&Code1=535&Geo2=PR&Code2=35&Data=Count&SearchText=Caledon%20East&SearchType=Begins&SearchPR=01&B1=All>
- Tankasem, P., Satiennam, T., Satiennam, W., & Klungboonkrong, P. (2019). Automated speed control on urban arterial road: An experience from Khon Kaen city, Thailand. *Transportation Research Interdisciplinary Perspectives, 1*, 100032. <https://doi.org/10.1016/j.trip.2019.100032>
- Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation, 27*(2), 237-246. <https://doi.org/10.1177/1098214005283748>
- Tilahun, N. (2022). Safety impact of automated speed camera enforcement: Empirical findings based on Chicago's speed cameras. *Transportation Research Record: Journal of the Transportation Research Board, 2677*(1), 1490-1498. <https://doi.org/10.1177/03611981221104808>
- Toronto Police Service (2019a). *Killed and Seriously Injured (KSI) Data*. [Dataset]. Accessed September 12, 2020, <https://data.torontopolice.on.ca/datasets/TorontoPS::ksi/explore?>
- Toronto Police Service (2019b). *Speeding*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/datasets/TorontoPS::speeding/explore?>
- Toronto Police Service (2019c). *Aggressive Driving*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/datasets/TorontoPS::aggressive-driving/explore?>
- Toronto Police Service (2019d). *Truck*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/pages/truck>
- Toronto Police Service (2019e). *Motorcyclists*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/pages/motorcyclist>
- Toronto Police Service (2019f). *Automobiles*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/pages/automobile>
- Toronto Police Service (2019g). *Cyclists*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/pages/cyclists>
- Toronto Police Service (2019h). *Pedestrians*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/pages/pedestrians>
- Toronto Police Service (2019i). *Fatal collisions*. [Dataset]. Accessed September 12, 2022, <https://data.torontopolice.on.ca/datasets/TorontoPS::fatal-collisions/explore?>
- Toronto Police Service. (n.d.). *Form Centre*. <https://www.tps.ca/services/form-centre/?page=5>
- Toronto Transportation Services (n.d.). *Automated Speed Enforcement Locations* [Dataset]. Accessed September 9, 2022. <https://open.toronto.ca/dataset/automated-speed-enforcement-locations/>

- Toronto Transportation Services (n.d.). *Traffic Volumes at Intersections for All Modes*. [Dataset] Accessed September 8, 2022. <https://open.toronto.ca/dataset/traffic-volumes-at-intersections-for-all-modes/>
- Toronto Transportation Services (n.d.). *Traffic Cameras*. [Dataset]. Accessed September 13, 2022. <https://open.toronto.ca/dataset/traffic-cameras/>
- Toronto Transportation Services (n.d.). *School Safety Zone Watch Your Speed Program – Locations*. [Dataset]. Accessed September 12, 2022. <https://open.toronto.ca/dataset/school-safety-zone-watch-your-speed-program-locations/>
- Toronto Transportation Services (n.d.). *School Safety Zone Watch Your Speed Program – Detailed Speed Counts*. [Dataset]. Accessed September 9, 2022. <https://open.toronto.ca/dataset/school-safety-zone-watch-your-speed-program-detailed-speed-counts/>
- Tremblay, M. (1957). The Key Informant Technique: A Nonethnographic Application, *American Anthropologist*, 59(4), 688-701 <https://doi.org/10.1525/aa.1957.59.4.02a00100>
- Vadiati, N. (2022). Alternatives to smart cities: A call for consideration of grassroots digital urbanism. *Digital Geography and Society*, 3, 1-7. <https://doi.org/10.1016/j.diggeo.2022.100030>
- Van Brakel, R., & De Hert, P. (2011). Policing, surveillance and law in a pre-crime society: Understanding the consequences of technology based strategies. *Surveillance & Society*, 19(2), 228-240. <https://doi.org/10.2139/ssrn.2772469>
- VicRoads. (n.d.). *Safe System Engineering*. <https://www.vicroads.vic.gov.au/business-and-industry/technical-publications/safe-system-engineering>
- Vision Zero Canada. (n.d.). *No more road violence*. <https://visionzero.ca>
- Watkins, C. (2017). Rapid and Rigorous Qualitative Data Analysis: The “RADaR” Technique for Applied Research. *International Journal of Qualitative Methods*, 16(1). 1-9. <https://doi.org/10.1177/1609406917712131>
- Winner, L. (1986). *The Whale and the Reactor: A search for limits in an age of high technology*. University of Chicago Press.
- York Region. (2018). *Automated Speed Enforcement Update*. Retrieved September 10, 2022, from <https://www.york.ca/media/54926/download>
- York Region (2020, November 5). *Minutes: Committee of the Whole*. Retrieved June 18, 2023, from <https://yorkpublishing.escribemeetings.com/Meeting.aspx?Id=7edf8d3c-3494-4f29-9f3e-1a243749b75a&Agenda=PostMinutes&lang=English>
- Zedner, L. (2003). Too much security? *International Journal of the Sociology of Law*, 31(3), 155-184. <https://doi.org/10.1016/j.ijsl.2003.09.002>
- Zedner, L. (2007). Pre-crime and Post-Criminology? *Theoretical Criminology*, 11(2), 261-281. <https://doi.org/10.1177/1362480607075851>

Appendix 1: Spreadsheet and Data Availability

Copies of both the spreadsheets developed by the author and the data that support the study findings are available from the author, Zeina Abouchacra, z.chac03@gmail.com, upon reasonable request.

Appendix 2: Interview Protocol

1. The City of Toronto has implemented several transportation-related safety interventions and programs aimed at eliminating fatalities and serious injuries (e.g., Vision Zero Road Safety Plan, the Watch Your Speed Program, and School Safety Zones mapping). With all these programs in place, what do ASE installations bring to these types of initiatives?
2. The concept of risk is at the core of traffic safety. It helps inform infrastructure, enforcement, and engineering of roads. In your opinion, how does the mediation of risk factor into the development and deployment of ASE installations and related traffic management infrastructures? Is risk-mediation *the* principal consideration? What are some of the others that are at play?
3. Having investigated ASE for a year now, I've come to understand that these installations have both risk-mediation and economic components— e.g., desire to keep pedestrians safe, the costs associated with installing and maintaining such technology, and presumably the revenue that is generated through ASE. Please can you elaborate on how safety considerations, operating costs, and revenue generation factor into the operation and deployment of ASE.
4. Many of the ASE policy documents I've read state that the objective for ASE is to “decrease speeding and increase safety.” I'd like to hear more about how the city goes about assessing whether ASE helps and/or is meeting this objective? How is the effectiveness of decreasing speed and increasing safety measured? Is there regular monitoring and evaluation of this? Some other assessment mechanism?

Possible follow-up if no M&E: Can you please comment on how this objective is put into practice?

5. I understand that selecting sites for ASE installations is a two-staged process with the first step consisting of a screening of all Community Safety Zones near schools. When I was looking at the public data, such as [as vision zero safety zones mapping](#), I found that all but 24 ASE installations are in Community Safety Zones. Derrydown Rd. Southbound North of Catford Rd and Gateway Blvd. Eastbound Near 10 Gateway Blvd, for example, are not part of any safety zone mappings and no one has been killed or seriously injured at these intersections. Nonetheless, they are sites with ASE installations. Do you know why is it that the 24 sites are the hosts of ASE installations even though they seemingly fall outside of the selection criteria?
6. I know that, at a basic level, ASE installations use a camera and a speed measurement device to detect and capture images of vehicles travelling in excess of the posted speed limit. These images are then reviewed by Provincial Offence Officers and then tickets are issued to the owner of the vehicle. Please can you walk me through the underlying technical processes at play. How is the data captured by ASE cameras, transformed, analyzed, stored, shared, and, ultimately, acted upon by different authorities (e.g., City of Toronto, Provincial government, etc.).

7. Much of the ASE documentation, along with the City of Toronto ASE website itself, specifies that ASE “locations are selected through a data-driven approach that considers speed and collision data.” In these materials I’ve not been able to find any specification of what exactly ‘data-driven’ means in the ASE context. Presumably, artificial intelligence, predictive analytics, and proportionality tests are all constituent elements of this data driven approach. Can you please tell me what a ‘data-driven approach’ means to you and how this is manifest in ASE infrastructures.
 8. Keeping in mind what you’ve just said about the ‘data-driven approach’ and ASE, how do considerations of risk-mediation factor into the equation? What’s the connection, as you see it, between data driven approaches and risk reduction.
 9. Looking at several documents and interactive maps published by the City of Toronto and the Toronto Police Service, there appears to be some overlap and, perhaps even convergence, between these two entities in terms of traffic data they make publicly available. Can you please elaborate on the nature of the relationship between the City of Toronto and the Toronto Police Service in this particular context.?
- **Potential follow up question:** Does any of the data gathered by the Toronto Police Service play a role with how the City of Toronto deploys and uses ASE installations?

Appendix 3: Consent form



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Project Title: *Automated Speed Enforcement in the City of Toronto:
Governmentality in Action*

MA Candidate: Zeina Abouchacra
Department of Communication

Supervisor: Dr. Daniel J. Paré
Department of Communication

Purpose of the Study: The purpose of this study is to examine how Automated Speed Enforcement (ASE) is used in combination with community safety programs behaviour in the City of Toronto to influence driving. The research project involves two components: (i) a desk-based analysis of publicly available Automated Speed Enforcement related open data sets published by the City of Toronto and the Toronto Police Service; and (ii) semi-structured interviews with some 15-20 key informants who possess relevant subject matter expertise.

My participation consists of engaging in a semi-structured interview of approximately 45-60 minutes in duration. I will be asked about Automated Speed Enforcement,

transportation planning, community safety programs, as well as more focused issues based on my area of subject matter expertise. I am aware that the interviews will be audio and video recorded. Following this interview, I will be provided a transcript of the discussion and asked to review it for accuracy, and to provide additional comments or feedback. The data provided will be kept confidential and anonymous as per the conditions specified below.

Risks: I understand that my participation in this study as a key informant interviewee entails minimal risks and confirm that the information I provide is being disclosed on a voluntary basis.

Confidentiality and Anonymity: I understand that any information I share will be, and will remain, anonymized, and that it only will be used in relation to Zeina Abouchacra's M.A. Thesis and any subsequent publications emerging from this work. I also am aware that only Zeina Abouchacra and her dissertation supervisor will have access to any information I disclose, and that my anonymity will be protected throughout all stages of the project by the removing any identifying characteristics from both the information I provide and its analysis.

Conservation of Data: The interview materials, including any audio recordings of the interview, electronic and print versions of the transcripts, and electronic and print notes will be conserved by Zeina Abouchacra for a period of five years in a secure manner using a password-protected USB drive. Both the drive and the printed materials will be stored in a locked cabinet in Zeina Abouchacra's private home office. Only Zeina Abouchacra and Prof. Daniel J. Paré will have access to the interview materials.

Voluntary Participation: I am under no obligation to participate in this audio & video-recorded interview to reflect the current study and can withdraw from the study at any time and/or refuse to answer any questions without suffering any negative consequences. If I choose to withdraw, all information pertaining to the interview will be deleted and/or destroyed.

Please specify if you would like to remain anonymous or your name to appear in the research

Anonymous

Real Name

I, (*please print name*) _____, agree to participate in the above research study and to maintain the confidentiality of the information discussed during the interview meeting(s) with Zeina Abouchacra. I have been assured by Zeina Abouchacra that I will not be asked to disclose or otherwise share confidential information.

If I have any questions about the study, I may contact either Zeina Abouchacra MA or Prof. Daniel J. Paré.

If I have any questions regarding the ethical conduct of this study, I may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5. Tel.: 613-562-5387 Email: ethics@uottawa.ca

I have shared a signed copy of this consent form with Zeina Abouchacra and have retained a signed copy for my records.

Participant's signature:

Date:

Principal Investigator's signature:

Date:

Appendix 4: uOttawa Ethics Clearance Certificate

05/02/2022

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	S-01-22-7802
Titre du projet / Project Title	Automated Speed Enforcement Technology and Governmentality
Type de projet / Project Type	Thèse de maîtrise / Master's thesis
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	05/02/2022
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	04/02/2023

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Zeina ABOUCHACRA	Département de communication / Department of Communication	Chercheur Principal / Principal Investigator
Daniel PARÉ	Département de communication / Department of Communication	Superviseur / Supervisor

Conditions spéciales ou commentaires / Special conditions or comments

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