

transportation tomorrow

SURVEY 2022

Design and Conduct of the Survey

October 2024



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SURVEY 2022

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FURTHER INFORMATION

The Transportation Tomorrow Survey (TTS) is part of an ongoing data collection program by the Transportation Information Steering Committee (TISC). The survey data (2022, 2016, 2011, 2006, 2001, 1996, 1991 and 1986) are currently under the care of the Data Management Group (DMG). This group is responsible for maintaining the TTS databases and making available appropriate travel information for any urban transportation study in the area. Requests for information from the TTS, or enquiries related to the contents of this report, should be directed to the address below.

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- County of Simcoe
- County of Wellington
- Metrolinx
- Ontario Ministry of Transportation
- Regional Municipality of Durham
- Regional Municipality of Halton
- Regional Municipality of Niagara
- Regional Municipality of Peel
- Regional Municipality of Waterloo
- Regional Municipality of York
- Toronto Transit Commission (TTC)
- Town of Orangeville
- Town of the Blue Mountains

Transportation Information Steering Committee (TISC) participated in planning and directing the 2022 TTS. The committee also has conducted the previous TTS studies since 1986. The agencies with representatives on the TISC steering committee were:

- City of Hamilton
- City of Toronto
- Metrolinx
- Ontario Ministry of Transportation

- Regional Municipality of Durham
- Regional Municipality of Halton
- Regional Municipality of Peel
- Regional Municipality of York
- Toronto Transit Commission (TTC)

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- Susanna Choy
- Reuben Briggs

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- Andreas Rose (Senior Technical Manager)
- Dr. Heather Woods-Fry (Project Manager)
- Robert Malatest (Advisor)

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- Steacy Henry Triptelligence Visual Review Coordinator
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- Mitchell Artz Data Analyst

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This report was prepared for the Transportation Information Steering Committee by Malatest. Malatest recognizes and appreciates all the support and cooperation from the TISC committee throughout the project.

More than 270 interview and coding staff contributed and played a fundamental role in the success of the data collection and verification process of the 2022 Transportation Tomorrow Survey. Their work and dedication is greatly appreciated.

1. INTRODUCTION

The Transportation Tomorrow Survey (TTS) is a confidential and voluntary travel survey on how Ontarians in the Greater Golden Horseshoe and surrounding areas (GGHA) use the transportation system. The data collected helps local and regional governments, as well as the province and transit agencies, make transportation planning and investment decisions. The 2022 TTS is one of the largest and most comprehensive travel surveys in North America, and the eighth in a series of surveys conducted every five years since 1986.

The TTS was planned to occur in the year 2021, however due to the onset of the COVID-19 pandemic in March of 2020, daily travel patterns once considered typical shifted significantly. Consequently, the TTS was conducted in two phases, Phase 1 in the Fall of 2022 and Phase 2 in the Spring of 2023. The goal for the 2022 TTS was to complete 181,514 surveys, via telephone and online. The number of full survey completions with trip information prior to data cleaning was 162,758, while the number of supplementary survey completions with completed household and person information but incomplete trip information was 33,103. Surveys failing validation tests were discarded, yielding a final dataset of 158,662 surveys with full trip information, and 27,429 with household and person information, or a total of 186,091 surveys delivered. It may be noted that the 158,662 surveys with trip information are those that will be relied on for analyses of travel patterns and transportation modelling.

R.A. Malatest & Associates Ltd. (Malatest) was retained by the Ministry of Transportation of Ontario (MTO) to conduct the 2022 Transportation Tomorrow Survey. The 2022 cycle of the survey was undertaken with the cooperation of the Transportation Information Steering Committee (TISC), the TTS Technical Advisory Committee (TAC) composed of selected TISC representatives, and the Data Management Group (DMG) from the University of Toronto.

In the 2016 TTS, data collection was split between using the University of Toronto DDE system (phone surveys) and Malatest's Triptelligence platform (online surveys). Due to the inability of the DDE software to be programmed in French, a decision was made to use a single bilingual platform for the 2022 study. In the TTS 2022, Triptelligence was used for both online and phone surveys, as the platform had the capabilities to collect data in both English and French. Other benefits to adopting Triptelligence as the sole platform included the ability to fully integrate telephone and online surveying into one platform, meaning that respondents had the ability to self-complete online, be guided through the survey by a trained interviewer, or use a mix of the two modes. The Triptelligence platform also included graphical map functions that allowed online respondents as well as telephone agents to pinpoint locations using Google map functions.

There were several key changes in the 2022 TTS, including:

- Trip capture from those 5+ years of age (compared to the 2016 TTS where trips were captured from those aged 11+ years)
- Inclusion of walking trips with a trip purpose (while continuing to exclude recreational walk trips)
- Addition of a gender diverse category;

- Expanded occupation types (from 4 categories to 12);
- Expanded household income ranges (from 4 to 10);
- Expanded trip purpose categories (from 8 to 17);
- Capture weekday travel pattern to work; and,
- Addition of new equity questions (i.e., immigration status, ethnic origin).

The purpose of this report is to provide an overview of the design and conduct of the 2022 TTS, including the planning and design of the survey, the technical and human resource needs, the survey conduct, and the geocoding and post-processing activities.

Readers are referred to the 2022 TTS: Data Guide and the 2022 TTS: Data Expansion and Validation report for additional detail on the content of the survey data file and the data processing methods used to expand and weight the survey data to better represent the surveyed population. These reports include further detail on differences between the 2022 TTS and previous survey cycles with respect to survey content, data definitions, survey samples, and data expansion methods.

1.1 Project Scope

The purpose of this project was to collect comprehensive data on trip patterns and choices made by Ontarians living in the Greater Golden Horseshoe (GGH) and surrounding areas. Malatest conducted the data collection, arranged office space, recruited project staff, and provided all of the equipment required to carry out the project, including the telephone and online survey software.

The major requirements of this project were to:

- Plan the data collection, including procuring the sampling frame and developing a sampling plan for the survey;
- Set up meetings with the Technical Advisory Committee (TAC) and the Transportation Information Steering Committee (TISC) and provide regular updates on the progress of the survey;
- Complete the travel data collection via telephone and online surveys;
- Check and geocode all geographic locations collected;
- Validate, correct and expand data to create a final database; and
- Provide reports, documentation, and materials related to the project and data.

Malatest conducted the telephone and online survey through their Triptelligence platform. A sample (n=1,956,879) of randomly selected households were sent an invitation letter that invited them to participate in the survey and included survey access information; i.e., a toll-free telephone number, and a link to access the survey online. Households with addresses that could be matched to a listed telephone number received a similar invitation letter but could also be followed up by telephone to conduct the survey via telephone interview.

Data from the regions listed below were combined into a single database that would serve as the Ministry's primary source of travel data and included data from the following regions:

In the GTHA:

- City of Hamilton
- City of Toronto
- Durham Region
- Halton Region
- Peel Region
- York Region

Non-GTHA regions:

- Brant County
- City of Barrie
- City of Brantford
- City of Guelph
- City of Kawartha Lakes
- City of Orillia
- City of Peterborough
- Dufferin County
- Grey County (new)
- Niagara Region
- Northumberland County (new)
- Peterborough County (partial)
- Simcoe County
- Town of Orangeville
- Town of The Blue Mountains (new)
- Waterloo Region
- Wellington County (partial)

1.2 Background

The TTS was jointly undertaken by 25 funding agencies including the MTO, Metrolinx, the TTC, and municipalities across the Greater Golden Horseshoe (GGH) and surrounding areas. Earlier in 2020, MTO retained Malatest to conduct the 2022 TTS. Malatest also conducted the 2016 TTS. The TTS collected three categories of information: household data (e.g., number of members in the household), demographics (e.g., employment status, age), and trip data (e.g., method of transportation, origin, destination).

Historically, the TTS has been conducted every 5 years since 1986. Data collection for previous TTS cycles has typically been conducted across two phases of data collection, with the exception of 2016.¹ The TTS has had targeted uniform sampling rates across the entire study area, with the exception of 1991.² The geographic area surveyed has expanded progressively since the outset of the first TTS.

¹ The 1996, 2001, 2006, and 2011 surveys were all conducted in two phases. The 2016 survey was completed over the course of one phase.

² The 1991 TTS employed a stratified sample, with a completion target of 4.5% in high growth areas and 0.5% in low growth areas.

Readers are referred to the 2022 TTS: Data Guide for more detail on differences between the survey cycles in terms of sampling approaches, data definitions, and survey methods.

1.3 Overview of the Survey Approach

The first 2022 TTS mailout occurred on September 9, 2022 and the survey closed on July 28, 2023. Approximately 5.1% of the total households in the survey area participated in the 2022 TTS study and provided household and demographic information, while approximately 4.4% also provided valid trip information.

Households that received a survey invitation letter in the mail could complete the survey online with respect to their previous weekday travel using their secure access code through a website developed and hosted by Malatest. Those using the survey website also had access to Frequently Asked Questions (FAQs), information about the survey partners, and telephone and email contact information for additional questions or support completing the survey. They could also call the toll-free number during staffed hours and complete the survey over the phone with a professional interviewer. Households that had listed landlines would have received a call from Tuesday until Saturday, with respect to previous weekday travel. Some surveys were completed during the day with daytime staff as they were available to accept inbound calls from respondents who called in with questions or to complete the survey. However, the majority of surveys were completed in the evening hours. Having the call centre staffed Sunday to Saturday helped to maximize productivity. In addition, call centre agents could complete the survey with respondents in a variety of second languages in addition to English or French. All surveying activities and related materials (invitation letter, survey instrument, FAQ) were in full compliance with the French Language Services Act requirements.

Near the end of the second survey phase, the survey was opened to the public on May 18, 2023 in efforts to increase the number of survey completions, particularly in harder to reach geographies such as Brampton, Oshawa, and some planning districts in the City of Toronto (PD 3, PD 9, PD 10, and PD13). This also gave an opportunity to those interested in completing the survey that were not part of our random sample. Interested residents of the GGHA and surrounding areas were instructed to visit the survey website to generate a secure access code and log in to complete their survey. Malatest consistently monitored these submissions to ensure that the survey data did not display any patterns representing biases from special interest groups, and had internal data checks to flag any households that had been completed as part of the regular sample and again through the open link to the survey. A total of 628 surveys were obtained through this process.

The survey asked participants questions about their household, their demographic profile, and about all the trips made on the previous weekday by each person five years of age and older in their household. This included asking the participants the mode of transportation used to get to and from their destination(s) on a given day (i.e., whether they drove or were a passenger in a vehicle, used a motorcycle, taxi, walked, biked, used transit, a school bus, etc.).

Prior to cleaning, 19,100 (11.7%) of the full survey completes (those that completed to the end of the trip capture section) were conducted via telephone and 143,635 (88.3%) were completed

online. Telephone completion was lower than initial expectations, possibly due to the impact of respondent's increasing wariness of unknown callers and anti-spam call-blocking tools utilized by major Canadian telecommunication companies.

As previously mentioned, the household sample included both households with a listed landline number as well as households for which a corresponding landline number was not available. These two groups are referred to as the 'address-and-phone sample' (i.e., a telephone number existed for the home) and the 'address-only' sample (i.e., only the address was available). In terms of survey completions by survey method and sample type, the majority of telephone surveys (14,143 prior to data validation) were completed with the address-and-phone sample, while 4,955 were completed with address-only sample, the latter of which were either call-ins to the toll-free number or phone follow-ups to partially completed online surveys. It should be noted the use of Random Digit Dialing (RDD) was not used as it was demonstrated in the 2016 TTS that such methods had poor response and was not an efficient process to collect household travel information.

The online survey completions were largely associated with the address-only sample type, with 93,836 online completes prior to data cleaning, although this mode was also popular with the address-and-phone sample, with 49,171 online completes. A small number of surveys (628) was completed with those who were not included in any of the samples but who accessed the website via the open link and generated a secure access code to complete the survey ('volunteer sample'), with two of these having been started online but completed by phone.

The following sections of this report provide more detail on various aspects of the planning, design and execution of this survey.

2. PLANNING AND DESIGN

Malatest led the 2022 TTS planning, implementation, analysis and reporting supported by the guidance and oversight of the TAC. The planning and design of the TTS retained many of the key elements from previous cycles.

This section details survey design and survey instrument, the survey study area, the sampling methodology, the different sample types, and the communication strategies used in the administration of the 2022 cycle of the TTS survey.

2.1 Survey Design and Survey Instrument

In 2016, data collection was split between using the DMG's DDE system (for phone surveys) and Malatest's Triptelligence platform (for online surveys). For the 2022 TTS, Triptelligence was used for both online and phone surveys. Triptelligence is an integrated CATI/CAWI system tailored to Origin-Destination surveys, allowing for several programming enhancements compared to the 2016 online survey, these included:

- Refinements to the embedded maps;
- Refinements to survey navigation;
- Ability to host the survey in both English and French;
- Refinements to built-in validation tests; and
- Use of general transit feed specification data to validate transit trips.

One major change to the survey design of the 2022 TTS was the collection of trip data from those 5+ years of age instead of those aged 11 years or older. Another significant change was made to trip definition, updated in the TTS 2022 to include walking trips for non work/school purposes (while continuing to exclude recreational walk trips).

The 2022 TTS instrument remained largely the same as in prior cycles to facilitate tracking and comparability. New elements to the 2022 TTS instrument included additional categories to pre-existing questions, as well as several new questions in response to the informational needs of the TAC. Table 1 details the type of information collected via questions asked in the 2022 TTS.

Table 1. Information collected through the 2022 TTS

Household	Demographic/Person	Trips (Persons 5+ years of age)
<ul style="list-style-type: none"> • Informed consent • Receipt of survey notification letter (phone only) • Confirm address (geocode home XY coordinates) • Travel day surveyed (date and day of week) • Dwelling type • Household size (number of persons) • Number of vehicles available (including company vehicles) • Household income (six new categories in 2022 & broader income range if refused) • Participation in future research (online respondents) • 	<ul style="list-style-type: none"> • Gender (addition of gender diverse, prefer to self-describe in 2022) • Age (or age range if exact age refused) • Driver’s licence • Transit pass • Employment status (full or part time) • Workplace location • Type of occupation (eight new categories in 2022) • Availability of free parking at work • Weekday travel to work (new question in 2022 for those with usual workplace outside the home) • Student status (full or part time) • School name/location • Made any trips between 4:00 a.m. and 3:59 a.m. on travel date • Ethnic origin (new in 2022) • Immigration (new in 2022) 	<ul style="list-style-type: none"> • Origin of first trip (geocode origin XY coordinates) • Destination location of all trips (geocode destination XY coordinates) • Primary mode of travel (new e-mobility category in 2022) • Trip departure time • Trip purpose (nine new categories in 2022) • Transit mode access (if transit taken) • Transit route(s) (if transit taken) (i.e., transit system and route name or number) • Transit boarding and alighting stations (if transit used TTC Subway or GO Train/Up express) • Transit egress mode (if transit taken) • Number of vehicle occupants (if auto driver) • Use of Hwy 407 (if auto driver and appropriate O-D combination)

2.1.1 Changes to the survey instrument

New categories to pre-existing questions as well as several new questions were added to the 2022 TTS. Specifically, additional categories were added to the household income question to ensure household income was captured at a more granular level. For those respondents not comfortable providing such detail, a follow-up question was asked to determine whether household income was above or below a certain threshold using more broad categories of income ranges. Also new to the 2022 TTS were two questions asking respondents to report their ethnic origin and how recently household members had immigrated to Canada, if not a Canadian citizen at birth. These questions were developed based on the TAC's needs, applying best practices for collecting these types of information. The goal was to help the TAC better understand the transportation needs and travel patterns of equitable access to transportation for all population groups. Given the impact of COVID-19 on travel, the TAC also wanted to understand respondents' commuting patterns. Collecting weekday travel to work for those with a usual workplace outside the home provided the TAC with information on the frequency and patterns of commuting. Additional updates to the 2022 TTS were the addition of a 'gender diverse' category, the addition of eight new occupation type categories, a new e-mobility category for mode of travel, and nine new trip purpose categories.

2.1.2 Data validation questions

Validation questions were included for quality control purposes to improve the quality of online responses. These additional questions were not used for analysis of the TTS data, and are not included in the final dataset. Nonetheless, the validation questions were useful to confirm the following details regarding survey responses:

- Confirmation of whether the main respondent was answering for another household member, or whether another household member completed their own answers;
- Confirmation of the reason if a household member was reported as not having taken any trips;
- Confirmation of the reason if the first origin of the day was not home;
- Confirmation that a household member was at their last reported location until the end of the travel day (i.e., 3:59 a.m.) if their last destination of the day was not home;
- Confirmation of mode of travel if a household member was reported as the auto driver for a trip but indicated that they do not hold a valid driver's licence;
- Confirmation of mode of travel if a household member was reported as the auto driver for a trip but indicated that no one in the household owned a vehicle;
- Confirmation of whether a household member worked from home if they were reported as employed, with their primary work location being outside their home, but they did not take any trips with work as a purpose or a destination; and
- Confirmation of whether a household member attended school if they were reported as being a student, at a school location outside their home, but they did not take any trips with school as a purpose or a destination.

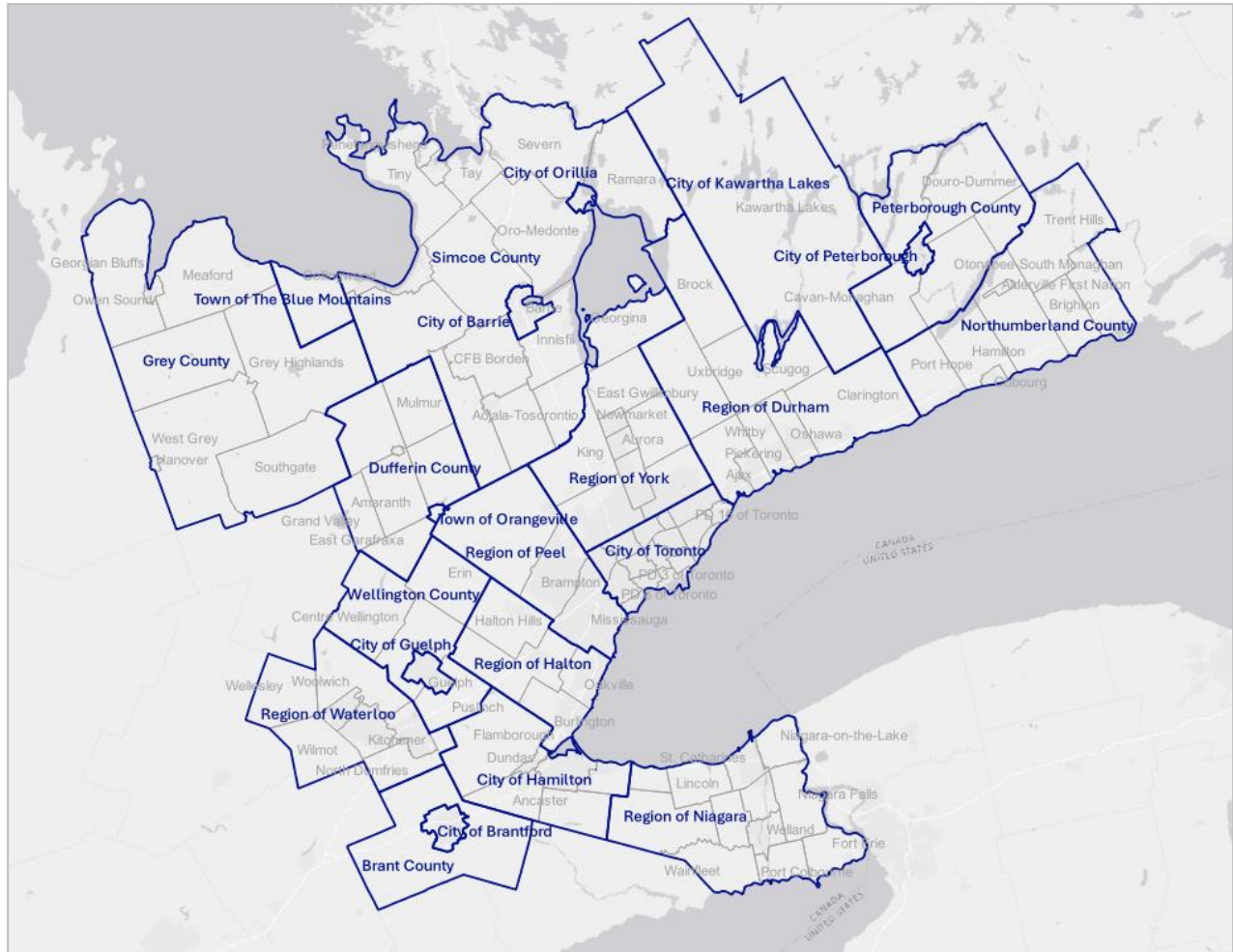
As a reminder to respondents, the definition of a valid trip was noted in the main survey introduction page, within the introductory section to recording trips, and was available as a pop-up window feature on every page of the survey that included questions about householder trips. The TTS trip definition changed in 2022, with the addition of non work/school related walking trips (while continuing to exclude recreational walk trips). The 2022 TTS trip definition is noted below.

A trip is a one-way journey from one location to another for a single main purpose. A single trip may include more than one mode of travel, such as car and transit (Kiss & Ride or Park & Ride). The TTS trip definition does not include incidental stops along the way (such as stopping at dry cleaners on the way to work); does not include round trips for leisure/exercise (such as going for a jog or bicycle ride around the block).

2.2 Survey Area

The TTS study area included partner municipalities across the Greater Golden Horseshoe (GGH) and surrounding areas, as well as the municipality of Kawartha Lakes. New to the TTS study areas in 2022 were Northumberland County, Grey County, and The Town of the Blue Mountains. The goal of the TTS study was to complete surveys with a representative random sample made up of 5% of households within the study area, except for Kawartha Lakes, which was to be sampled at 2.5%. The following image (Figure 1) displays the study area for the 2022 TTS and shows all geographies where households were sampled to obtain a balanced and representative distribution of the population covering the study area.

Figure 1. Geography of the 2022 TTS



2.3 Sampling Methodology

With the continued decline in the number of households that have a listed telephone landline and in recognition of the increasing number of cell phone only households, Malatest continued to implement address-based sampling to ensure that the data set would be more representative than previous methodologies. For address-based sampling, addresses were drawn from a Canada Post database of all mailable addresses in the study area, including both households with landlines and households without. The portion of the addresses that could be matched to listed phone numbers were retained to form the address-and-phone sample, and households without a listed landline formed the address-only sample. The final sampling plan included a mixed sampling approach involving address-and-phone and address-only records. This approach was deemed to be the optimal means of maximizing the representativeness of the final dataset.

Survey access and completion methods for the two sample types are outlined below:

- Address-and-phone: Received a notification letter. Households could complete the survey online, by telephoning the call centre using the toll-free number, or waiting until they received a call from the centre to complete the survey over the phone.
- Address-only: Received a notification letter. Households could complete the survey online or by telephoning the call centre using the toll-free number. These individuals did not receive calls as there was no telephone number associated with their address.
- Volunteers: These were individuals who heard about the 2022 TTS study but were not initially selected through the random sample. These households could participate by contacting Malatest or accessing the survey website and requesting a secure access code.³ From a public relations perspective, it was not desirable to turn people away who were interested in participating. These surveys account for only 628 households⁴ across the entire study area, and should have no appreciable impact on the overall survey results.

The address-and-phone and address-only samples were purchased from Canada Post. The information available for each address-and-phone listing included, name, phone number, street address, unit, municipality, postal code and dwelling type. Similar information was available for the address-only households, with the exception of phone number.

2.4 Survey Invitation Letter

A survey invitation letter was sent to the randomly selected households in the study area. This letter served as an introduction to the study, highlighted the objectives of the study and outlined the types of survey questions and the privacy policies associated with the collection of this information. The project toll-free number and email address were provided, along with a secure access code and instructions on how to complete the survey by phone or online.

The letter was printed on official letterhead, with signatures from either the Deputy Minister or Director of the Ministry of Transportation Ontario and included the partner agency logos.⁵ All letters were addressed to 'Resident' rather than the name associated with the address because it was understood the name associated with the address could be incorrect. Envelopes bore the Ontario logo, the title of the Ministry of Transportation, and the return address of the call centre. All materials in the survey invitation letter were provided in both official languages.

The invitation letter for the address-and-phone sample and the address-only sample differed slightly, with the main difference being the statement in the letter for the address-and-phone sample noting that the respondent may receive a call to complete the survey over the phone. Letters sent to households in the GTHA and external-GTHA municipalities were differentiated only by the logos included on the bottom of the letter. See Appendix A for examples of the advance letter.

³ The survey was opened to the general public in the Spring data collection phase on May 18, 2023.

⁴ After validation, 605 volunteer surveys were included in the final dataset.

⁵ Several changes were made to the survey invitation letter across the data collection period to stimulate participation. More information on these changes can be found in the 2022 TTS: Challenges and Lesson Learned report.

In Spring 2023, an informational brochure was incorporated into the mailing packages along with the survey invitation letter to help boost response rates (See Appendix B for the informational brochure).

2.5 Communication Strategies

Malatest prepared a communication strategy outlining the recommended steps and methods to circulate information about the 2022 TTS (See Appendix C). The strategy included a comprehensive package of communication materials to assist partners with the promotion of the TTS. The package included the following:

- 2022 TTS Fact Sheet (see Appendix D);
- 2022 TTS Frequently Asked Questions (see Appendix E);
- 2022 TTS Launch Opinion Article (see Appendix F);
- 2022 TTS Press Release (see Appendix G);
- 2022 TTS posters in portrait and landscape orientation along with the individual design elements allowing partners to adapt the posters to their needs (see Appendix H); and
- Survey invitation letters and informational brochure.

The package was circulated to all partners for their use, in whole or in part, at their discretion. The target audience for this information was City Councils, Transit and Transportation officials, transportation advocacy groups and advisory committees, municipal client service centres and front-line call centre staff, police, and other government groups.

2.5.1 TTS website

A dedicated website for the survey was established by Malatest.⁶ The website, which was bilingual in both English and French, contained extensive information about the study and served as a portal to log-in and complete the survey online. The website had seven main sections listed below:

- Home
- About
- FAQ
- Survey Questions
- Participants
- Agencies
- Privacy Statement

2.5.2 Municipal websites

The TTS was featured on MTO's website. The participating agencies were also invited to feature the TTS on their official websites using any of the promotional material provided to them. Featuring the TTS on other websites increased the promotion of the survey and assisted in legitimizing the study in the eyes of the public.

⁶ During the Fall 2022 data collection phase, the website was www.TTS2022.ca and the Spring 2023 phase was www.TTS2023.ca. Note that during the Spring phase, the www.TTS2022.ca website redirected to the www.TTS2023.ca website.

2.5.3 Earned media

The following items were provided to partnering agencies for distribution to media outlets:

- Press release: A press release template was provided to partners that outlined the background and purpose of the TTS and included information about how residents may be randomly selected to participate.
- Op-ed articles: An article for publication in community papers, school papers, councillor’s columns and websites, and other newsletters was provided for use. The op-ed outlined the background and purpose of the TTS and encouraged those who had been randomly selected to participate in the survey.

2.5.4 Social media

Malatest established a project specific Twitter account to promote the study. This account also served as a form of communication, allowing Malatest to address any questions or complaints about the 2022 TTS from members of the public. MTO did not post any tweets about the 2022 TTS, however partner agencies were encouraged to promote the study through their existing social media accounts (i.e., Facebook, Twitter, Instagram), as well as other platforms such as e-newsletter lists. In addition to the twitter account, Malatest established a dedicated email address and toll-free numbers for residents who had questions or concerns about the survey. MTO Info also fielded questions from the public regarding the survey.

2.5.5 Communication activities undertaken by survey partner agencies

A variety of communication activities were undertaken by various partner agencies to promote participation in the 2022 TTS. These activities are outlined in Table 2 below.

Table 2. Communications activities undertaken by partner agencies

Activity	Partnering agencies (25)
2022 TTS content on partner agency website	6
Social Media	
Twitter	6
Facebook/Instagram	7
Snapchat	1
LinkedIn	3
Advertisements	
Public transit vehicles	2
Public transit stops/station	2
Other public transit	-
Road signs	-
Online or Radio advertisements	2
Billboards	3

Activity	Partnering agencies (25)
Transit Alerts	1
News	
Local paper	3
News release/ op-ed article	9
Newsletter	1
Blog post	1
Public service announcement	1
Communication to internal or external stakeholder groups	4

3. CALL CENTRE

The call centre was set up for the purpose of completing the 2022 TTS. The call centre could accommodate approximately 100 workstations. Each station was equipped for their respective purpose, whether that be surveying, geocoding, administrative, supervisory, or managerial tasks. The floor layout was organized into four distinct areas; one area for surveying, one area for coding, one area for management and the other area for administration. Surveyors were seated in cubicles with sound dampening dividers in between to reduce noise levels to the lowest extent possible. Supervisors were seated at stations with low cubicle walls to allow for visual monitoring of the floor so that they could quickly assist surveyors during calls.

3.1 Location

Starting in May 2022, the lease for the call centre was signed for the office space located at 1243 Islington Avenue, suite 200, Toronto, Ontario, M8V 1Y9. This location was selected due to its ability to accommodate the required number of staff, while maintaining safe social distance protocols in place during the COVID-19 pandemic. The location was highly accessible by those living in the Greater Toronto Area, situated 100 metres from the Islington subway station.

3.2 Equipment

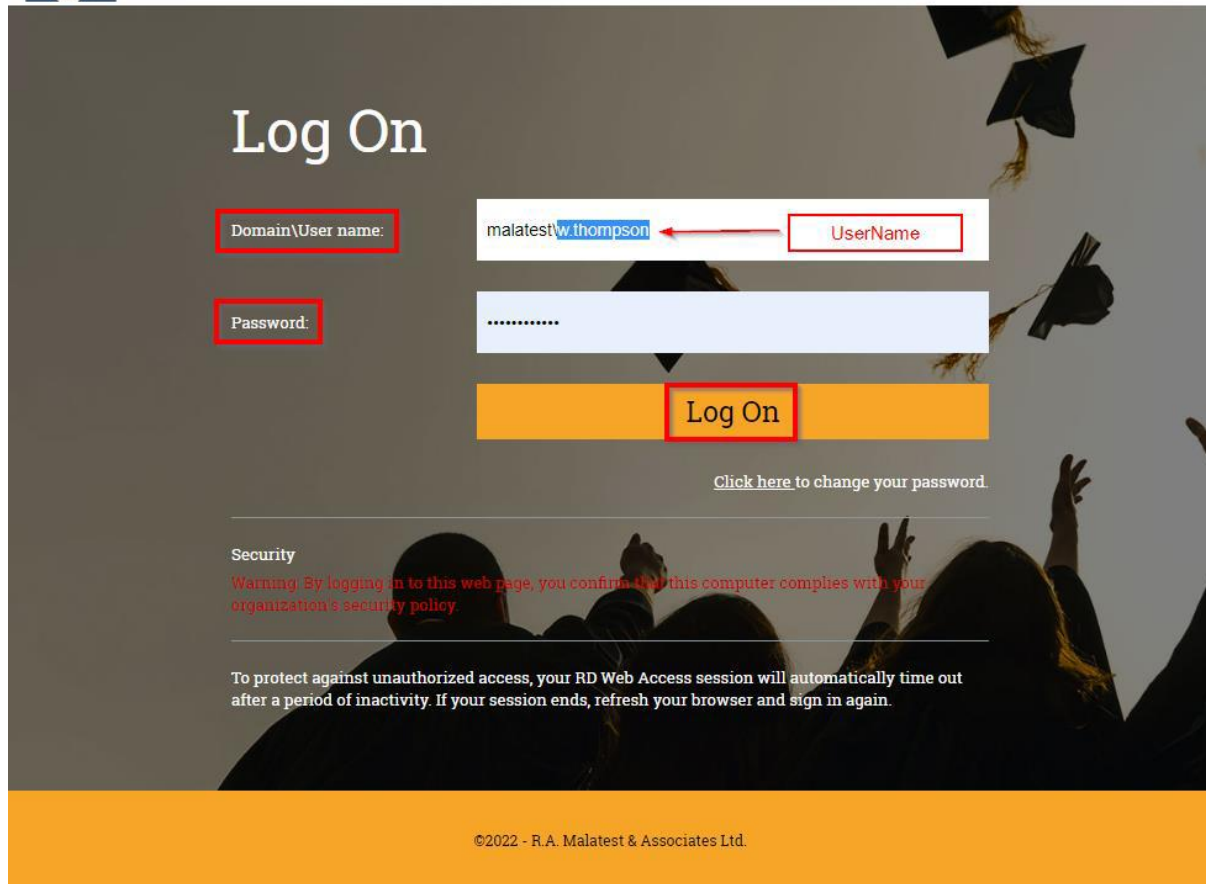
During the set-up of the call centre space, a significant amount of time and energy was dedicated to purchasing and installing the equipment required for the successful execution of the study. The necessary steps were taken to ensure internet and phone connections were reliable, uninterrupted, and secure.

3.2.1 Computers

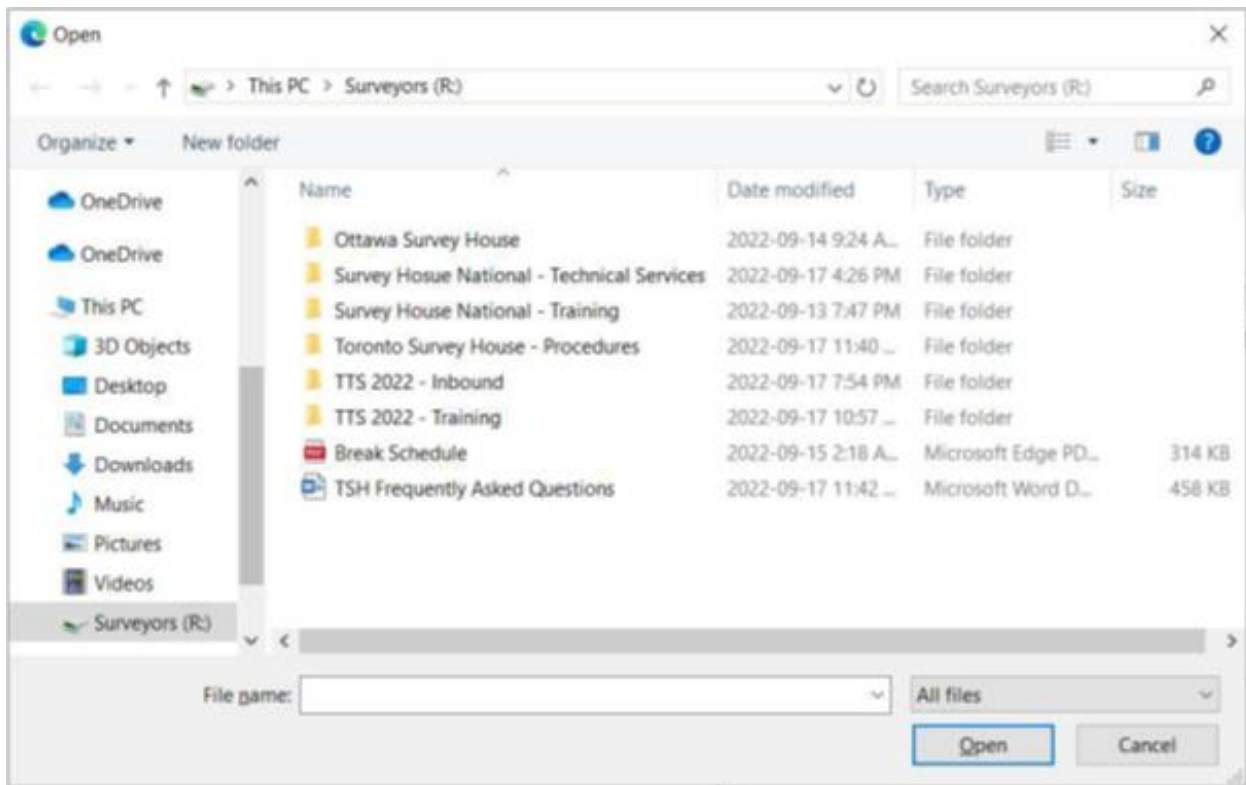
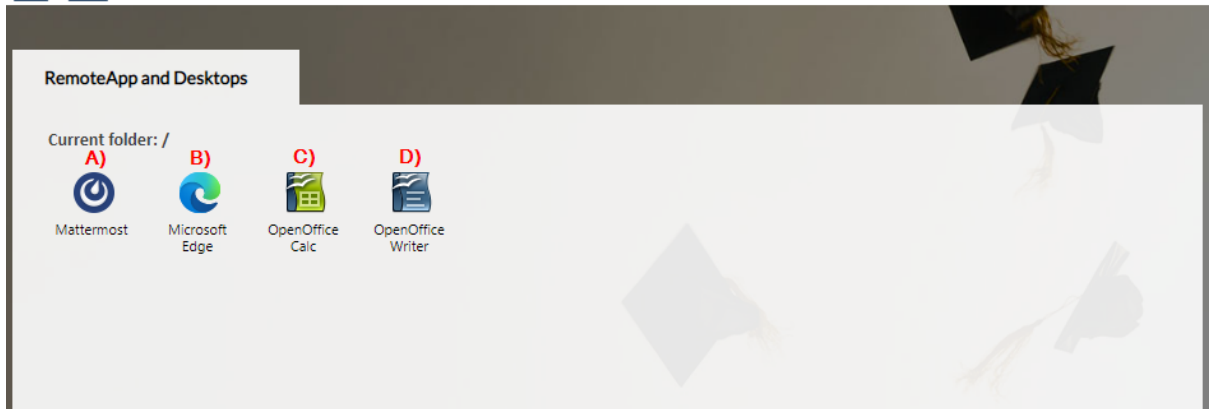
The call centre site was equipped with approximately 65 Dell Optiplex 3060 Micro Computers configured with Windows 10 Kiosk Mode (8th generation Intel Core i5 8400T 1.7GHz processor and 16GB RAM). Kiosk mode is a feature in the Windows operating system (OS) that allows a device to run only specified applications and settings. The computers were divided to create 40 call centre stations and 25 data reviewer stations.

All surveying stations were used solely to access a remote desktop session that was hosted offsite by the firm's IT Services Provider, Simnet. The Remote Desktop Services Platform ran on Intel(R) Xeon(R) Gold 5220R CPU @ 2.20GHz servers with Microsoft Server 2019. The Remote Desktop Services Platform was configured so that Surveyors and Data Reviewers would only have access to the applications, files and websites required to complete their tasks. Each user account was authenticated through Microsoft Azure Active Directory to ensure security and authentication of user accounts. Three different user profiles were established for surveyors, data reviewers and supervisors. Surveyors were provided with very limited access and could only access the survey platform, the soft phone application for placing calls, and limited files. Data Reviewers and Supervisors had a more extensive environment that allowed them to access Microsoft Office applications.

To complement the 40 in house call stations in our Toronto office, Malatest employed surveyors from our Victoria, Edmonton, and Ottawa call centres to work on the project as well as a contingent of remote workers who accessed the Remote Desktop Services (RDS) Platforms from their home computers. To access the RDS from home, surveyors would go to <https://remote.malatest.com/> to access the log in screen.



Once authenticated with their active directory credentials, they could access the platform, including the applications and file shares assigned to their profile.



All work was completed within the RDS platform hosted by Simnet and secured within the Malatest VPN. The home computer provides a “window” in which to see the applications and files within the RDS but at no time does any data transfer to the home computer. In this way, Malatest provided a work-from-home solution that maintained a high level of security.

3.2.2 Telephones

Malatest utilized a Cloud PBX solution provided by our internet provider, Broad Band Dynamics. The benefits of this system included scalability to meet our needs, built in soft phone capability

that was compatible with the Remote Desktop Service Platform, and the ability to have granular control over all features such as call records inbound and out, IVR functionality, call display, and other functions of the telephony system. The soft phone application was accessible from within the Remote Desktop Session profiles eliminating the need for hard phones. An additional 250 extensions were obtained for the project's duration to support the additional survey staff hired.

For survey administration, Surveyors used VOXCO as the dialing platform. For regular outbound dialing, Surveyors logged into the platform using their unique login credentials. Once logged in, they would select the project to be dialed from the Pronto module list and confirm their project/mode selection (2022_TTS_TEL as the project, Pronto module as the mode). Then they would receive a toll-free number to dial into the dialer followed by their individual Pin. This would log them into the dialer and once ready to start making calls, they would select "ready", and the system would start making calls and then connecting calls resulting in an answer or a voicemail message to the Surveyors. The system would automatically code cases that resulted in a busy, no answer, or not in service, thereby speeding up the call process as the Surveyors did not need to wait on each call to be made. For connected calls, once the Surveyor was finished talking with the respondent or leaving an answering machine message, they would code the case off with the appropriate call status code. When going on break, or ending their shift, the Surveyors would click "pause" or "last call" during their final call so that no further calls were made and they could log out. For incoming calls, Surveyors could manually bring up cases using the case ID for that particular case.

3.2.3 Computer network and servers

A single network was created using the 10.0.100.0 address range that covered all devices on the network. Surveying stations and servers were assigned static IP addresses with remaining devices provisioned via DHCP. The host part of each IP address corresponded to the extensions in the VoIP system. This arrangement permitted team leads and coaches to easily locate and monitor the performance of each staff member.

4. PILOT TEST

A pilot survey was conducted prior to the full survey administration, from February to March of 2022. The pilot test assessed new questions being considered by TAC & TISC for inclusion in the 2022 TTS. These potential new questions included:

- Telecommute frequency;
- Frequency of travel to/for work on weekdays; and,
- Equity questions (i.e., immigration status, ethnic origin, racial identity).

The pilot test also served to assess the response rates by sample type (address-and-phone, address only) and by survey mode, helping to estimate the expected response rates for the full administration especially in light of concerns about survey uptake during the COVID-19 pandemic. With respect to the communication materials, different options for the advance letters (addressed to Resident versus Occupant; with and without a deadline) that would be mailed to potential respondents during the full launch were tested.

4.1 Pilot test survey administration

The pilot sample was purchased from Canada Post, which has a comprehensive dwelling coverage. The pilot sample consisted of $n = 4,953$ randomly selected households across the GGH and surrounding areas. Of those, 1,141 cases had both address and phone number information (address-and-phone sample). The remaining 3,812 cases had an address but were not associated with a phone number (address-only sample).

The sample was further stratified to test the impact of the following items on the response rate to the survey:

- Letter addressed to Occupant versus Resident
- Survey participation deadline (“Please complete by March 4, 2022” vs. no deadline)

The pilot survey was administered using Malatest’s Triptelligence CATI/CAWI platform. The invitation letter was sent by Personalized mail, printed on Ministry of Transportation letterhead and signed by a Director from the Ministry of Transportation. The letter also included an information sheet that provided information on how to participate by phone or online, a toll-free number to call with questions or comments, the type of survey questions asked, and extensive information on privacy and use of information. All materials in the mail-out package were provided in English and French. The mail out of pilot invitation letters was sent to 4,953 residents of the GGH and surrounding areas on February 2 and began to arrive to sample on February 7. The pilot survey was in field from February 7 to March 8, 2022.

Respondents could complete online or by phone with respect to previous weekday travel. Outbound dialing for telephone surveys occurred from 5:00 pm to 9:30 pm on weekdays (Tuesday through Friday) and 10:00 am to 6:00 pm on Saturdays. The survey team also responded to call-ins from participants who wished to complete the survey by phone, or who requested support with the online survey. When a participant had scheduled a date and time to be called back, survey staff conducted the scheduled daytime call backs as requested. They also

followed up with participants who partially completed online surveys and those who completed surveys but ran into issues.

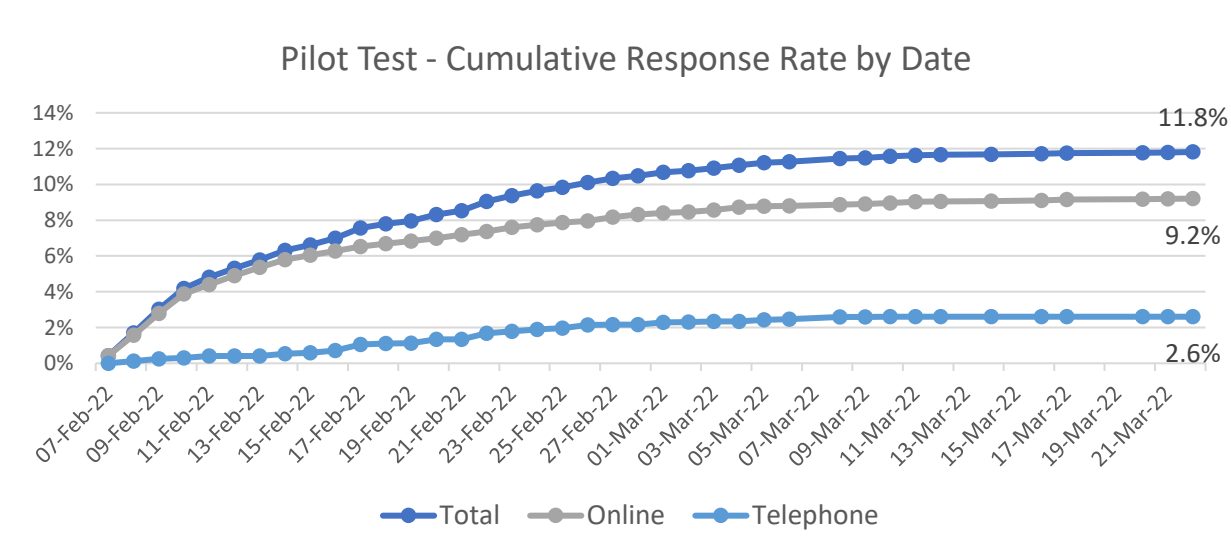
4.2 Pilot test results

4.2.1 Pilot test survey response

A total of 4,953 invitation letters were sent, resulting in 585 completed surveys. The cumulative number of responses by day is shown below. The cumulative response rate by method of completion is also shown in Figure 2 and Table 3. The overall response rate was 11.8%. Survey completions began with a strong preliminary response, after which the curve initially flattened. Survey completions began to rise more slowly after the first week of data collection.

The telephone response rate was 2.6% across the entire sample, i.e., including address-only cases that were not dialled. Telephone completions included inbound calls to the toll-free line from people who received the letter as well as outbound dialling to the address-and-phone portion of the sample. Telephone completions began to increase when outbound dialling began on February 16. Progress tapered off when outbound dialling ceased on March 8. A total of 7 to 9 call attempts were made for any remaining address-and-phone cases. However, it was noted that such a high number of call attempts would not be feasible for the full TTS administration. The online response rate was 9.2%. Online completions demonstrated an early rise but slowed after the first week of data collection. Near the end of the surveying period, completions rose slightly, likely in response to the completion deadline listed on some survey invitation letters.

Figure 2. Pilot test – response rate by date



The total response rate was less than what was expected, as we were aiming for a response rate of 14% to 15%. The telephone response to outbound dialling was lower than expected despite extensive calling efforts, and telephone response from inbound calls to the address-only portion of the sample was lower than expected. The online response was also lower than desired, for both sample types. The lower-than-expected response rate may have been due to a number of factors, such as recent geopolitical events, the COVID-19 pandemic, the Winter season, a shift in

how individuals engage with government at all levels, the content of the letter, difficulty in reaching households by telephone (with greater use of call blocking/spam identification, and the general public’s increased aversion to answering calls), and/or not having a communication program or press release to promote the survey.

Response rates in the pilot test varied by sample type (Table 3). The address-and-phone portion of the sample achieved a 23.5% response rate in the pilot test, with 13.4% online and 10.1% telephone. The address-only sample achieved an 8.3% response, with 7.9% online and 0.4% telephone. It was suspected that a lower telephone response rate was indicative of a shift in how people choose to connect with the survey and the wariness of incoming calls from unknown numbers. The lower online response could have been a result of ‘online fatigue’, with potential respondents being reluctant to do online surveys as result of the pandemic where many activities had moved online. These lower-than-expected response rates for both sample types and both modes of survey completion suggested less engagement on the part of respondents as compared to the 2016 full survey administration.

Table 3. Pilot test – response rates

	Sample Size	Online Response Rate	Telephone Response Rate	Total Response Rate
Address & phone	1,141	13.4%	10.1%	23.5%
Address-only	3,812	7.9%	0.4%	8.3%
Overall response rate	4,953	9.2%	2.6%	11.8%

It may be noted that the response rates achieved in the pilot test were higher than in full survey administration. The pilot telephone response rates were in part supported by increased dialing efforts. Pilot cases received up to nine telephone calls, whereas in full survey administration, cases received a maximum of five calls. Also, the pilot test did not have any geographic quotas. By contrast, during full administration, if a given geography exceeded its survey target, outbound calls ceased to cases in that geography and no new sample was drawn, but if a given geography had low response rates, further sample was drawn and more letters were sent. In addition, as telecommunications companies had only recently been provided a mandate to implement more blocking of suspected spam calls, different telecommunications companies’ approaches to blocking of calls originating from call centres may have been different in the pilot as compared to during full survey administration.

4.2.2 Test of letter variations

The difference between survey letter greeting (Occupant or Resident) and the indication of a deadline had very little impact on response rates. Letters addressed to Resident had marginally higher response rates (non-significant), suggesting that Resident is a ‘warmer’ or less impersonal form of address, which may increase the likelihood that a household will respond to the survey. The survey invitation with a deadline had a slightly higher response rate, however these differences were also non-significant.

4.2.3 Test of racial identity versus ethnic origin question

During the survey design phase, TAC expressed a desire to test two variations of a question about race. One version asks about the racial identity of the surveyed household members, whereas the other asks about their ethnic/cultural origins. The wording of the Racial Identity question is guided by the Provincial Anti-Racism Data Standards and the race categories align well with the Statistics Canada question on which “population group(s)” one falls into which is used to report on the incidence of visible minorities. However, asking about ethnic or cultural origins was proposed as an alternative, as a result of its successful implementation in a Metrolinx survey in 2020.

Respondents were randomly assigned one version of the question. Both questions gave examples of the answer categories in either pop-up or mouseover format. In both instances, respondents were provided with an explanation of why this information was being collected.

The Racial Identity question had a higher percentage (5.4%) that preferred not to answer, compared to the Ethnic Origin question (4.4%), suggesting that the latter might be slightly better received by respondents, although the difference is small and within the margin of error for the sample size. Moreover, only a few respondents provided comments in the survey feedback questions expressing an issue with reporting this information.

Both questions allowed respondents to specify other categories aside from those provided, but regardless of question variation, 1.4% of responses were not easily coded (e.g., Central Asian, Eurasian).

4.2.4 Test of immigration status question

A new question about immigration status was developed during the survey design phase. Respondents were first asked if everyone from their household was born in Canada. Those who responded ‘no’ were asked a follow-up question to determine what year each person in their household immigrated to Canada. Only five year-range response categories were included. This was based on the assumption that immigrants are likely to be fairly well settled after 15 years of residence in the country (the point at which the average income of immigrants matches that of Canadian-born citizens). Additionally, a separate category was provided to differentiate between non-permanent residents who are students/visitors versus other non-permanent residents. Respondents were also provided with an explanation of why this information was being collected.

Only 2.5% declined to answer the immigration status question.⁷ This suggests that respondents were for the most part willing to answer whether all household members were born in Canada and approximately what year each household members immigrated to Canada. There were very few respondents who expressed concern over answering these questions in the survey feedback section.

⁷ 2.1% did not answer the initial question “Was everyone in your household born in Canada?” and 0.4% of those who indicated not all household members were born in Canada declined to indicate what year a household member immigrated to Canada.

4.2.5 Test of telecommute frequency question

The telecommute frequency was asked to get a better understanding of the incidence of telecommuting amongst workers with a usual workplace outside the home. Of this subset of workers (72%), just over half (51%) of workers with a regular workplace outside the home were telecommuting, and 28% did so 2 or more days a week (Table 4). These pilot test results indicated that the COVID-19 pandemic was a factor in the regular workplace commute patterns prior to the full administration of the 2022 TTS.

Table 4. Pilot test – telecommute frequency

	#	% of Total Workers	% of Workers with Usual Workplace Outside the Home
Total workers	627	100%	
Work exclusively from home	116	19%	
No fixed workplace	61	10%	
Usual workplace outside the home	450	72%	100%
No, never telecommute	216	34%	48%
Once per month or less	33	5%	7%
2 or 3 days per month	25	4%	6%
1 day per week	43	7%	10%
2 or 3 days per week	60	10%	13%
4 or more days per week	66	11%	15%
Prefer not to answer	7	1%	2%

4.2.6 Test of work commute frequency question

While the question on frequency of telecommuting is helpful to better understand the incidence of telecommuting amongst workers with a usual workplace outside the home, it does not necessarily provide the full picture of the impact on travel patterns and may include travel on non-weekdays. To capture more information about weekday commuting patterns, pilot respondents were asked how many weekdays they commute to work.

Out of the total number of workers, just under one third (31%) commuted 5 weekdays a week, whereas 44% of those with a usual workplace outside the home commuted 5 weekdays per week. Only 8% of total workers and 11% of workers with a usual workplace outside the home did not regularly travel on weekdays (Table 5).

Table 5. Pilot test – number of days commute to work on weekdays (Monday-Friday)

	#	% of Total Workers	% of Workers with Usual Workplace Outside the Home
Total workers	627	100%	
Work exclusively from home	116	19%	
No fixed workplace	61	10%	
Usual workplace outside the home	450	72%	100%
Do not regularly travel to work on weekdays	48	8%	11%
One weekday every two weeks to one weekday per month	16	3%	4%
1 weekday per week	28	4%	6%
2 weekdays per week	38	6%	8%
3 weekdays per week	59	9%	13%
4 weekdays per week	51	8%	11%
5 weekdays per week	196	31%	44%
Don't know/ prefer not to answer	14	2%	3%

4.3 Pilot Test Recommendations and Decisions

Based on the results of the pilot, the following recommendations for full survey administration were made:

- The response rate was lower than expected, both overall and for each type of sample (address-and-phone, address-only), despite a high number of phone attempts with the address-and-phone sample. As a matter of concern when planning for full survey administration, Malatest cautioned the TAC that decreasing engagement could persist into the Fall. As a result of the low response rates from the pilot, the TAC decided to increase the project budget before full administration to allow for a greater number of households to be included in the sample frame.
- Addressing all letters to Resident (instead of Occupant) as it may be perceived as a warmer greeting than Occupant.
- With respect to the new Racial Identity versus Ethnic Origin question, results suggested that the Ethnic Origin question may have been better received by respondents, as slightly fewer declined to answer this version of the question. The cost to include Ethnic Origin in the final survey instrument was approved by TISC.
- The new question on Immigration Status had similarly low percentage of respondents declining to respond. The cost to include this question in the final survey instrument was approved by TISC.

In addition, TAC chose to approve the new question on commute frequency but not the new question on telecommute frequency, in order to contain the survey length.

5. SAMPLING PLAN

5.1 Mailing Plan

The mailing plan was updated throughout the data collection phase of the project based on performance statistics. A full schedule of the final mailing plan for the address-only and for the address-and-phone sample types is presented below in Table 6.

Table 6. Mailing plan – address-and-phone sample & address-only sample

Mailing Date	Address-and-phone		Address-only		Total
	Flight Code	Number of Letters	Flight Code	Number of Letters	Flight Total
12-Sep-22	1	13,658	1	40,954	54,612
16-Sep-22	2	20,837	2	64,581	85,418
23-Sep-22	3	22,431	3	66,859	89,290
30-Sep-22	4	23,001	4	68,246	91,247
07-Oct-22	5 ^a	4,562	5 ^a	23,480	28,042
	-	-	5 ^b	42,018	42,018
14-Oct-22	6 ^a	24,192	6 ^a	64,829	89,021
28-Oct-22	6 ^b	1,445	6 ^b	3,795	5,240
21-Oct-22	7	22,160	7	77,839	99,999
28-Oct-22	8 ^a	44,928	8 ^a	119,842	164,770
28-Oct-22	8 ^b	5,000	8 ^b	5,000	10,000
04-Nov-22	9 ^a	22,768	9 ^a	1,828	24,596
	-	-	9 ^b	118,669	118,669
04-Nov-22	-	-	32	6,735	6,735
11-Nov-22	10	60,597	10	89,847	150,444
18-Nov-22	11	48,785	11	111,215	160,000
25-Nov-22	12	14,374	12	32,771	47,145
11-Apr-23	13	38,754	13	41,189	79,943
17-Apr-23	14	36,655	14	63,320	99,975
19-Apr-23	15 ^a	5,289	15 ^a	12,308	17,597
	-	-	15 ^b	79,568	79,568
26-Apr-23	16	55,099	16	64,740	119,839
3-May-23	17	52,190	17	68,283	120,473
10-May-23	18	51,112	18	69,424	120,536
2-June-23	19	20,687	19	31,015	51,702
Total Mailed		588,524		1,368,355	1,956,879

In the table, ^a and ^b superscripts were for internal tracking purposes and indicate different portions of the given flight of letters, such as when a new letter format was implemented part way through preparation of a given flight. Flight 32 (between Flights 9 and 10) was a batch of letters sent to farm addresses.

Letters were printed at and sent by a professional mailing house. The files for each mailing group were sent to the mailing house by email typically five days before each mail-out. All letters were sent by Personalized Mail. In practice, delivery turnaround times from date of mailing were somewhat variable, perhaps dependent on mail processing workloads at Canada Post mail sortation facilities. No major delays in delivery were experienced.

The sample for the mailing lists was selected based on the total number of completions remaining to meet the target for each FSA or postal code. The targeted number of surveys to obtain in each geography was based on the projected number of completions for the sample drawn at that time in consideration of the response rate for the sample that had been in the field for greater than three weeks.

All samples were uploaded to the data collection system prior to being delivered to the mail house. Address-and-phone samples were activated for outbound dialing one week after they had been mailed.

5.2 Sample Distribution

Usage of each sample type was adjusted over the course of data collection, based on actual response rates achieved. Table 7 outlines the distribution of sample by source, the expected and actual response rates, and percentage of final completions for each sample type.

Due to unforeseen challenges and lower-than-expected response rates, we ended up contacting 1,956,879 households from the GGHA and surrounding areas, representing a 48% increase from the originally planned sample size of 1,323,794.

Table 7. TTS planned versus actual contact sample and full completions by sample type

Sample Type	Planned			Actual		
	Planned Percentage of Total Contact Sample	Expected Response Rate	Expected Percentage of Final Completions	Actual Percentage of Total Contact Sample ^a	Actual Response Rate	Actual Percentage of Final Completions ^b
Address-and-phone	25%	27.7%	50%	30%	10.8%	39%
Address-only	75%	9.1%	50%	70%	7.2%	61%
Total	1,323,794	13.7%	181,514	1,956,879	8.3%	162,758^c

^a Differences between total contact sample planned versus actual are a result of lower-than-expected response rates.

^b Percentage of final completions reflects total completions prior to validation.

^c Completions from planned contact sample (excluding volunteers). This includes full survey completions that completed the trip section of the survey prior to data validation and rejection of surveys with poor trip information.

5.3 Sampling Plan by Municipality

A sampling plan was developed outlining the sample size requirement for each municipality. The sampling plan set targets for each of the 23 regions, 122 planning districts, and 594 sampling

districts (based on the 2016 TTS data expansion zone geographies) to ensure that the sample was geographically representative. The overall sampling rate target for the entire study area was 5.0%. It may be noted that the survey targets for each region were originally determined prior to release of the 2021 Census data based on a 5.0% sample of projected dwelling counts in 2021. After the release of the 2021 Census data, the survey targets for each region were not readjusted, thus some regions had higher or lower sampling rate targets. The different types of address samples used included address-and-phone and address-only samples. Calculations were made to determine the expected number of letters of each type to send to obtain a balance between the two sample types, based on anticipated response for each sample type. During the course of survey administration, the sampling plan was updated to track survey response and adjust targets as appropriate.

Table 8 below outlines the actual achieved survey completions and sampling rate for each municipality.

Table 8. Completions by TTS region

TTS Regions	2021 Census Dwellings Occupied by Usual Residents	Final Survey Completions with Valid Trip Data (after validation)		Final Survey Completions Including those with Only Household & Demographic Data (after validation)	
		# of records	Sampling Rate	# of records	Sampling Rate
Toronto	1,160,892	51,436	4.4%	59,582	5.1%
Durham	243,048	10,740	4.4%	12,821	5.3%
York	391,034	17,388	4.4%	20,502	5.2%
Peel	450,741	19,080	4.2%	22,829	5.1%
Halton	208,601	9,272	4.4%	10,906	5.2%
Hamilton	222,807	9,725	4.4%	11,385	5.1%
Niagara	195,914	8,324	4.2%	9,809	5.0%
Waterloo	222,426	10,017	4.5%	11,610	5.2%
Guelph	56,345	2,686	4.8%	3,085	5.5%
Wellington	24,022	1,124	4.7%	1,329	5.5%
Orangeville	11,061	502	4.5%	589	5.3%
Barrie	55,316	2,600	4.7%	3,032	5.5%
Simcoe	133,086	5,516	4.1%	6,539	4.9%
Kawartha Lakes ⁸	32,708	893	2.7%	1,047	3.2%
City of Peterborough	35,977	1,655	4.6%	1,901	5.3%
Peterborough County	19,214	838	4.4%	1,017	5.3%

⁸ The target sampling rate for Kawartha Lakes was 2.5%.

TTS Regions	2021 Census Dwellings Occupied by Usual Residents	Final Survey Completions with Valid Trip Data (after validation)		Final Survey Completions Including those with Only Household & Demographic Data (after validation)	
		# of records	Sampling Rate	# of records	Sampling Rate
Orillia	14,422	597	4.1%	734	5.1%
Dufferin	12,254	560	4.6%	679	5.5%
Brantford	41,263	1,800	4.4%	2,094	5.1%
Brant	14,939	611	4.1%	728	4.9%
Northumberland	37,328	1,601	4.3%	1,876	5.0%
Blue Mountains	4,348	158	3.6%	186	4.3%
Grey County	37,961	1,539	4.1%	1,810	4.8%
Total	3,625,707	158,662	4.4%	186,091	5.1%

6. HUMAN RESOURCES

Data collection for the 2022 TTS was primarily undertaken in the Toronto call centre but was a simultaneous effort with the support of Malatest's Ottawa, ON and Victoria, BC offices. Close to 59% of staff were from the Toronto call centre, and 30% were from the Ottawa call centre. Support from the Victoria call centre represented just over 10% of staff. All human resources related activities were undertaken in compliance with applicable federal and provincial regulations with respect to compensation, hours of work, and working conditions.

6.1 Recruitment

Recruitment started in mid-June 2022 and continued until end of November 2022 due to attrition and to maintain full capacity throughout the data collection. Recruitment was affected by labour market shortages and pressures to offer remote work. This difficult hiring environment made it extremely challenging to hire and retain quality surveying staff for TTS. Malatest observed that there were not enough resumes being received for quality candidates. In efforts to uphold a high level of quality control, we focused on bringing in candidates that met the quality expectations of this project. However, we experienced further challenges during the onboarding process, with significant attrition due to a variety of factors (finding other positions, drop off due to the nature of the work versus their expectations, unwillingness to work in office, or inability to provide a remote environment that is private and free of disruptions) and further attrition after onboarding.

The primary method of recruitment was through online advertisements on job websites. Other methods of recruiting included attendance at local job fairs as well as the posting of the job openings at local post-secondary schools, community employment centres and transit stops near the call centre. Malatest also contacted existing staff members who have worked as surveyors on other projects and would be suitable for the TTS. We also contacted interested individuals who worked on prior cycles of the TTS.

Job advertisements were posted starting on June 2nd, 2022. Applications were continuously reviewed, and phone interviews were conducted until November 17th, 2022.

Over 5,753 job recruitment interviews were conducted by Malatest. The recruitment process resulted in 554 hires for the call centre across the different roles. The majority were data collection clerks (interviewers), with a small group of supervisors, and approximately 51 quality assurance staff. Several interviewing staff had worked on 2016 TTS (approximately 1%), most of whom now held supervisory roles.

6.2 Training

The training program started on August 17, 2022 and continued until December 15, 2022. The training consisted of 16 hours (average of 10 people per session). The week before data collection began, the survey had five training sessions ongoing. After the kick off, there were generally three training sessions per week. Weekday training sessions took place during evening hours similar to the peak time of outbound calling. The training process consisted of the following steps:

- Use of Mattermost which is our internal communication tool. Surveyors were trained that if they had questions while on a call, they could message a Supervisor, and they would receive an answer live within a few moments.
- Use of the VOXCO interviewer calling system. This included:
 - How to log in and connect to the dialer
 - How to launch the survey
 - Review of the list of call outcome codes, what each code meant and how/when to use each code
 - How to manually bring up cases that were call-ins or appointments
 - Going through test cases where they experienced both sides of the call (both as the respondent and as an interviewer)
- Review and discussion of the [TTS project website](#) in detail with particular attention to outlining respondent FAQs and the study area;
- Review and discussion of a 'Local Area Familiarization Guide' which outlined the study area in detail including neighbourhood names, major transit operators, major highways, landmarks and tips on using [Google Maps](#) to identify trip origins and destinations;
- Review and discussion of the survey instrument document and skip patterns; and
- Overview of the telephone and online survey versions via simulated/mock interviews and demonstrations of the survey as programmed.

All staff working on the project (surveyors, supervisors and data validation/geocoding staff) completed the above training program prior to beginning work on the project. Staff were monitored closely by research staff during initial shifts and ongoing throughout survey administration to ensure training was well understood. Feedback was provided to staff from these monitoring reviews on a continuous basis and regular meetings were held to address any questions that arose from respondents and surveyors. Regular/daily checks were completed on survey completions to ensure training and quality standards were being met by all staff.

Supervisory staff attended regular meetings with the research team to debrief on any questions or troubleshooting required during their oversight of surveying shifts.

The training noted above was followed up with and refreshed continuously throughout survey administration by research staff completing data validation and overall review of the survey data. Emphasis was placed on key skip patterns related to changes/edits made in the dataset.

6.3 Hours of Work

Due to a higher call-in volume during evenings and weekends, standard evening interview shifts ran from 4:00 p.m. to 9:00 p.m. on weekdays, 10:00 a.m. to 6:00 p.m. on Saturdays, and 12:00 p.m. to 8:00 p.m. on Sundays. A smaller daytime team was also available as of 9:00 a.m. to answer respondent call-ins. Between the daytime staff and evening staff, the call centre was available and ready to respond to inbound calling from 9:00 a.m. until 9:00 p.m. on weekdays. On

weekends staff were available from 10:00 a.m. to 6:00 p.m. on Saturdays and 12:00 p.m. to 8:00 p.m. on Sundays.

Similar to previous TTS cycles, evening staff conducting outbound calls were instructed not to start any new interviews after 8:50 p.m. but were encouraged to complete any in progress. If surveyors had a live interview in progress past 9:00 p.m., they were credited another 15 minutes to their time worked. This encouraged interviewers to dial right up until the end of their 9:00 p.m. shift, maximizing potential completions for the day.

7. CONDUCT OF THE SURVEY

The first mailout occurred on September 9, 2022 and the first completion was recorded on September 14. The Fall period closed on December 20, 2022. The Spring phase of data collection occurred from April 12 to July 28, 2023. Within this time frame, approximately 162,758 completions were received prior to validation, of which 113,320 (70%) were obtained in the Fall period and 49,438 (30%) were obtained during the Spring period.

The majority of these surveys were completed online (88%), with a smaller proportion completed by phone (12%). It was anticipated that the online survey would be the preferred method of completion for most participants. Malatest's call centre staff administered the telephone surveys and served as an important point of contact for study participants that had questions regarding their survey, or who required feedback regarding the survey process and/or survey questions. Our call centre also had multilingual staff who could assist participants in completing the telephone survey via a variety of second languages.

7.1 Data Collection Process

Letters were mailed out by the printing company in regular batches. After approximately a week, we began calling residents with a listed phone number (address-and-phone sample). Sending the letters one week in advance of calling helped increase the possibility of both earning online completions from proactive respondents and increasing participants knowledge of the survey in advance of being contacted.

Participants were generally asked about the previous weekday's travel (i.e. if the survey was accessed on a Tuesday, the survey would ask about Monday's trips). This travel day calculation was different for weekend days, since the survey only collects data related to weekday travel. Therefore, those completing the survey on a Saturday were asked about their travel information for Thursday or Friday's travel depending on the standing week to week of total completions by travel day. When the survey was accessed on a Sunday or Monday, travel was collected for Friday's trips, to ensure the best recall of trip details.

At various points in the survey, to capture trips equally across travel days, fresh sample was continuously provided to staff. In the final week of the project, fresh sample was used almost continuously to maximize completions within the remaining outbound calling data collection window.

A household was removed from the active telephone sample / calling queue under the following circumstances:

- If a case was accessed 5 times by an interviewer;
- If 5 calls were made consecutively resulting in a 'No Answer' call status code;
- Cases where telephone contact was deemed not possible by the call centre staff, such as cases with call status codes of not in service, non-home-based business telephone numbers etc.
- Cases where the respondent was not interested in participating; these cases were coded as refusals.

The survey was offered in both official languages on the telephone and online. French speaking respondents who called in to the project helpline or who were contacted over the telephone to engage their participation in the study were transferred to a French speaking interviewer to complete the study in their first language. Any non-official languages requested by respondents were handled on a case-by-case basis. If the Toronto call centre had a surveyor on staff that was able to complete the survey in the requested language, the surveyor would arrange a date and time to call back and administer the survey by translating on the fly.

Provincial requirements for compliance with the Accessibility for Ontarians with Disabilities Act (AODA) were followed throughout the survey administration period, including the programming of the online survey.

7.2 Voice Mail Strategy

Malatest employed a similar voicemail strategy in the 2022 TTS as in the 2016 TTS. When interviewers called a household the first time, no message was left and a callback was scheduled for the next available week-day. The second call (assuming the first call encountered an answering machine) with no answer proceeded with the surveyor leaving a detailed message providing similar content to that of the advance letter. The voicemail also advised the recipient that an interviewer would call that evening or the next day, and left a phone number at which the recipient could call back to complete the survey. Voicemails were left again 5 business days after the first message and thereafter up to the call limit of 5 calls.

7.3 Inbound Telephone Calls

The 2022 TTS handled inbound telephone calls similarly to the 2016 TTS. Whether participants were calling in response to a voice message from an outbound call or voluntarily calling in as a response to the advance letter, a small group of inbound staff were available to assist them. As calls increased, a bigger team was soon formed after the launch of the survey. This team consisted of 5-10 staff who could also accommodate many of the non-English interviews. During downtime these staff members conducted the non-English callbacks.

The call-in area was staffed from 9:00am to 9:30pm on weekdays, and 10:00am to 6:00pm on weekends. In most cases the staff working on the inbound team worked throughout the majority of the data collection period of the 2022 TTS.

7.4 Survey Complaints

Over the course of survey administration, Malatest received roughly 785 complaints regarding various aspects of the project. This compares favorably to the 2016 TTS, where 2,000 complaints were received.

Malatest tracked the 2022 TTS complaints to identify any systemic issues with the survey process, particularly the online survey, as well as areas where the user experience could be improved. This represents a complaint rate of 0.04% relative to 1,956,879 households invited to participate in the survey.

During the data collection phase of the project, a complaint tracking section was included in the progress reports distributed to TAC, outlining the complaints received by call centre staff, over

email, and social media. Table 9 details the complaints received throughout the data collection period.

Table 9. Total complaints received

Source	Fall 2022	Spring 2023	Cumulative Complaints
Phone call	117	59	176
Email	349	238	587
Twitter (X)	0	0	0
MTO/Partners	11	11	22
Total	477	308	785

The nature of the complaints was also tracked across the entire survey data collection period. The majority of complaints were focused on online survey performance and privacy concerns. See Table 10 for the detailed breakdown of complaint type.

Table 10. Nature of complaints received

Nature of Complaint	Fall 2022	Spring 2023	Cumulative Complaints
Privacy concerns	69	44	113
Online survey performance complaint	245	137	382
Length of survey	48	22	70
Called too many times	4	2	6
Complaint about interviewer	6	0	6
Non-TTS related complaint	28	41	69
Online survey content complaint	55	32	87
Does not see the purpose of the survey	11	11	22
Other	11	19	30
Total	477	301	785

In order to respond to complaints in an expedient manner, Malatest provided TTS front-line staff with templates for the more common complaints. All emails provided the URL for the study website, the toll-free number for the Toronto call centre and emphasized the importance of the study. Templates existed for the following concerns:

Security or privacy concerns:

- Description of online security features (secure access code, encoding of data as it is being transmitted, all responses are stored securely on our servers which are housed within Canada – no cookies used);
- Security features on Malatest’s servers;
- Link to the project privacy statement and Malatest’s corporate privacy policy; and
- Authority for collecting information.

Prefer not to provide demographic characteristics:

- Explanation that these data are important to ensure the survey represents a good cross-section of the entire population;
- How travel patterns are influenced by these demographic characteristics; and
- Concrete examples of how these data will be used in practice.

Slow Survey Performance:

- Apologize for technical issue;
- Explanation that the slow survey could be the result of higher-than-expected web traffic; and
- Provide an outline of mitigation strategies (e.g., splitting load across multiple surveys, archiving data).

7.5 Partially Completed Online Surveys

As households from the address-only sample type did not have telephone numbers associated with their case, a question asking for the participant’s phone number was added to the online survey. There was also a field where the participant could provide an email address, though this was not mandatory. Collecting both phone numbers and email addresses allowed Malatest to contact respondents with partially completed surveys to encourage them to complete their responses. Contact information for online respondents was also used by data review staff in following up to clarify or correct survey responses during the visual review and editing process.

Malatest made considerable effort to review and address abandonment rates for the online survey, by measuring web traffic and server load. Mitigation strategies to help reduce abandonment included adding multiple servers to reduce the overall server loads, monitoring for peak activity and periodically archiving data to clear out the server databases.

Malatest also analyzed survey pages where abandonment rates were high. Survey pages were adapted and improved as a result of this analysis, also taking into account feedback from respondents obtained via the project support email.

Malatest considered surveys that had progressed to the following points to be eligible to be contacted as part of the partial completion recovery strategy:

- Address-only sample were eligible for follow-up upon provision of a phone number; and,

- Address-and-phone sample were eligible for follow-up once they entered the number of vehicles in the household (indicating they had opened the survey online and answered the first few questions).

Professional interviewers made up to 9 outbound telephone calls to users who abandoned the survey. Of all 149,073 surveys completed at least partially online, 5,438 (3.6%) were started online but finished by a Malatest interviewer. Often the telephone follow-up to respondents with partially completed surveys resulted in the survey being revisited and completed online by the respondent, as they had stopped due to technical issues or difficulty with the survey questions. The process of telephone follow-up with surveys that were partially completed online assisted in increasing the overall survey completions.

Malatest sent emails to respondents who recently abandoned the survey after completing at least the few initial questions capturing their email contact information. These emails were sent the following day after survey abandonment. Emails to partially completed cases were sent via custom software, written in Python. Weekly reminder emails were also sent via Triptelligence's integrated e-mail function. These partial completions were directed to call the toll-free number or email the project inbox for support with completing their survey.

Thousands of online partially completed cases requiring follow-up received an email and/or a follow up call encouraging completion of the survey. Efforts to email and callback partially completed surveys resulted in many additional survey completions being obtained, proving the value of follow-up with online survey respondents.

Emails were also sent to households who had critical errors in their survey identified during visual review but could not be reached by telephone. This was done in an effort to recover online surveys that would otherwise have been rejected by the data review team. A specific email account was established for these follow-up emails, while the main project email was used to email respondents with partial completions.

8. QUALITY CONTROL

A set of quality control measures were put in place to ensure the quality of the survey data.

8.1 Logic Checks

Logic checks were conducted for online and telephone surveys. The Triptelligence platform had multiple built-in validation tests to ensure that data was captured correctly. For telephone interviews the Triptelligence logic checks controlled the flow of the interview, and prevented the interviewer from moving to the next question until a valid response was received. Online surveys provided an error message to the respondent if conflicting or incorrect information was entered. In addition to these live logic checks, a set of validation checks were completed after the survey respondent had finished their survey. Any uncertainties or issues found in the visual review process were corrected by performing a callback or email correspondence if required.

The Triptelligence database testing system used for the post-survey validation checks is designed to categorize issues based on the nature and severity of the data issue, allowing for a structured

approach to resolution of any conflicting survey responses. Flags are assigned based on a system that considers the level (e.g., household, person, trip) and type of issue (e.g., missing data, logical errors, inconsistencies), facilitating a quick identification and prioritization process for data validation and visual review. The severity of each flag is determined by its potential impact on the case's integrity, guiding efforts to prioritize follow up on high-priority issues that require immediate attention.

High-priority flags were defined by data tests related to respondent trips and missing data points that may be forgotten quickly. The objective of prioritizing issue flags is to address any critical issues swiftly, leveraging the respondent's recollection of events to correct inaccuracies and fill in any missing information.

All cases were tested each day. This process checked any edits from data review staff in prior days to ensure no new issue flags had been populated from changes made to the survey data. Cases that were flagged after initial reviews had been completed were transitioned to a specialized queue designated for "Unresolved Issues." This protocol ensured that recurring and novel issues were promptly identified and addressed, thereby minimizing the likelihood of data inaccuracies persisting in the later stages of data analyses. In instances where flags reoccur or are mistakenly marked as resolved, the system is designed to highlight these cases for further review. This mechanism allows the team to delve deeper into the reasons behind the initial issue and apply corrective measures accordingly, such as adjusting training materials, coaching individual team members or editing the data quality tests to be more rigorous.

8.2 Live Monitoring of Interviews

Two primary tools were used by the TTS Supervisory team for monitoring/shadowing staff within the RDS environment to uphold data accuracy, the RDPSoft (the primary monitoring tool) and the MS Database (for logging interactions with Surveyors, keeping track of attendance history, and filing actual reports). RDPSoft was (and is) vital for live monitoring scenarios, as it allows Supervisors to view not just an individual Surveyor's screen but allows multiple screens to be open at once plus the ability to reach out to Surveyors for immediate feedback and provides actionable in-the-moment assistance when needed. Supervisors tasked with monitoring would launch the RDPSoft application and could either look up and monitor one individual identified or pull up a group of individuals to monitor at the same time. This was more efficient as Supervisors did not need to wait for each Surveyor to start a completion but could monitor multiple people and thus have multiple completions being monitored one after the other with little down time in-between.

In addition to the screen monitoring, Supervisors could listen in to the specific Surveyors call via their Supervisory extensions without the Surveyors knowledge. We incorporated live monitoring at virtually every opportunity we could for the TTS project with a whole Supervisory staff trained and capable of doing this. In addition to live monitoring, in-office Supervisors also regularly walked the floor, checked in on Surveyors, and gave them live coaching sessions and feedback. With all TTS Surveyors, live monitoring was utilized.

Coaching and feedback were provided primarily through Microsoft Teams, BBD phone, and in person. Speaking with remote Surveyors, voice calls were encouraged to call and talk with staff directly through Teams or BBD rather than through message or chat to add a more personal touch and allow for any questions. In-office Surveyors were pulled aside on the floor and spoken with.

Regardless of the nature of the coaching (positive or negative), the Surveyor received an e-mail afterward restating what was said on the call and what changes/feedback the Surveyor was required to modify.

The TTS Surveyors were provided with their performance metrics via multiple means. Hourly productivity reports, e-mails and Excel reports were made by Management (the RDS activity report integration into the Productivity report) and circulated regularly by Supervisors. The charts could be fine-tuned to show daily, weekly, and monthly reports and provide a visual aid to Surveyors that allowed them to track their progress (whether on decline or upswing). Supervisors regularly sent out hourly productivity reports to team members so they could see their results during their shift and how they compared to other team members.

The Supervisory team encouraged feedback and sent off surveys bi-monthly to Surveyors on the project. The consensus was that they had appreciated the multiple ways we had for them to check in on their metrics and stats.

8.3 Visual Review Process

After the initial import to the database and database tests being run on the data (which would occur on a nightly basis), survey cases are sent to a visual review stage. In visual review, each case is presented in a web form to data review staff detailing the information collected (segmented by household, individual, and trip data). The cases are batched together for reviewing assignments, based on the severity of issues found in testing the data and organized by date, so that the previous days survey completions are reviewed in a timely manner. To ensure the consistency and quality of database testing, the project terms of reference required that a minimum of 25% of additional cases that were not flagged by any tests be reviewed. Approximately 27% of cases that did not flag on any tests were reviewed.

The visual review form designed for case-by-case review includes a map pinpointing work, school, and trip locations and embedded links for mapping trip patterns, and allows for notations related to email follow-ups, and respondent follow-up calls. After a comprehensive review, data review staff either flag the case for data edits to be completed, confirm the case has no issues that require resolution, or, in situations where email or voicemail contact has been initiated and a response is pending, move it to a specific assignment batch for edits pending follow-up. Data review staff aimed to visually review all cases from the previous day's surveying activities on a daily basis. The visual review web form ran on Voila, an internal self-hosted Jupyter Notebook renderer. The image below (Figure 3) depicts a typical view of a completed survey case.

Figure 3. Example visual review form

▶ Callback History

Survey completed by Respondent by Online on 2022-09-22 for a travel date of 20220921

Name: [REDACTED]

Phone: [REDACTED]

Extension: Unknown

Email: Click to send email to [REDACTED]

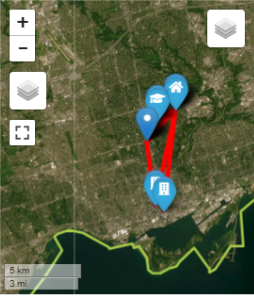
▶ Uploaded Data

Number of Vehicles: 2

Household Size: 4

Income: \$200,000 and above

Online Comment:



Test 1506 - OnlineFeedback is not null

Household High

Non-issue

Callback/Editing Notes:

Issues with crashing of site

You

Gender: Male

Age: 53

Occ Status: Student: No

Employment: Employed Full-time

Work away from home

Management

Workplace Location: [REDACTED]

Has Drivers License

Took Trips: Yes, took trips

▶ Work Search Log

Depart Time: 1330

Trip Number: 1

Trip ID: MDW99779-P01-T01

Origin: [REDACTED]

Destination: Home: [REDACTED]

DGeocode Method: GeoCoder

DGeocode Accuracy: POI (Google)

Trip Purpose: Return Home

Primary Mode: Paid rideshare

spouse

Gender: Female

Age: 51

Occ Status: Student: No

Employment: Employed Full-time

Work away from home

Management

Workplace Location: [REDACTED]

Has Drivers License

Took Trips: Yes, took trips

▶ Work Search Log

Depart Time: 800

Trip Number: 1

Trip ID: MDW99779-P02-T01

Origin: [REDACTED]

Destination: Main work location: [REDACTED]

DGeocode Method: AutoComplete

DGeocode Accuracy: Street Address (Google)

Trip Purpose: Travel to Work (usual place of work)

daughter

Gender: Female

Age: 16

Occ Status: Student: Student full-time

Employment: Employed Part-time

Work away from home

Sales

School Name: [REDACTED]

Occupation Other: [REDACTED]

School Location: [REDACTED]

Workplace Location: [REDACTED]

No Drivers Licence

Took Trips: Yes, took trips

Why No Work: No, did not work

▶ Work Search Log

Depart Time: 800

Trip Number: 1

Trip ID: MDW99779-P03-T01

Origin: [REDACTED]

Destination: Main SCHOOL - [REDACTED]

son

Gender: Male

Age: 12

Occ Status: Student: Student full-time

Employment: Too young to be employed

School Name: [REDACTED]

School Location: [REDACTED]

Took Trips: Yes, took trips

Depart Time: 800

Trip Number: 1

Trip ID: MDW99779-P04-T01

Origin: [REDACTED]

Destination: Main SCHOOL - [REDACTED]

DGeocode Method: School selected from list

DGeocode Accuracy: Landmark

Trip Purpose: Attend school

Primary Mode: Walking (incl. jogging)

Trip Distance: 1.4 km

Depart Time: 1600

Trip Number: 2

Test 2418 - Trip to work, WhyNoWork not null

CANNOT BE NON-ISSUE

Person 1 Medium

Fixed

Callback/Editing Notes:

T01 ORG is at workplace rather than home, reported as such in WhyNoWork

Test 3508 - Walk trip over 5km

Person 1, Trip 1 ID: MDW99779-P01-T01 Information

Fixed

Callback/Editing Notes:

Rideshare reported as walk trip

Test 3526 - Possible multiple drivers with matched trip

Person 1, Trip 2 ID: MDW99779-P01-T02 Information

Fixed

Callback/Editing Notes:

P03 T03 indicates driving lessons occurring once this trip arrived at [REDACTED]

Test 3527 - Possible trip mismatch in HH

Person 1, Trip 3 ID: MDW99779-P01-T03 Information

Non-issue

Callback/Editing Notes:

[REDACTED]

Test 3508 - Walk trip over 5km

Person 2, Trip 1 ID: MDW99779-P02-T01 Information

Fixed

Callback/Editing Notes:

Rideshare reported as walk trip

9. GEOCODING AND POST-PROCESSING

9.1 Overview

All cases undergo a pair of geospatial processes (during and post data collection). During the survey data collection process, the Triptelligence software automatically geocodes latitude-longitude coordinates for home, work, school and other trip locations as respondents complete the survey. This geocoding process captures the final location selected by the respondent, while also capturing any search terms they may have typed in, as well as the precision of the location returned by [Google Maps](#). Once the survey is complete, all locations and trips that have been mapped by the respondent proceed through further geospatial analysis, including spatially joining all locations to a set of geographies, including some Statistics Canada Census geographies as well as client-provided geographies such as Traffic Analysis Zones (TAZs).

9.2 Geocoding

Initial geocoding of all locations mapped in the survey was done by Google's Geocoding APIs which are built into the Triptelligence programming. These tools built into the survey platform allows the respondent to correct the returned location if they felt it did not match where they were searching for. At the start of each trip capture, the respondent initially sees a map centred on the study area with a search bar, (very similar to Google Maps itself). For the home and known work/school locations of the household, these locations were pre-geocoded and after being initially mapped to allow the respondent to select these while completing the trips section for additional household members.

After the survey was completed, some locations were re-geocoded by data review or research staff as part of the survey data validation process. Re-geocoding typically occurred after the resolution of an issue with a trip sequence or an incorrect workplace, school or other location entry. Locations were geocoded using the Google Maps interface, which uses the same data sources as the initial geocoding in the survey.

All geocoded locations are stored with a pair of metadata pieces to identify their precision (accuracy) and method of geocoding (via a search or placement of marker on map). As part of the data quality check processes, locations with low precision were flagged for review and corrected as needed. The Google Maps API returns a list of types, corresponding to the precision and level of detail in the location. Precision is impacted by how much a respondent zooms in before they double click or drop a pinpoint, or the specificity of their search in the search bar (searching for "Toronto, Ontario" has low specificity whilst searching for "290 Bremner Blvd, Toronto" has a higher accuracy). High precision in geocoding indicates that the returned result closely matches a specific, well-defined location. For example:

- **Street Address (e.g., 1243 Islington Ave., Etobicoke, ON M8X 1Y9):** This is a precise location, including a specific building and its exact position on the street. The geocoding result is highly accurate because it pinpoints the exact address. About 19.9% of trip destinations have street addresses recorded.

- **Place of Interest or Landmark (e.g., White Oaks Secondary School, 1330 Montclair Dr, Oakville, Canada):** Places of interest and landmarks are typically well-known locations such as schools and businesses and geocoding them generally yields high accuracy because they are easily identifiable. Often the coordinates are returned by Google with rooftop precision. Approximately 78.9% of trip destinations have these kinds of locations recorded.
- **Intersection (e.g., Spadina Ave. & Richmond St W, Toronto, ON M5V, Canada):** This result is also highly accurate, as it identifies a specific intersection between two streets. It's far less precise than an exact street address but gives a very good indication. Only 0.9% of trip destinations were coded to an intersection.
- **Plus Code (e.g., 2XHF+VQ8, Mono, ON):** Plus codes are precise and can pinpoint locations without a street address, making them highly precise within the specified area, although the actual accuracy of the survey response may be dependent on whether the respondent placed the map marker at the correct location. Use of these codes is uncommon.

Low-precision geocoding results occur when the returned location is more generalized or less specific. This usually comes from a respondent either using autocomplete for a town name, or not zooming into the map before dropping a pin. For example:

- **Postal Code (e.g., Guelph, ON N1G, Canada):** While postal codes narrow down to a specific area, they don't pinpoint an exact address. This result is less precise than a full street address.
- **Neighborhood (e.g., Streetsville, Mississauga, ON, Canada):** Identifying a neighborhood provides a general area but not a specific point within it. The precision is lower because it covers a broader region.
- **Route/Street Name (e.g., Lewiston Queenston Bridge, Lewiston, NY 14092, USA):** This indicates a known route but does not specify a particular location on that route, leading to lower accuracy.
- **Locality (e.g., Stratford, ON, Canada):** A locality or town name gives an idea of the area but is not specific to any exact location within that town, which makes it less accurate compared to a street address. This is the least accurate. Localities were typically only allowed for locations outside the study area.

Very few trip destinations captured by the survey (0.2%) have these kinds of low-precision results.

9.3 Spatial Joins

All home, work/school and trip locations captured in the survey were spatially joined to a set of geographies as part of the automated data import process. These geographies include Statistics Canada standard geographies, including Census Subdivisions (which usually align closely with municipal borders), Aggregated Dissemination Areas, Dissemination Areas, and Dissemination

Blocks. The location data were also joined to TTS geographies, including region, planning district, historic municipality, 2022 transportation analysis zones (TAZ) and 2006 TAZ, as well as to municipal Wards for the GTHA municipalities.

After the data was spatially joined, a review process was undertaken to ensure consistency between the various values returned by the spatial join process, including cases with inconsistencies between different files (for example, a location being flagged as inside the study area, but missing a TAZ value). These kinds of inconsistencies are common for geographies built on different base files, as is the case with the TTS geographies, which were built from various boundary files provided by municipalities. There are often small gaps between TAZ, especially along roadways that form boundaries between different areas, and even a small gap of one metre or less can result in this kind of discrepancy for a geocoded location with less than rooftop precision. In addition, along the coastlines of lakes, the boundary files sometimes do not include recent changes to natural boundaries or certain built structures such as piers, jetties, or float homes that survey locations may sometimes be geocoded to. Such geocoding issues were resolved by either bumping the given coordinates closer to the appropriate survey geography or by assigning the appropriate zone to the given coordinates.

9.4 Post-Processing

Following data review, follow-up and other data corrections by data review and quality assurance (QA) staff, final post processing activities were undertaken by the research team to ensure a clean data set for the data weighting and expansion process. These processes were not strictly linear, as research staff were involved in QA tasks during initial data cleaning processes as well as preparing specific sets of cases for manual review by the quality assurance staff, such as cases that involved transit as one of the trip modes. The thresholds for acceptance of each data point varied, however the overall goal of post-processing tasks and data analysis was to get as close to zero instances of poor or missing data as possible. The final stages of the data review process also checked for rejected cases (cases data review/QA staff had flagged for rejection from the dataset), to see if they could be salvaged as well as ensuring cases with very poor data were not inadvertently left in the final dataset. Some of the final quality assurance processes were iterative, as changes made to the dataset could trigger other tests, which then might need to be reviewed in turn.

After this data review and post-processing task was completed, the data were weighted against the 2021 Census data to address non-response bias and better represent the characteristics of all households in the study area. This process is documented under a separate cover in the *TTS 2022 Survey Data Expansion* report.

9.5 Preparation of Data Deliverables

The data were transformed into a data structure with formats, variable names, and response code values consistent with the legacy files used by DMG and other project partners to manage and analyse the data in previous cycles of the TTS. In some instances where there were revisions to the survey instrument, or where there was a desire to use numeric codes, two versions of the variable may exist, one in the new format and one in the legacy format (sometimes collapsed

down to the legacy categories). A number of new derived variables were created—such as counts of trips via different modes at the household and person level, identification of the mode of travel used on the first work tour, identification of overall transit access type (looking at both the access and egress modes), etc.—to add value to the delivered data.

The data deliverables included two versions of the data file: one has full survey completions with successfully validated trip information; the other has full survey completions that were rejected but which had good household and demographic information, plus partial surveys that completed the household and demographic questions but which failed to complete the trips sections. Table 11 below provides a breakdown of the surveys reviewed and delivered.

For surveys that completed the trip section, the rejection rate was only 2.5% (compared to about 5% in 2016). For surveys that did not complete the trips section, the rejection rate was 38% due to too many missing, poor, or refused responses in the household or demographic questions. Many of these surveys were very incomplete.

Table 11. Surveys collected and delivered

	Collected		Delivered	
	Surveys completing trip section (A)	Surveys that did not complete trip section (B)	Deliverable for travel day analysis (from A)	Deliverable including surveys with households and demographics only (from A+B)
Surveys collected	162,758	33,103		
Accepted trip data after validation	158,622	-	158,622	158,622
Rejected due to poor/missing trip information but with good household and demographic information	3,483	-	-	3,483
Good household and demographic information, but no trip information	-	23,946	-	23,946
Rejected with poor/missing household or demographic information	613	9,157	-	-
Total surveys delivered			158,622	186,091

10. COMPLETION STATISTICS

10.1 Survey Completions by Sample Type

Table 12 summarizes the number of final survey completions with trip data and final survey completions that contain only household and demographic data by each sample type.

Table 12. Total of completed surveys by sample type

Sample	Final Survey Completions (after validation)	Final Survey Completions with Only Household & Demographic Data (after validation)	Total
Address-and-phone	61,338	6,407	67,745
Address-only	96,719	20,805	117,524
Volunteer*	605	217	822
Total	158,662	27,429	186,091

* Volunteer sample includes households who contacted the call centre via phone or went to the survey website and obtained an access code through the open survey link. All volunteers could not be matched to an existing address or phone number in the sample. As the number of volunteers was negligible, and unlikely to impact the representativeness of the randomly selected sample, they were included in the final dataset.

10.2 Historical Overview of Survey Statistics

Since 1986, the household sample participating in TTS has increased from 61,453 to 186,091⁹ in 2022. The geographic scope has widened to include more geographical areas, and population has grown, requiring more surveys to obtain the target 5% sample rate in most of the cycles.

A historical overview of survey completions from 1986 until 2022 is provided in Table 13. The lower overall response rate in 2016 compared to previous cycles can be attributed to the change in method to include address-only sample (as address-only sample does not have an associated telephone number, it is not possible to follow up with the household, therefore the address-only sample requires more letters to be sent in order to obtain a similar response rate to the address-and-phone sample). Although the 2022 TTS also used address-only and address-and-phone sample as in 2016, the lower overall response rate in 2022 can be attributed to a variety of other factors, including the lack of a proactive communications approach, technologies offered by large telecommunications companies to help users screen out unwanted/unknown callers. For further discussion about factors impacting 2022 TTS response rates, see the 2022 TTS Lessons Learned report.

In reviewing the differences between cycles in the number of interview stations and staff, readers should keep in mind the COVID-19 pandemic led to severe labour market shortages. Such shifts in the labour market made recruitment of survey interviewers and data reviewers

⁹ Includes validated final survey completions with trip data and final survey completions that contain only household and demographic data.

extremely challenging due to expectations around fully remote work and considerably higher wage expectations than planned. In addition to these challenges, the delayed project launch led to some staff attrition. For further discussion about the labour market challenges experience during the 2022 TTS, see the 2022 TTS Lessons Learned report.

Table 13. Historical overview of survey statistics

	1986	1991	1996	2001	2006	2011	2016	2022
Households in study area (million)	1.47	1.71	2.32	2.51	2.87	3.12	3.34	3.6
Target sample	4%	5%*	5%	5%	5%	5%	3%, 5%†	2.5%, 5%
Completed sample	4.2%	1.4%	5%	5.5%	5.2%	5.1%	3%, 5%†	4.4% ^a 5.1% ^b
Sample used	102,606	34,167	158,753	215,000	340,820	345,541	1,004,840‡	1,956,879
Overall completion rate	59.9%	71.7%	72.6%	63.4%	43.9%	46.1%	16.2% [^]	8.3% ^{^^}
Final database								
Household records	61,453	24,507	115,193	136,379	149,631	159,157	162,708	158,662 ^a 27,429 ^b
Person records	171,086	72,496	312,781	374,182	401,653	410,404	395,885	366,172 ^a 78,239 ^b
Trip records	313,633	142,453	587,676	817,744	864,348	858,848	798,093	759,736
Transit records	56,615	14,896	70,295	85,095	87,244	86,703	91,437	55,261
Mean household size (expanded data) (persons)	2.77	2.77	2.71	2.70	2.68	2.73	2.43	2.60 ^a
Trips per person 11 or older (expanded data)	2.35	2.54	2.48	2.54	2.47	2.40	2.26	2.02 ⁺⁺ ^a 2.13 ^{##} ^a
Trips per person 5 or older (expanded data)								2.14 ^a
Interview stations	86	33	120	120	121	120	145	40 ^c
Interviewers and supervisors	390	75	300	275	370	395	410	277
Coding / data review staff	n/a	6	17	13	14	13	25	64

* In 1991: high growth areas 4.5%, low growth areas 0.5%.

† In 2016: Hamilton 3.0%, rest of TTS area 5.0%

‡ In 2016: Sample used includes all cases either mailed a letter or dialed. Phone-only sample was not mailed a letter, and address-only sample would only have telephone contact if initiated by the respondent.

[^] The 2016 completion rate is the combined result of a 36.9% completion rate for the address-and-phone sample, 10.3% for the address-only sample, and 6.6% for the phone-only sample.

^{^^} The 2022 completion rate is the combined result of a completion rate for the 10.8% address-and-phone sample, 7.2% for the address-only sample.

⁺⁺ 2022 trip rate for persons 11+ years excluding non-commute walk trips that would not have been captured in earlier surveys.

^{##} 2022 trip rate for persons 11+ years including non-commute walk trips that would not have been captured in earlier surveys.

^a Completions with trip data.

^b Completions with only household & demographic info.

^c Represents in-person interview stations

^e Trip rate with equivalent

The table above includes a comparison of trip rates across the various survey cycles. The 2022 TTS daily person trip rate for the household members 5+ years of age for whom trips were

captured was 2.14. The 2022 survey differed from earlier surveys in that the age for trip capture was lowered from 11+ years to 5+ years and for the first time non-commute walking trips were also captured. Users of the data should keep the differences in mind when making historical comparisons. Looking only at household members 11+ years of age, the 2022 trip rate is 2.13. Filtering further to exclude the kinds of walking trips that were excluded from earlier survey cycles—namely, non-commute walking trips that do not link trips by other modes—the 2022 trip rate using parameters comparable to earlier cycles was 2.02. This is a 10.6% drop in the six years since the 2016 cycle.

While this is part of a general trend in reduction in trip rates since 2001, this recent significant drop in trip-making can be associated with the changes in travel patterns brought about by the COVID-19 pandemic. The pandemic has had a profound and persistent impact on many areas of human activity, including social and recreational activities, online commerce, and work arrangements, particularly the increase in people working from home and people with hybrid work arrangements (commuting some days, working from home other days). The most severe impacts of the pandemic-induced impacts on people's activity and the corresponding changes in travel behaviour had receded by the time the survey was conducted in Fall 2022; however, some activity and travel behaviours may still have been in flux. Some may still be subject to further change from what was observed in the 2022 survey, particularly due to the evolving state of work-from-home and hybrid work arrangements.

Table 14, following, provides a historical comparison to allow comparisons of survey response in context of the sample type. The volunteer surveys listed were from residents of the area who were not randomly sampled in the address-based sampling and who participated online after signing up for a survey access code.

The address-and-phone sample had a 10.4% valid completion rate (fully validated surveys with trips; when surveys delivered with only household and demographic records are included, the response percentage is 11.5%), a significant drop from 2016, largely due to increased challenges in contacting potential respondents by phone. The table shows a general decline in valid contact rates (the proportion of the sample that leads to either a completion or a refusal), with notably steep drops between 2001 and 2006, from 81% to 62%, and again between 2011 and 2016, from 60% to 50%. In 2022, the overall contact rate dropped further, to only 14%. The low contact rate from outbound calling may be a product of a number of factors, including the indiscriminate application of call blocking/spam call identification by telecommunications companies and the general public's increased aversion to answering calls from unknown numbers. The online response rate was also lower for this sample in 2022. The lower online response may be due to the limited communications campaign, a shift in how citizens engage with surveys and their governments, and/or 'online fatigue' due to a shift to doing more activities online during the pandemic.

Of note, the refusal rate for the 2022 address-and-phone portion of the sample was 24.8%, which is somewhat higher compared to 2016 but on par with 2006 and 2011. It may be noted that in 2022, the 'contacts' and 'refusals' in the address-and-phone portion of the sample include surveys started online and completed at least as far as the end of the demographics section.

These cases would have received a number of follow-up calls and e-mails (if the respondent gave an email address at the start of the survey) to attempt to complete the survey or encourage the respondent to complete the survey themselves, although many did not result in an actual phone contact. As noted earlier in this report, over 5,400 surveys that were started online ended up being completed by phone. At least 4,400 of these were with address-and-phone sample.

The address-only sample type had a 7.1% valid completion rate (fully validated surveys with trips; or 8.6% for surveys delivered with only household and demographic records included). This is to be expected, as this sample type only receives a letter without the benefit of follow-up phone calls. This is lower than the 10.3% response rate in 2016. Given that many aspects of the survey invitations to these samples and the online survey were the same as in 2016, one can speculate that the reduced response for this sample type may also be related to reasons noted above. The address-only sample is essential in order to reach cell-phone-only households and obtain a more representative survey sample, although subject to greater non-response bias (within the types of households and population that comprise this portion of the population universe). In the table, valid contact rates and refusal rates are not presented for the address-only sample as they would not be meaningful measures of productivity for this type of sample: contacts and refusals are only logged if the respondent either accesses the survey online or calls into the toll-free number, and outbound calling is not possible for this sample.

Table 14. Historical statistics for different sample types

	1986	1991	1996	2001	2006	2011	2016	2022
Address & phone sample								
Sample mailed letter*	102,606	34,167	158,753	215,000	340,820	345,541	223,640	588,524
Valid contacts (complete or refused) †	83,764	27,813	139,952	174,000	207,082	207,209	111,408	81,567
Valid contact rate (of sample used)	81.6%	81.4%	88.0%	81.2%	62.0%	60.0%	49.8%	13.9%
Refusals	~21,700	~3,200	~30,500	~36,700	~55,100	54,314	22,737	20,229
Refusal rate (of valid contacts)	25.9%	11.4%	21.8%	21.1%	26.6%	25.1%	20.4%	24.8%
Valid completed surveys‡	61,453	24,507	115,193	136,379	149,631	159,157	82,460	61,338 ^a 67,745 ^b
Completion rate (of sample mailed letter)	59.9%	71.7%	72.6%	63.4%	43.9%	46.1%	36.9%	10.4% ^a 11.5% ^b
Address-only sample								
Sample mailed letter							766,743	1,368,355
Refusals							422	453
Valid completed surveys‡							79,226	96,719 ^a 117,524 ^b
Completion rate (of sample mailed letter)							10.3%	7.1% ^a 8.6% ^b
Volunteer sample								
Valid completed surveys‡								605 ^a 822 ^b

* Sample mailed letter includes all sample mailed, whether or not dialled. From the 2011 TTS documentation, it appears that somewhere between 5,000 and 11,000 sample that were mailed letters were never dialled (and did not complete online). In 2016, address-and-phone sample never dialled (and not completing online) comprised over 43,000 cases.

† Valid contacts include refusals and valid completions (for 2011 and 2016, this includes both phone surveys and online surveys from the address-and-phone sample). For 2016 and 2022, the count of valid contacts includes interrupted phone surveys, partial online completions that completed at least as far as the demographics section, survey completions rejected in visual review, and over-quota online surveys that were completed after the geographic quota for the household had been filled and which were never processed through visual review.

‡ Valid completed surveys include all surveys that were accepted in visual review and data validation, whether completed by phone (all cycles) or online (2011, 2016 and 2022 cycles). For 2022, separate counts have been provided for valid completions with trips and the total including those with only demographic and household information.

^a Completions with trip data.

^b Completions with trip data plus completions with only household & demographic info.

10.3 Survey Completions by TTS Region

Table 15 summarizes the number of completed surveys in the final database for the areas represented by each of the participating municipal agencies.

Table 15. Completed surveys by TTS region

Region	Completions with Trip Data	Completions with Only Household & Demographic Info	Total
Toronto	51,436	8,146	59,582
Durham	10,740	2,081	12,821
York	17,388	3,114	20,502
Peel	19,080	3,749	22,829
Halton	9,272	1,634	10,906
Hamilton	9,725	1,660	11,385
Niagara	8,324	1,485	9,809
Waterloo	10,017	1,593	11,610
Guelph	2,686	399	3,085
Wellington	1,124	205	1,329
Orangeville	502	87	589
Barrie	2,600	432	3,032
Simcoe	5,516	1,023	6,539
Kawartha Lakes	893	154	1,047
City of Peterborough	1,655	246	1,901
Peterborough County	838	179	1,017
Orillia	597	137	734
Dufferin	560	119	679
Brantford	1,800	294	2,094
Brant	611	117	728
Northumberland	1,601	275	1,876
Blue Mountains	158	28	186
Grey County	1,539	271	1,810
Total	158,662	27,429	186,091

10.4 Survey Completions by Travel Day

Table 16 highlights the distribution of surveys completed by trip day, for the surveys with full trip data. The distribution of the surveys by day of week is somewhat loaded towards Thursday and Friday. Attempts were made to distribute the letter delivery across days of the week, albeit, after the letters were dropped off at Canada Post, the actual delivery date might vary depending on workload. The TTS is a 24-hour recall survey, which requires surveys to be completed within a reasonable enough time of the weekday surveyed to allow for accurate recall of trip details, with the trip day typically set to the most recent previous weekday. However, compared to other trip days, respondents could complete the survey on more days of the week (Saturday, Sunday, and Monday) with respect to Friday travel. To help balance this, a portion of surveys started on a Saturday or Sunday were directed to report on Thursday travel rather than Friday travel. It may be noted that work commutes are usually lower on Mondays and Fridays, so the over-representation on Fridays may work to balance the under-representation on Mondays, together the surveys

Table 16. Completed surveys by trip day

Trip Day	Completions with Trip Data	Percentage by Travel Day
Monday	22,513	14%
Tuesday	27,754	17%
Wednesday	27,429	17%
Thursday	42,001	26%
Friday	38,965	25%
Total	158,662	100%

Table 17 highlights the distribution by week across the surveyed period, and Table 18 highlights the cumulative number of surveys by week across the surveyed period. The figures illustrate a ramp up in productivity as the staff complement grew and the size of mailouts was increased, and a steep drop off mid-December as the Fall survey phase came to an end. Given that a very large number of letters had been mailed in the fall (with the last batch having been mailed on November 25) the survey was left open for completion between January 4 and early April to accommodate interested respondents who might have been delayed in checking their mail and/or responding to the letter, and also to allow for possible pilot testing of alternate contact approaches if approved. Full surveying resumed when mailouts began for the Spring phase in mid-April 2023. Surveys were flagged for removal from the final survey dataset if they were completed by households with school-age children for travel days after the last day of K-12 classes on December 16, 2022, in the interim period between the Fall and Spring phase during school break periods, or after the end of the K-12 school term on June 28, 2023, as they would not be reflective of typical patterns for these households while school was in session.

Table 17. Survey completions by trip week

Week Number	Trip Week	Completions with Trip Data
1	September 13, 2022 (Tuesday)	2,139
2	September 19, 2022(Monday)	5,276
3	September 26, 2022(Monday)	6,391
4	October 3, 2022(Monday)	6,461
5	October 11, 2022 (Tuesday)	9,181
6	October 17, 2022(Monday)	9,032
7	October 24, 2022(Monday)	8,440
8	October 31, 2022(Monday)	11,890
9	November 7, 2022 (Monday)*	11,051
10	November 14, 2022(Monday)	11,827
11	November 21, 2022(Monday)	12,014
12	November 28, 2022(Monday)	9,056
13	December 5, 2022(Monday)	4,860
14	December 12, 2022(Monday)	3,125
15	December 19, 2022 (Monday)**	159
16	December 26 – no collection	-
17	January 3, 2023 (Tuesday)	1,057
18	January 9, 2023(Monday)	632
19	January 16, 2023(Monday)	95
20	January 23, 2023(Monday)	332
21	January 30, 2023(Monday)	407
22	February 6, 2023(Monday)	299
23	February 13, 2023(Monday)	189
24	February 21, 2023 (Tuesday)	137
25	February 27, 2023(Monday)	280
26	March 6, 2023(Monday)	208
27	March 13, 2023(Monday)	69
28	March 20, 2023(Monday)	78
29	March 27, 2023(Monday)	72
30	April 3, 2023 (Monday)****	62
31	April 10, 2023(Monday)	842
32	April 17, 2023(Monday)	4,556
33	April 24, 2023(Monday)	9,383
34	May 1, 2023(Monday)	6,399
35	May 8, 2023(Monday)	5,826
36	May 15, 2023(Monday)	6,632
37	May 23, 2023 (Tuesday)	2,190

Week Number	Trip Week	Completions with Trip Data
38	May 29, 2023(Monday)	1,954
39	June 5, 2023(Monday)	2,437
40	June 12, 2023(Monday)	1,346
41	June 19, 2023(Monday)	1,099
42	June 26, 2023(Monday)	474
43	July 4, 2023 (Tuesday)	203
44	July 10, 2023(Monday)	268
45	July 17, 2023(Monday)	150
46	July 24, 2023(Monday)	84

* Week starting Nov 7 was a short week (Monday to Thursday only due to Remembrance Day)

** Week starting Dec 19 was a short week (Monday only due to end of fall data collection)

*** Data collection was suspended Dec20-Jan2, so there are no surveys in week 16

**** Week starting April 3 was a short week (ended Thursday due to Good Friday)

Table 18. Survey completions by travel date

Travel Date	Day of Week	Completions with Trip Data
September 13, 2022	Tuesday	70
September 14, 2022	Wednesday	497
September 15, 2022	Thursday	804
September 16, 2022	Friday	768
September 19, 2022	Monday	438
September 20, 2022	Tuesday	1,037
September 21, 2022	Wednesday	1,163
September 22, 2022	Thursday	1,157
September 23, 2022	Friday	1,481
September 26, 2022	Monday	1,235
September 27, 2022	Tuesday	1,454
September 28, 2022	Wednesday	1,103
September 29, 2022	Thursday	1,610
September 30, 2022	Friday	989
October 3, 2022	Monday	786
October 4, 2022	Tuesday	1,056
October 5, 2022	Wednesday	1,210
October 6, 2022	Thursday	1,796
October 7, 2022	Friday	1,613
October 11, 2022	Tuesday	1,556
October 12, 2022	Wednesday	1,801
October 13, 2022	Thursday	3,611
October 14, 2022	Friday	2,213
October 17, 2022	Monday	1,468

Travel Date	Day of Week	Completions with Trip Data
October 18, 2022	Tuesday	1,685
October 19, 2022	Wednesday	1,613
October 20, 2022	Thursday	2,464
October 21, 2022	Friday	1,802
October 24, 2022	Monday	1,279
October 25, 2022	Tuesday	1,828
October 26, 2022	Wednesday	1,541
October 27, 2022	Thursday	2,303
October 28, 2022	Friday	1,489
October 31, 2022	Monday	1,449
November 1, 2022	Tuesday	2,110
November 2, 2022	Wednesday	2,607
November 3, 2022	Thursday	3,361
November 4, 2022	Friday	2,363
November 7, 2022	Monday	1,294
November 8, 2022	Tuesday	1,864
November 9, 2022	Wednesday	2,087
November 10, 2022	Thursday	5,806
November 14, 2022	Monday	1,714
November 15, 2022	Tuesday	1,808
November 16, 2022	Wednesday	1,959
November 17, 2022	Thursday	2,370
November 18, 2022	Friday	3,976
November 21, 2022	Monday	1,960
November 22, 2022	Tuesday	2,009
November 23, 2022	Wednesday	1,859
November 24, 2022	Thursday	1,739
November 25, 2022	Friday	4,447
November 28, 2022	Monday	1,631
November 29, 2022	Tuesday	1,626
November 30, 2022	Wednesday	1,408
December 1, 2022	Thursday	1,168
December 2, 2022	Friday	3,223
December 5, 2022	Monday	1,031
December 6, 2022	Tuesday	824
December 7, 2022	Wednesday	707
December 8, 2022	Thursday	620
December 9, 2022	Friday	1,678
December 12, 2022	Monday	580

Travel Date	Day of Week	Completions with Trip Data
December 13, 2022	Tuesday	454
December 14, 2022	Wednesday	589
December 15, 2022	Thursday	447
December 16, 2022	Friday	1,055
December 19, 2022	Monday	159
January 3, 2023	Tuesday	229
January 4, 2023	Wednesday	214
January 5, 2023	Thursday	181
January 6, 2023	Friday	433
January 9, 2023	Monday	141
January 10, 2023	Tuesday	140
January 11, 2023	Wednesday	116
January 12, 2023	Thursday	111
January 13, 2023	Friday	124
January 16, 2023	Monday	18
January 17, 2023	Tuesday	4
January 18, 2023	Wednesday	16
January 19, 2023	Thursday	13
January 20, 2023	Friday	44
January 23, 2023	Monday	8
January 24, 2023	Tuesday	13
January 25, 2023	Wednesday	41
January 26, 2023	Thursday	63
January 27, 2023	Friday	207
January 30, 2023	Monday	99
January 31, 2023	Tuesday	76
February 1, 2023	Wednesday	56
February 2, 2023	Thursday	42
February 3, 2023	Friday	134
February 6, 2023	Monday	41
February 7, 2023	Tuesday	56
February 8, 2023	Wednesday	59
February 9, 2023	Thursday	36
February 10, 2023	Friday	107
February 13, 2023	Monday	21
February 14, 2023	Tuesday	30
February 15, 2023	Wednesday	22
February 16, 2023	Thursday	27
February 17, 2023	Friday	89

Travel Date	Day of Week	Completions with Trip Data
February 21, 2023	Tuesday	15
February 22, 2023	Wednesday	15
February 23, 2023	Thursday	13
February 24, 2023	Friday	94
February 27, 2023	Monday	62
February 28, 2023	Tuesday	15
March 1, 2023	Wednesday	33
March 2, 2023	Thursday	63
March 3, 2023	Friday	107
March 6, 2023	Monday	28
March 7, 2023	Tuesday	54
March 8, 2023	Wednesday	35
March 9, 2023	Thursday	35
March 10, 2023	Friday	56
March 13, 2023	Monday	6
March 14, 2023	Tuesday	11
March 15, 2023	Wednesday	14
March 16, 2023	Thursday	10
March 17, 2023	Friday	28
March 20, 2023	Monday	13
March 21, 2023	Tuesday	5
March 22, 2023	Wednesday	9
March 23, 2023	Thursday	9
March 24, 2023	Friday	42
March 27, 2023	Monday	4
March 28, 2023	Tuesday	15
March 29, 2023	Wednesday	10
March 30, 2023	Thursday	10
March 31, 2023	Friday	33
April 3, 2023	Monday	6
April 4, 2023	Tuesday	8
April 5, 2023	Wednesday	5
April 6, 2023	Thursday	43
April 10, 2023	Monday	5
April 11, 2023	Tuesday	10
April 12, 2023	Wednesday	68
April 13, 2023	Thursday	444
April 14, 2023	Friday	315
April 17, 2023	Monday	565

Travel Date	Day of Week	Completions with Trip Data
April 18, 2023	Tuesday	485
April 19, 2023	Wednesday	489
April 20, 2023	Thursday	1,429
April 21, 2023	Friday	1,588
April 24, 2023	Monday	1,731
April 25, 2023	Tuesday	1,941
April 26, 2023	Wednesday	1,485
April 27, 2023	Thursday	2,482
April 28, 2023	Friday	1,744
May 1, 2023	Monday	1,130
May 2, 2023	Tuesday	978
May 3, 2023	Wednesday	1,040
May 4, 2023	Thursday	1,617
May 5, 2023	Friday	1,634
May 8, 2023	Monday	1,031
May 9, 2023	Tuesday	1,077
May 10, 2023	Wednesday	913
May 11, 2023	Thursday	1,505
May 12, 2023	Friday	1,300
May 15, 2023	Monday	1,132
May 16, 2023	Tuesday	1,285
May 17, 2023	Wednesday	1,045
May 18, 2023	Thursday	1,696
May 19, 2023	Friday	1,474
May 23, 2023	Tuesday	584
May 24, 2023	Wednesday	442
May 25, 2023	Thursday	640
May 26, 2023	Friday	524
May 29, 2023	Monday	264
May 30, 2023	Tuesday	267
May 31, 2023	Wednesday	247
June 1, 2023	Thursday	618
June 2, 2023	Friday	558
June 5, 2023	Monday	492
June 6, 2023	Tuesday	464
June 7, 2023	Wednesday	403
June 8, 2023	Thursday	599
June 9, 2023	Friday	479
June 12, 2023	Monday	272

Travel Date	Day of Week	Completions with Trip Data
June 13, 2023	Tuesday	254
June 14, 2023	Wednesday	194
June 15, 2023	Thursday	355
June 16, 2023	Friday	271
June 19, 2023	Monday	177
June 20, 2023	Tuesday	153
June 21, 2023	Wednesday	149
June 22, 2023	Thursday	398
June 23, 2023	Friday	222
June 26, 2023	Monday	102
June 27, 2023	Tuesday	85
June 28, 2023	Wednesday	55
June 29, 2023	Thursday	119
June 30, 2023	Friday	113
July 4, 2023	Tuesday	35
July 5, 2023	Wednesday	38
July 6, 2023	Thursday	65
July 7, 2023	Friday	65
July 10, 2023	Monday	89
July 11, 2023	Tuesday	33
July 12, 2023	Wednesday	36
July 13, 2023	Thursday	69
July 14, 2023	Friday	41
July 17, 2023	Monday	27
July 18, 2023	Tuesday	28
July 19, 2023	Wednesday	19
July 20, 2023	Thursday	36
July 21, 2023	Friday	40
July 24, 2023	Monday	25
July 25, 2023	Tuesday	23
July 26, 2023	Wednesday	17
July 27, 2023	Thursday	17
July 28, 2023	Friday	2

11. CONCLUSIONS

The 2022 TTS was the eighth in a series of surveys that were initiated in 1986, intended to capture travel patterns of those living in the GTHA (up until 2016) and the GGHA and surrounding areas (in 2022). The data collected helps local and regional governments, as well as the province and transit agencies, make transportation planning and investment decisions.

Despite some challenges, the 2022 TTS was an overall success. Despite the challenges with conducting this very large survey at a time impacted by the disruptions of the pandemic, over 186,000 surveys with household and demographic information were delivered, with over 158,600 surveys with valid trip information that can be used for analysis of travel patterns. The 2022 TTS obtained an overall sampling rate of 5.1% of households in the survey area when including surveys with household and demographic information only, or 4.4% of household in the survey area with valid travel information for the sampled travel day. The exception to this was Kawartha Lakes, which was funded to be a 2.5% sampling rate, and which achieved a 3.2% sample of households and a 2.7% sample of households with valid trip information.

The 2022 TTS used a similar methodology to the 2016 TTS. Advance letters were sent out to notify households about the study and to help emphasize the legitimacy of the study. There were some differences in the letter appearance (letterhead and signatory) and content (privacy information, clearer call to action). A communications strategy was developed to help partner agencies advertise the survey to the public. The communications approach was limited as the 2022 TTS did not have a proactive communications strategy and generally relied on whatever communication efforts partners could reasonably undertake.

The 2022 TTS was the second cycle to incorporate both address-only and address-and-phone sample types. The use of address-based sampling is the best approach to maximize the representativeness of the final dataset as it increases coverage of dwellings in the TTS area, includes better coverage of apartments and allows households with cell phones and/or household without landline phone service to participate. Address-based sampling is a common methodology used in other international jurisdictions' travel surveys including the most recent US National Household Travel Survey (2022) as well as the UK's National Travel Survey (2022), as well as for travel surveys conducted in numerous other jurisdictions across Canada. While response rates were somewhat lower than initially planned for, necessitating the sending of more survey invitation letters, address-based-sampling was proven to still be a viable method of completing a travel survey with a representative sample of households across the broad geography of the study area, particularly given the low telephone response.

The 2022 TTS was the third cycle to incorporate the use of an online version of the TTS instrument. In 2011, the TTS online instrument was only available in English, and only used by 11% of respondents. The 2016 and 2022 TTS online survey instruments were programed in both English and French. In the past two cycles, the majority of surveys were completed online (65% in 2016 and 88.3% in 2022), with a smaller proportion completed by phone (36% in 2016 and 11.7% in 2022). When planning for the 2022 TTS, it was anticipated that the online survey would be the preferred method of completion for most participants as it is generally well-accepted and a

widely used option among those randomly selected to participate in the survey. While online completions were often obtained with very little outbound calling, it should be noted that considerable efforts are needed to provide email and telephone support to online respondents, follow-up with partial online survey completions (including survey interviews with abandoners to complete the survey with them over the phone), and data review and follow-up to clarify answers to the online survey.

The call centre was set up in the Etobicoke area to carry out the telephone survey completions. The call centre space accommodated approximately 100 workstations, with approximately 40 of those filled across any given week of surveying. The location was accessible to the large group of staff hired over the duration of the project, with the Islington subway station located approximately 200 metres away from the call centre location. Other Malatest offices in Victoria, BC and Ottawa, ON supported the Toronto office in executing the data collection and analysis portion of the study. Overall, approximately 277 staff were newly hired for the 2022 TTS.

Completions by telephone were lower than expected, likely due in part to developments in technologies offered by large telecommunications companies that enable users' ability to screen unwanted/unknown callers. While voicemail messages were left if the respondent did not answer the telephone, extra impetus is likely required for potential respondents to call back or access the survey online as compared to a live conversation with a surveyor. Online response rates were also somewhat lower than expected based on response in 2016. The reduced response by both survey modes may be the product of a number of factors, including shifts in some citizen's engagement in surveys and with their governments, the more limited communications campaign in this survey cycle, and/or 'online fatigue' due to a shift to doing more activities online during the pandemic. Given that the survey was conducted at time when society was emerging from a period of considerable disruption due to the pandemic, it is possible that future surveys could see some recovery in response rates.

The 2022 TTS captured trips from those 5+ years of age (compared to prior cycles where trips were captured from those aged 11+ years) and included walking trips with a trip purpose (while continuing to exclude recreational walk trips). New categories to pre-existing questions as well as several new questions were added to the 2022 TTS. Specifically, additional categories were added to the household income question to ensure household income was captured at a more granular level. Also new to the 2022 TTS were two questions asking respondents about their ethnic origin and how recently household members had immigrated to Canada, if not a Canadian citizen at birth. Given the impact of COVID-19 on travel and commuting patterns, the survey asked about weekday travel to work for those with a usual workplace outside the home to provide the TAC with information on the frequency and patterns of commuting. Additional updates to the 2022 TTS included the addition of a 'gender diverse' category, the addition of eight new occupation type categories, a new e-mobility category for mode of travel, and nine new trip purpose categories.

In total, the 2022 TTS obtained 162,758 survey completions that included trip information prior to validation. The number of supplementary survey completions with completed household and person information but incomplete trip information was 33,103 prior to validation, for a total of

195,861 total surveys prior to validation. After validation, there was a final dataset of 158,662 surveys with full trip information, and 27,429 with household and person information only, for a total of 186,091 surveys, which is over the target of 181,514 surveys. It may be noted that the 158,662 surveys with trip information are those that will be relied on for analyses of travel patterns.

The 2022 survey saw a reduction in the number of trip records captured, with average daily trip rates dropping by about 10.6% relative to previous cycles.¹⁰ This recent significant drop in trip-making can be associated with the changes in travel patterns brought about by the COVID-19 pandemic. The pandemic has had a profound and persistent impact on many areas of human activity, including social and recreational activities, online commerce, and work arrangements, particularly the increase in people working from home and people with hybrid work arrangements (commuting some days, working from home other days). The most severe impacts of the pandemic-induced impacts on people's activity and the corresponding changes in travel behaviour had receded by the time the survey was conducted in Fall 2022; however, some activity and travel behaviours may still have been in flux. Some may still be subject to further change from what was observed in the 2022 survey, particularly due to the evolving state of work-from-home and hybrid work arrangements.

Despite the representativeness of the 2022 TTS data, caution should be taken when comparing results to previous cycles. There are differences across TTS cycles in terms of the samples, survey methods, trip capture and post-survey data processing. Readers are referred to the *2022 TTS: Data Guide* and the *2022 TTS: Data Expansion and Validation* report available under separate covers for further detail on differences between the 2022 TTS and previous survey cycles.

¹⁰ When comparing household members 11+ years of age, excluding non-commute walking trips that would not have been captured in previous surveys: an average of 2.26 daily trips per person 11+ in 2016, and 2.02 in 2022.

APPENDICES

Appendix A: Examples of Survey Invitation Letters

Fall 2022 External to GTHA version


Ministry of Transportation
Office of the Deputy Minister
777 Bay Street, 5th Floor
Toronto [ON M7A 1Z8](#)

Ministère des Transports
Bureau du sous-ministre
777 rue Bay, 5e étage
Toronto [ON M7A 1Z8](#)



[Mailing Date]

[NameEN]
[Full Unit Address]
[City] [Prov] [Postal]



Log in at TTS2022.ca
Your secure access code is
[access code]

Dear [NameEN],

Your household has been randomly selected to represent your community in the 2022 Transportation Tomorrow Survey. The Transportation Tomorrow Survey is an important travel survey, conducted on behalf of the Province of Ontario, your municipality and other municipalities in the Greater Golden Horseshoe (GGH) and surrounding areas. Every five years for the past 35 years, this survey has collected travel information of people in your community to support planning for transportation infrastructure and services.

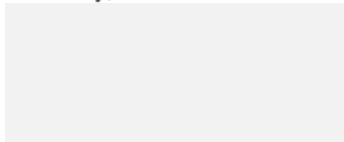
The survey is voluntary. You may be contacted by telephone in the coming weeks and asked to spend about 10-20 minutes answering transportation-related questions. Alternatively, you can complete the survey online at www.TTS2022.ca using your secure access code at the top of this letter, or call 1-877-216-7786 (toll-free). It's important that one person complete the survey for the entire household (regarding the travel of household members 5 years of age and older).

Your survey responses will be anonymous, and will be combined with other responses in your area in order to identify travel patterns. Please see the "Notice" section in the enclosed information page for more details on how we use your information.

Your household's participation in this voluntary survey is critical to the project's success. The Transportation Tomorrow Survey is an important tool to support planning for transportation infrastructure and services across the GGH and surrounding areas. If you have any questions, please use the contact information in the "Notice" section.

Thank you for participating.

Sincerely,



Doug Jones
Deputy Minister of Transportation



transport tomorrow

SURVEY 2022

Ministry of Transportation

Office of the Deputy Minister

777 Bay Street, 5th Floor
Toronto ON M7A 1Z8

Ministère des Transports

Bureau du sous-ministre

777 rue Bay, 5e étage
Toronto ON M7A 1Z8



[Mailing Date]

[NameFR]
[Full Unit Address]
[City] [Prov] [Postal]

Connectez-vous à
TTS2022.ca
Votre code d'accès sécurisé :
[access code]

Cher(ère) [NameFR],

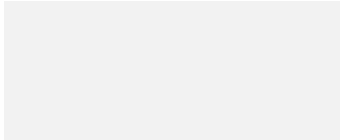
Votre ménage a été sélectionné au hasard pour représenter votre communauté dans le cadre du Sondage pour le système de transports de demain (SSTD) de 2022. Il s'agit d'un important sondage sur les déplacements mené au nom de la province de l'Ontario, de votre municipalité et d'autres municipalités de la région élargie du Golden Horseshoe (REGH) et ses environs. Tous les cinq ans depuis les 35 dernières années, ce sondage permet de recueillir de l'information sur les déplacements des résidents de votre communauté afin de guider la planification des infrastructures et des services de transport.

La participation au sondage est volontaire. Nous envisageons communiquer avec vous par téléphone dans les semaines à suivre pour vous poser des questions sur vos déplacements; l'appel durera environ 10 à 20 minutes. Vous pouvez également répondre au sondage en ligne à l'adresse TTS2022.ca en entrant le code d'accès sécurisé inscrit en haut de la page, ou par téléphone au 1-877-216-7786 (sans frais). Il est important qu'une seule personne réponde au sondage pour le ménage (les réponses doivent concerner les déplacements des membres de 5 ans et plus).

Vos réponses seront anonymes, et seront combinées à celles des autres personnes de votre région afin d'identifier les habitudes de déplacement. Veuillez consulter la section « AVIS » de la page d'informations ci-jointe pour plus de détails sur la façon dont nous utilisons vos informations.

La participation de votre ménage à ce sondage volontaire est essentielle à la réussite du projet. Le SSTD 2022 est un outil important pour guider la planification des infrastructures et des services de transport dans la REGH et ses environs. Si vous avez des questions, veuillez utiliser les coordonnées de la section « AVIS ».

Merci de votre participation. Veuillez agréer mes sincères salutations.



Doug Jones
Sous-ministre des Transports



Spring 2023 External to GTHA version

Ministry of Transportation

Ministère des Transports

Integrated Policy and Planning Division

Division des politiques et de la planification

System Planning Branch
438 University Ave. 12th Floor
Toronto ON M5G 2K8

Direction de la planification des transports
438, avenue University, 12^e étage, Toronto
ON M5G 2K8



[Mailing Date]

[NameEN]
[Full Unit Address]
[City] [Prov] [Postal]

Log in at TTS2023.ca
Your secure access code is

[access code]

Dear [NameEN],

We need your help to shape the future of transportation in your community. Your participation in the 2023 Transportation Tomorrow Survey will help improve transportation services you use every day in your neighbourhood.

Your household has been selected to complete a short survey about your travel patterns. This information will help answer important questions, such as:

- How can traffic on our roads be reduced?
- How can transit connectivity make my life easier and more affordable?
- How can transportation for everyone in my neighbourhood be improved (e.g., driving, public transit, walking, cycling)?

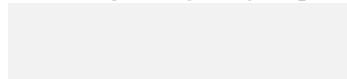
R.A. Malatest & Associates is conducting this survey on behalf of the Ontario Ministry of Transportation, your municipality and other municipalities in the Greater Golden Horseshoe (GGH) and surrounding areas. Please see the enclosed brochure for more details on the study.

Please complete the survey by:

- Visiting TTS2023.ca and entering the secure access code above; or
- Calling the toll-free survey hotline at 1-877-216-7786 to do the survey over the phone (available in multiple languages, including: 普通话 [普通話], 广州话 [廣州話], ਪੰਜਾਬੀ, Tagalog, and اَرَبِيَّة). You may also be contacted by a professional interviewer to complete the survey over the phone.

Your survey responses remain anonymous and are protected under applicable privacy legislations. Refer to the enclosed brochure or TTS2023.ca for more information.

We thank you for participating in this important study!



Greg Malczewski,
Director



transportation tomorrow

SURVEY 2022

Ministry of Transportation

Integrated Policy and Planning
Division

System Planning Branch
438 University Ave., 12th Floor
Toronto ON M5G 2K8

Ministère des Transports


Division des politiques et de la planification

Direction de la planification des transports
438, avenue University, 12^e étage, Toronto
ON M5G 2K8



[Mailing Date]

[NameEN]
[Full Unit Address]
[City] [Prov] [Postal]



Log in at TTS2023.ca
Your secure access code is
[access code]

Dear [NameEN],

We need your help to shape the future of transportation in your community. Your participation in the 2023 Transportation Tomorrow Survey will help improve transportation services you use every day in your neighbourhood.

Your household has been selected to complete a short survey about your travel patterns. This information will help answer important questions, such as:

- How can traffic on our roads be reduced?
- How can transit connectivity make my life easier and more affordable?
- How can transportation for everyone in my neighbourhood be improved (e.g., driving, public transit, walking, cycling)?

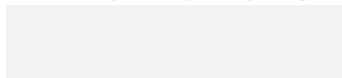
R.A. Malatest & Associates is conducting this survey on behalf of the Ontario Ministry of Transportation, your municipality and other municipalities in the Greater Golden Horseshoe (GGH) and surrounding areas. Please see the enclosed brochure for more details on the study.

Please complete the survey by:

- Visiting TTS2023.ca and entering the secure access code above; or
- Calling the toll-free survey hotline at 1-877-216-7786 to do the survey over the phone (available in multiple languages, including: 普通话 [普通話], 广州话 [廣州話], ਪੰਜਾਬੀ, Tagalog, and العربية). You may also be contacted by a professional interviewer to complete the survey over the phone.

Your survey responses remain anonymous and are protected under applicable privacy legislations. Refer to the enclosed brochure or TTS2023.ca for more information.

We thank you for participating in this important study!



Greg Malczewski,
Director



Appendix B: Informational Brochure

Help shape transportation in Ontario!



Whether you walk, cycle, bus or drive, your participation in this survey will help improve transportation services in your neighborhood.

How do I participate?
Online
 Log in at tts2023.ca using your secure access code located at the top of your letter.

By Phone
 Call (toll-free) at 1.877.216.7786 to complete the survey with a professional interviewer.
 To complete the survey in another language including 普通话 (普通话), 广州话 (廣州話), ਪੰਜਾਬੀ, Tagalog, and العربية call 1.877.216.7786

What will I be asked?
 We will ask about the travel of each household member on a particular day, specifically where, why and how trips were made.
 We will also ask you a few questions about your household, type of housing, number of vehicles, bicycles, and ages of residents.
 The survey will take between 10 to 20 minutes or more depending on the size of your household.



Privacy
 Our survey team is committed to your privacy. Any information collected will be protected per the provisions of the Freedom of Information and Protection of Privacy Act.

Names, addresses and phone numbers are destroyed at the conclusion of the survey's data collection phase and before responses are received by the Ministry or partners.

For more information please visit: www.tts2023.ca

Questions or comments!
 Please contact us at 1.877.216.7786 or email us at info@tts2023.ca.



Aidez à façonner le transport en Ontario!



Que vous soyez à pied, à vélo, en bus ou en voiture, votre participation à ce sondage contribuera à améliorer les services de transport dans votre quartier.

Comment puis-je participer ?
En ligne :
 Connectez-vous à TTS2023.ca en utilisant votre code d'accès sécurisé en haut de votre lettre.

Par téléphone :
 Appelez (sans frais) le 1.877.216.7786 pour compléter le sondage avec un enquêteur professionnel.
 Pour répondre au sondage dans une autre langue y compris le 普通话 (普通话), 广州话 (廣州話), ਪੰਜਾਬੀ, Tagalog, et العربية appelez le 1.877.216.7786.

Que me demandera-t-on ?
 Nous posons des questions sur les déplacements de chaque membre du ménage par rapport à une journée prédéfinie. Le sondage recueille des données sur la destination des déplacements, le but et le mode de transport utilisé.
 Nous vous poserons quelques questions sur votre ménage (type de logement, nombre de véhicules et de vélos, âges des membres du ménage).
 Le sondage prend de 10 à 20 minutes ou plus, selon la taille de votre ménage.



Confidentialité
 Notre équipe s'engage à respecter votre vie privée. Toute information recueillie sera protégée conformément à la Loi sur l'accès à l'information et la protection de la vie privée.

Les noms, adresses et numéros de téléphone sont détruits à la fin de la phase de collecte de données du sondage et avant que les réponses ne soient reçues par le ministère ou ses partenaires.

Pour plus d'informations, visitez : www.tts2023.ca

Questions ou commentaires !
 Veuillez nous contacter au 1.877.216.7786 ou par courriel : info@tts2023.ca.



Appendix C: Transportation Tomorrow Survey 2022 Communications Strategy

Background

The Transportation Tomorrow Survey (TTS) is a confidential and voluntary travel survey on how Ontarians in the Greater Golden Horseshoe and surrounding area use the transportation system. The information collected is an important data source for local and regional governments, as well as the province and its agencies. The results have been used in transportation planning and investment decisions since the TTS was first conducted in 1986. The survey is repeated every five years.

The TTS 2022 is jointly undertaken by 25 funding agencies including the Ministry of Transportation of Ontario (MTO), Metrolinx, the TTC, and municipalities across the Greater Golden Horseshoe and surrounding area. Starting in early September 2022, survey invitation letters will be sent to randomly selected households with details on the purpose of the survey and the types of information being collected. Participants will have the option of completing the survey by phone or online. The letters will be mailed in large batches twice a week throughout the Fall of 2022 and the Spring of 2023.

We strongly recommend supporting this survey with a strong communications campaign conducted locally in each municipal jurisdiction participating in the survey, with the support of MTO for assistance with messaging and region-wide communication. Outlined in this document are recommendations from R.A. Malatest & Associates Ltd. for communications strategies to support the 2022/23 Transportation Tomorrow Survey.

A good portion of the households to be contacted do not have listed land line phone numbers (including many younger households who are important to include for the survey to be representative). This means that the main method of contact for many households will be the letter inviting them to log on or call in to participate. If the message is out there that the survey is important for improving transportation planning and if there is 'brand recognition' of the Transportation Tomorrow logo, this will boost participation when such households receive the invitation letter. Having information about the survey readily available on the websites of each municipal jurisdiction will also reaffirm the legitimacy of the survey.

If participating municipalities are able to provide effective communications support for the survey, it will provide the best chance possible to meet—or even exceed—survey targets for their municipality and obtain a more robust data set for transportation planning.

Communication objectives

- Create survey awareness, recognition, and acceptance among residents of the Greater Golden Horseshoe and surrounding areas.
- Establish the legitimacy of the survey to encourage participation.
- Foster a sense of shared responsibility and ensure all residents realize that the importance of their participation is an investment in their future. The advantages of

acquiring this data directly affect future development and transportation planning in their neighbourhoods, communities and cities.

Target Audiences

- Residents of the participating municipalities
- City Councillors and other local government officials
- Provincial and Federal Government officials (i.e., MPs, local MPPs)
- Police (i.e., municipal, provincial)
- Transportation advocacy groups
- Transportation advisory committees
- Media
- Municipal client service centres /municipal call centre staff/public transit properties
- Provincial and municipal staff

Strategic Approach

The campaign will occur between the months of September and December 2022 and March-April 2023 and should be highly visible, as close to 1.5 million households will be asked to participate, with the goal of obtaining approximately 182,000 completed surveys. Those involved in communication with the public and the media should be prepared for questions about how the survey research relates to transportation planning for the region.

All residents who are selected to participate will be sent a letter before receiving a phone call to take part in the survey. Batches of letters will be sent twice a week over the duration of the data collection phase of the project. Letters will notify residents that they have been selected to participate, provide information on the questions asked, and instruct them how to complete the survey in the method of their choice (online or telephone).

Information about TTS will be available on the MTO website as well as the website dedicated to this wave of the project (Phase 1 Fall 2022 surveying period website: TTS2022.ca; Phase 2 Spring 2023 surveying period website: TTS2023.ca), where residents can also go to complete the survey online. Information packages will also be prepared for government officials and the media prior to the official launch of the survey.

Partner agencies are encouraged to promote the study on their own website, using social media tools (Instagram, Facebook, Twitter), direct advertising, and/or through onboard advertisements on public transit or at transit stops.

A media engagement strategy should also be used. Regular updates should be shared with the media to keep them engaged during the entire campaign with quotes from local politicians and transit officials explaining the importance of the study, how results will be used to improve transportation planning, and encouraging residents that have been selected to participate.

Key Messages

- You may get a very important letter from MTO inviting you to participate.
- If so, you have the opportunity to help shape your region's transportation future by providing information on your travel patterns that can be used to make informed transportation decisions.
- Approximately 182,000 households randomly selected from across the greater Golden Horseshoe and surrounding areas will complete the survey.
- This important telephone survey is being undertaken on behalf of the MTO and 25 partner agencies.
- The survey is confidential and will only take 10-20 minutes of your time. This time will be a direct investment in your future by contributing to transportation planning where they live.
- The survey questions focus on where members of the household five years of age and older travelled the previous day, how they got to and from their destinations, as well as a few demographic questions.
- It is important that we gather information from residents from all walks of life who use every mode of transportation – including drivers, public transit users, cyclists, and pedestrians, regardless of how many trips they took.
- The COVID-19 pandemic has shifted our travel patterns, and therefore it is equally important to highlight that even if no trips were made, residents can still participate as they are still providing valuable contributions to the research.
- Data gathered from this survey will be used for years to come by planners across the province to better assess the transportation needs and infrastructure requirements.
- Residents who wish to complete the survey can do so by going online (Phase 1 Fall 2022 surveying period website: TTS2022.ca; Phase 2 Spring 2023 surveying period website: TTS2023.ca) or by calling 1-877-216-7786 (toll-free). They will need to have their secure access code from their advance letter on-hand to participate.

Communications Tactics

Survey Invitation Letter. An invitation letter will be mailed to all households to advise people that they have been randomly selected to participate in the TTS and how they can participate. The letter will be on Ministerial letterhead and will carry the logo of their municipality and the signature of the Ontario Minister of Transportation. Not all invitation letters will be mailed at the same time. Batches of letters will be sent twice a week to ensure completed surveys are evenly distributed across the duration of the data collection period.

Information packages. Information packages will be developed for City Councils, Transit and Transportation officials, transportation advocacy groups and advisory committees, municipal client service centres and front-line call centre staff, police, and other government groups. These packages will provide background on the study, the type of information collected, how

households will be contacted, frequently asked questions, and points of contact for residents with further questions or concerns.

Web content. A dedicated website for each wave of the survey has been established (Phase 1 Fall 2022 surveying period website: TTS2022.ca; Phase 2 Spring 2023 surveying period website: TTS2023.ca). According to the survey period, the website will be noted on invitation letters and will provide additional information about the study. The website will serve as a portal to complete the survey online, where residents can log on using their secure access code indicated on the invitation letter. The TTS will also be featured prominently on the MTO website as a way of promoting the survey and confirming the legitimacy of the study.

Participating agencies are encouraged to feature information about the study prominently on their own websites. A high-quality TTS logo will be provided as well as text outlining:

- Background on the study
- Importance of participating
- How to participate (with a link to TTS2022.ca for Fall survey; and TTS2023.ca for Spring survey)
- Frequently asked questions
- Points of contact for further information

Social media. In addition to posting information about the TTS on their websites, partner agencies are encouraged to promote the study through their existing social media accounts (i.e., Facebook, Twitter, Instagram, Snapchat), as well as other platforms such as e-newsletter lists.

Transit properties. Participating agencies are encouraged to feature communication promoting survey participation onboard their public transit vehicles (i.e., buses, subway, street cars), at bus/subway stops and stations.

Advertisements. A comprehensive ad campaign to cover the entire survey target area will be required. Given the costs of radio, television and display advertising, each agency should determine what their budget is and where advertising is available for free or at reduced rates (i.e., community newsletters/papers). Agencies should make use of daily papers, community papers, and commuter papers to ensure extensive, cross-cultural, and long-lasting coverage that will reach all demographics.

Roadside signs, billboards, and/or traffic displays. Participating municipalities should also consider promoting the study using road signage on high volume traffic corridors. Roadside advertising has also been proven to be highly effective in previous such surveys. For example, roadside signs (posters on portable roadside sign boards about 6 feet high by 8 feet wide) set up at the side of major thoroughfares and moved to different locations during the course of survey administration, were seen by 27% of participants in the Edmonton & Region Household Travel Survey. Municipalities or agencies that are able to leverage such resources are encouraged to do so.

Earned media. There is a need to maintain community awareness of the survey over the course of the campaign. A TTS spokesperson should be selected to represent the group. Each partner organization should select a point of contact for the media as well. Following the launch, interviews should be coordinated with local radio and television stations to help raise awareness of the TTS. The following items will be provided to partner agencies for distribution to media outlets:

Press releases. A press release will be provided at the beginning of each survey wave (Fall 2022/Spring 2023). It will outline the background and purpose of the TTS and include information about how residents who are randomly selected can participate. Press releases may also be provided throughout the study to highlight progress and some preliminary results.

Op-ed articles. A catchy article for publication in community papers, school papers, councillors' columns and websites, and other newsletters will be provided for use. This piece will outline the background and purpose of the TTS and encourage those selected to participate to respond. The article will also indicate where partner agencies may include quotes from a local official or representative to underscore the importance of the study and how it will enhance residents' travel throughout the region. Further articles may be provided throughout the course of the study, providing updates and interesting pieces of information from surveys completed at that time.

Posters. Posters can be used in a variety of settings including recreation facilities, libraries, government offices and public spaces. Posters have been created for use by the partnering municipalities, in both portrait and landscape format. Municipalities will be provided with the design files, providing them with the ability to adapt the poster size and images used in order to suit their communication needs.

Appendix D: 2022 TTS Fact Sheet

The Transportation Tomorrow Survey (TTS) is a confidential and voluntary travel survey on how Ontarians in the Greater Golden Horseshoe and surrounding areas use the transportation system. The data collected helps local and regional governments, as well as the province and its agencies make transportation planning and investment decisions. The survey has been conducted every five years since 1986.

The TTS is jointly undertaken by 25 funding agencies including the Ministry of Transportation of Ontario (MTO), Metrolinx, the TTC, and municipalities across the Greater Golden Horseshoe and surrounding area. The data collection for the 2022 TTS will take place in two phases, during the Fall of 2022 and Spring of 2023. Survey invitation letters will be sent to randomly selected households with details about the survey and instructions on how to complete the survey online or by phone.

1. **Survey Type:** Household travel survey.
2. **Survey Methodology:** Interviews conducted by telephone or online to collect information related to household travel on the previous weekday.
3. **Type of Information Collected:** There are three types of factual information collected in the survey:
 - **Household Information:** Home location, number of people, dwelling type (single family, apartment), and total household income range.
 - **Individual Information:** Age, gender, year range of immigration (if an immigrant), ethnic origin, employment status (work full-time, part-time), work location, parking arrangements at work (free, paid), telecommute on survey day, student status (attend school), school location, transit pass, and occupation.
 - **Trip Information:** Origin and destination, mode of travel (car driver, car passenger, transit, bike, walk, taxi/Uber, etc.), trip purpose (work, school, etc.), start time, travel route information (transit trips only).
4. **Survey Duration:** The 2022 TTS will occur in two phases. Phase 1 begins in the Fall of 2022, and Phase 2 begins in the Spring of 2023.
5. **Survey Letters and Phone Contact:** Households will receive a survey invitation letter under the Minister's/Deputy Minister's signature. Households with listed phone numbers will also receive phone calls (caller display: "Ontario Gov't").
6. **Telephone Call Timing:** Telephone calls will be made from 5:00 PM to 9:30 PM on weeknights and from 10:00 AM to 6:00 PM on Saturdays.
7. **Survey Sample:** For the main survey administration, approximately 1.4 million households will be contacted.
8. **Survey Area:** The survey area includes the Cities of Barrie, Brantford, Guelph, Hamilton, Kawartha Lakes, Orillia, Peterborough and Toronto; the Counties of Brant, Dufferin, Grey, Northumberland, Peterborough, Simcoe and Wellington; the Regional Municipalities of Durham, Halton, Niagara, Peel, Waterloo and York; and The Town of The Blue Mountains and the Town of Orangeville.

Appendix E: TTS Frequently Asked Questions

Q1: What is the Transportation Tomorrow Survey (TTS)?

A1: The TTS is a voluntary household travel survey that collects information about daily travel. Survey participants are asked about each member of their household's (over the age of 5) travel on the previous weekday.

The Ontario Ministry of Transportation conducts this survey every five years and the information collected is used to support planning for transportation infrastructure and services.

Q2: Is this survey legitimate?

A2: Yes, the Ontario Ministry of Transportation mailed letters to randomly selected households inviting them to participate in the survey either by telephone, or online. The study is supported by regional, municipal, and local agencies in the Greater Golden Horseshoe and surrounding areas.

More information is available on the survey website TTS2022.ca. The Ministry of Transportation may also be contacted by telephone at 1-800-268-4686.

Q3: How is my privacy protected?

A3: Any information obtained from each household and held by the Ministry of Transportation of Ontario or its funding partners is processed, stored, and used in a form that does not permit any particular household or individual to be identified. Names, addresses, and phone numbers are destroyed at the conclusion of the survey's data collection phase and before responses are received by the Ministry or its funding partners.

Q4: Who is sponsoring this survey?

A4: The survey is co-funded by local municipal governments as well as the Ontario Ministry of Transportation. A total of 25 local and regional municipalities and transit operating agencies from the Greater Golden Horseshoe and surrounding area, as well as Metrolinx and the Toronto Transit Commission, are involved in this survey.

Q5: Is the survey mandatory?

A5: Participation in the survey is voluntary.

Q6: What information will be collected from this survey?

A6: The survey will collect previous weekday trip related information such as start of trip (origin), trip purpose, and where the trip ends (destination) for each household member. In addition, demographic details, such as age and employment are asked to understand the household composition.

Q7: I'm retired / I don't travel anywhere / I don't often leave the house. Should I participate?

A7: Yes, residents who do not travel are just as important as those that do. Your survey answers will help build a snapshot of the travel patterns of the population as a whole, including people who did not travel on the day for which travel information is being provided. Your participation will ensure the survey reflects the make-up of the general population.

Q8: Why does the survey ask questions about ethnic origin and immigration status?

A8: These questions will help us understand whether we have surveyed a representative sample of the entire population. The survey will help us better understand the different transportation needs and travel patterns of all residents of our region, and whether access to transportation is equitable for all population groups. These questions, like other questions on the survey, are entirely voluntary.

Q9: What will be done with the data collected from this survey?

A9: The information on travel patterns will help planners better understand residents' current transportation choices and trip purposes. Your responses will be combined with other responses in your area and the results will be used to help plan transportation infrastructure and services in communities in the Greater Golden Horseshoe and surrounding area to better accommodate residents' needs.

Q10: Who will be surveyed?

A10: Households are randomly selected based on geography from a survey area that includes the Cities of Barrie, Brantford, Guelph, Hamilton, Kawartha Lakes, Orillia, Peterborough and Toronto; the Counties of Brant, Dufferin, Grey, Northumberland, Peterborough, Simcoe and Wellington; the Regional Municipalities of Durham, Halton, Niagara, Peel, Waterloo and York; and the Town of The Blue Mountains and the Town of Orangeville.

Q11: When will the survey take place?

A11: The TTS will occur in two phases. Phase 1 begins in the Fall of 2022, and Phase 2 begins in the Spring of 2023. If you received invitation and completed the survey in Fall 2022, you will not be contacted again in Spring 2023.

Q12: How long will the survey take?

A12: The survey should take about 10 - 20 minutes. The length depends on the number of people in the household and how many trips were taken the day before the interview.

Q13: Can I schedule a time to be called?

A13: Yes. To make an appointment to be interviewed please phone 1-877-216-7786. Please leave a voicemail that includes the date and time as well as your household's secure access code, found on the survey invitation letter.

Q14: Can the survey be completed online?

A14: Yes. An online version of the survey is available at TTS2022.ca. The survey can be accessed by entering the household's unique secure access code found on the survey invitation letter.

Q15: Can the survey be completed in languages other than English?

A15: Yes. Surveys can be completed online and by phone in both English and French. If you have received a survey invitation and cannot do the survey in English or French, please call us at 1-877-216-7786 (toll-free) to complete the survey over the phone with one of our surveyors in another language.

Q16: Who will conduct the survey?

A16: R. A. Malatest & Associates Ltd. will conduct the survey on behalf of the participating government agencies.

Q17: Is there a monetary incentive if I complete the survey?

A17: Monetary incentives will not be given for completing the survey, however, your participation in this survey is critical to support planning for transportation infrastructure and services in your community.

Q20: Why is this survey taking place during the COVID-19 pandemic?

A20: The TTS has been conducted every five years since 1986. The research helps local and regional governments, as well as the province and its agencies, make transportation planning and investment decisions. The latest cycle of the TTS was originally scheduled for 2021. Due to the impact of the pandemic on daily travel patterns, the full survey has been postponed to the Fall of 2022. In February 2022, a pilot survey was conducted with a small sample of households that helped us assess the stability of travel patterns. The pilot survey results, along with the results of the full survey in Fall 2022, will also help us to better understand long-term trends in travel patterns throughout the COVID-19 pandemic.

Appendix F: TTS Launch Opinion Article

Fall 2022: Province of Ontario launches massive travel survey

The Ontario Ministry of Transportation is set to launch the Transportation Tomorrow Survey, one of the largest household transportation studies in North America. Starting in September 2022, researchers will reach out to randomly selected households in the Greater Golden Horseshoe and surrounding areas and ask residents to provide general information about the trips they -- and other members of their household -- took the previous day. In total, close to 1.4 million households will be contacted.

The survey will take between ten to twenty minutes to complete depending on the size of the household and will ask where and when residents travelled the previous day and how they made those trips, as well as a handful of demographic questions that will ensure the data collected is representative of the Ontario population. Even residents that did not make any trips can still participate, as residents who do not travel are just as important as those that do. This will help build a snapshot of the travel patterns of the population as a whole.

Results from the survey will help the Ministry of Transportation (MTO), the Toronto Transit Commission (TTC), Metrolinx and twenty-five partnering municipalities plan transportation infrastructure to respond to the changing needs of the population.

[BLOCK QUOTE ENCOURAGING PARTICIPATION AND CITING HOW DATA HAVE BEEN USED IN THE PAST]

This is the eighth wave of the Transportation Tomorrow Survey, which has run every five years since 1986. [Insert name of official or agency representative] asks anyone who receives a letter to participate by completing the survey online at TTS2022.ca, or by calling the survey hotline at 1-877-216-7786 to complete the survey over the phone. For more information, visit TTS2022.ca.

Spring 2023: Ontario's Transportation Planning Survey

TORONTO – Spring is here, and the Transportation Tomorrow Survey (TTS) has resumed data collection activities. As one of the largest household travel surveys in North America, findings from the TTS helps the province of Ontario, transit agencies and municipalities understand the transportation needs of residents from the Greater Golden Horseshoe and surrounding areas.

Preliminary unweighted results from the fall of 2022 round of surveying for TTS have provided invaluable insights. While the pandemic is mostly over, people across the Greater Golden Horseshow Area continue to work from home in greater numbers than pre pandemic days.

According to the latest TTS data from the fall of 2022, 17% of residents across the GGHA worked from home. This represents almost a fifty percent decrease in the proportion of individuals working from home compared to when the census was conducted in 2021.

While work from home has reduced drastically since the time the 2021 Census was conducted, it is still more than double the amount in the 2016 Census and 2016 TTS when only 7% of GGHA residents were working from home. During the pandemic, women were more likely to work from home compared to men. As things have opened up, work from home has decreased, though women are still more likely than men to work from home, especially outside the City of Toronto.

So far, upwards of 100,000 surveys have been collected during the first phase of the TTS that began in September 2022. In efforts to reach a total of 170,000 completed surveys by June 2023, the participation of residents in the Greater Golden Horseshoe and surrounding areas is more crucial than ever. Starting in the second week of April 2023 and running till June 2023, randomly selected households will be contacted to take part in the spring round of data collection.

These households will receive an official invitation letter informing them they have been selected to take part in the survey. The invitation letter will provide households with a secure access code and more information about the survey. Households can participate by visiting the project website at TTS2023.ca, or by calling the survey hotline at 1-877-216-7786.

While other data sources, such as the 2021 Census also collect data on travel patterns, none are as comprehensive as the TTS. The TTS collects travel information for all household members, providing a snapshot of where, how, and why trips occurred. This allows transportation planners to assess the level of transportation demand at the regional as well as municipal level.

In order to obtain a representative sample of the population, it is important to hear from residents across all areas being surveyed, whether residents made trips on that given

day or not. The information collected by the TTS will help improve local transportation and help answer key questions such as how to reduce gridlock on our roads, and how to plan future infrastructure needs that can accommodate all modes of transportation.

While the survey is voluntary, success of the TTS data collection efforts across the Greater Golden Horseshoe is ultimately dependent on the participation of the residents in these regions to provide responses that reflect the transportation needs specific to each area.

A Canadian-based research firm, R. A. Malatest & Associates Ltd., is conducting the survey on behalf of the Ministry of Transportation, municipal partners and transit planning agencies. All survey responses will remain anonymous and will be combined with other responses in order to identify travel patterns.

If you or a member of your household receives the invitation to participate, you have an opportunity to make sure your region is represented in the TTS and help transportation planners make informed decisions based on your travel patterns, and the patterns of those in your community.

Media Contacts:

[Insert municipal media contact]

For more information, please visit TTS2023.ca

Appendix G: TTS Press Release

NEWS RELEASE For Immediate Release

Ontario's Transportation Planning Survey

TORONTO— This fall, approximately 1.4 million households in the Greater Golden Horseshoe and surrounding areas will be asked to take part in the Transportation Tomorrow Survey (TTS), an exciting travel study looking at the travel habits and preferences of residents. The Transportation Tomorrow Survey is jointly undertaken by 25 funding agencies including the Ministry of Transportation of Ontario (MTO), Metrolinx, the TTC, and municipalities across the study area. Results from this survey will help local and regional governments, as well as the province and transit agencies, make transportation planning and investment decisions.

[Insert quote from municipal government official]

Randomly selected household will receive an official invitation letter informing them they have been selected to take part in the survey. The invitation letter will provide households with a secure access code and more information about the survey. Participation in the survey is voluntary. Households can participate by accessing the project website at TTS2022.ca, or by calling the survey hotline at 1-877-216-7786. Survey questions will focus on trip information for each household member, including origin, destination, time, reason for travel, mode of transportation, as well as some basic demographic questions. Residents that did not make any trips can still participate in the survey, as this helps build a snapshot of the travel patterns of the population as a whole and ensures the survey reflects the make-up of the general population. All survey responses will remain anonymous and will be combined with other responses in order to identify travel patterns.

Canadian-based research firm R. A. Malatest & Associates Ltd. will conduct the survey on behalf of the participating agencies. The study runs from the Fall of 2022 until Spring of 2023 and the results will be and released in 2024. The Transportation Tomorrow Survey has been administered every five years since 1986.

Media Contacts:

[Insert municipal media contact]

For more information, please visit TTS2022.ca

Appendix H: TTS Posters

transportationtomorrow

SURVEY 2023

Help shape how your community moves.



You may receive a letter or a phone call from Transportation Tomorrow to participate in a survey about your travel patterns.

Visit TTS2023.ca to learn more.



Ontario 



Partners for the Transportation Tomorrow Survey

transportationtomorrow

SURVEY 2023

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Ontario



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