Réseau express métropolitain (REM) Survey Report: 2019–2022

TRAM TRANSPORTATION RESEARCH AT MCGILL

McGill

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June 2023

For citation, please use:
Negm, H., Redelmeier, P., Soliz, A., Victoriano-Habit, R., Rodrigue, L., Soto, N., James, M., & El-Geneidy, A. (2023). *Réseau express métropolitain (REM) survey report: 2019-2022*. Transportation Research at McGill (TRAM), McGill University, Montréal, Québec, Canada. https://tram.mcgill.ca/About/REM/REM_report_2023.pdf

Territorial Acknowledgment

We would like to acknowledge that McGill University is located on unceded Indigenous lands. Tiohtià:ke/Montréal has long served as a site of meeting and exchange amongst Indigenous peoples, including the Kanien'kehaì:ka of the Haudenosaunee Confederacy, Huron/Wendat, Abenaki, and Anishinaabeg, among others. TRAM recognizes and respects these nations as the traditional stewards of the lands and waters. We respect the continued relationship these diverse Indigenous peoples have with the territory upon which we now gather.

Research Acknowledgment

We would like to thank Daniel Schwartz from McGill IT Customer Services for his assistance in developing the online survey. We would like to thank the co-applicants on the project Yan Kestens, Geneviève Boisjoly, James DeWeese, Ehab Diab, Daniel Fuller, Kevin Manaugh, Gregory Moullec, Nancy Ross, Lijun Sun, Rania Wasfi, and Meghan Winters for their invaluable help designing the study. We are especially grateful for the ongoing insights from knowledge users: Gregory Butler and Stephanie Prince (Public Health Agency of Canada), Daniel Blais (Transport Canada), David Kaiser (Direction de santé publique de Montréal), Mathieu Lanthier-Veilleux (Direction de la Santé Publique de la Montérégie), Jean-Sebastien Langelier (Infrastructure Canada), François Rousseau (Ministère des Transports du Québec) and Mark Purdon (IQCarboone), and Nicholas Tanguay (Réseau de transport de Longueuil). We would like to thank current and previous TRAM members who contributed to the study Meredith Alousi-Jones, Carolyn Birkenfeld, Thiago Carvalho, Boer Cui, and Léa Ravensbergen. Finally, we would like to thank Tim Elrick (GIC) for training the team members in technical skills. This research is funded by the Collaborative Health Research Projects Grant (CIHR 00035–007) of the Canadian Institutes of Health Research (CIHR) in partnership with the Natural Sciences and Engineering Research Council of Canada (NSERC CHRPJ 549576-20).

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Summary

The Réseau express métropolitain (REM), a new light-rail system that will open its first branch of service in Summer 2023, is expected to have major impacts on residents across the Montréal metropolitan region. This 67-km light-rail network provides an unprecedented opportunity to study a major public transport investment in the Canadian context. This report provides an overview of three waves of surveys conducted by the Transportation Research at McGill (TRAM) Group and Sphere lab in the fall of 2019 (wave one), 2021 (wave two), and 2022 (wave three). The surveys form a part of the multiyear project titled "Impacts of the new Réseau Express Métropolitain (REM) on mobility, health and equity: A pre-post intervention study," funded through the federal government's Collaborative Health Research Projects (CHRP) program. This report documents the methodology used for the surveys, as well as provides a summary of the findings from waves one (N = 3,533), wave two (N= 4,063), and wave three (N= 4,065).

Key Findings

- In terms of **travel behaviour**, car-use frequency increased by 59%, while public transit usage decreased by 65% from 2019 to 2022, with a marginal public-transit recovery of 9% between 2021 and 2022.
- In line with the COVID-19 pandemic, **telecommuting** increased by 140% between 2019 and 2021, and remained at similarly high levels in 2022 when considering hybrid work (a combination of in-person and remote workdays).
- Perceptions regarding **construction impacts** remained mostly stable across the three waves, while the percentage of respondents reporting that they felt well informed about transport alternatives increased.
- Women were disproportionately impacted by the REM's **construction** compared to men across the three waves.
- Respondents' **intentions to use the REM** decreased by 7% between 2019 and 2022. Across the three waves of data collection, women were consistently found to be less likely to use the REM than men.
- **Perceptions** toward the anticipated impacts of the REM were largely positive across the three waves, especially regarding environmental and regional benefits.

Sommaire

Le Réseau express métropolitain (REM), un système de métro léger qui ouvrira en été 2023, devrait avoir un grand impact à travers la région de Montréal. Ce réseau de 67 km offre une occasion inédite pour étudier un investissement majeur en transport en commun dans le contexte canadien. Ce rapport résume les trois vagues de sondage réalisées par le groupe de recherche en transport de l'université McGill (TRAM) et le Sphere lab en automne 2019 (première vague), 2021 (deuxième vague), et 2022 (troisième vague). Les sondages font partie d'un projet continu intitulé « Les impacts du nouveau Réseau express métropolitain (REM) sur la mobilité, la santé et l'équité : une étude pré- et post-intervention » financé par le programme de Projets de recherche concertée sur la santé (PRCS) du gouvernement fédéral. Ce rapport documente la méthodologie utilisée pour les enquêtes et donne un aperçu des résultats tirés de la première vague (N = 3,533), la deuxième vague (N = 4,063), et la troisième vague (N = 4,065).

Principaux Résultats

- Concernant les **habitudes de déplacement**, la fréquence d'utilisation de la voiture a augmenté de 59% alors que celle du transport en commun a diminué de 65% de 2019 à 2022, ce qui inclut une reprise partielle de l'utilisation du transport en commun de 9% entre 2021 et 2022.

- En lien avec la pandémie de la COVID-19, le **télétravail** a connu une croissance de 140% entre 2019 et 2021, demeurant élevé en 2022 lorsque l'on considère le travail hybride (un mélange de travail présentiel et à distance).

- Les perceptions liées aux **impacts de la construction** sont restées stables à travers les trois vagues. En revanche, le pourcentage de répondants ayant répondu se sentir bien informés des modes de déplacement alternatifs a augmenté.

- Les femmes ont été touchée disproportionnellement par la **construction** du REM, comparé aux hommes à travers les trois vagues.

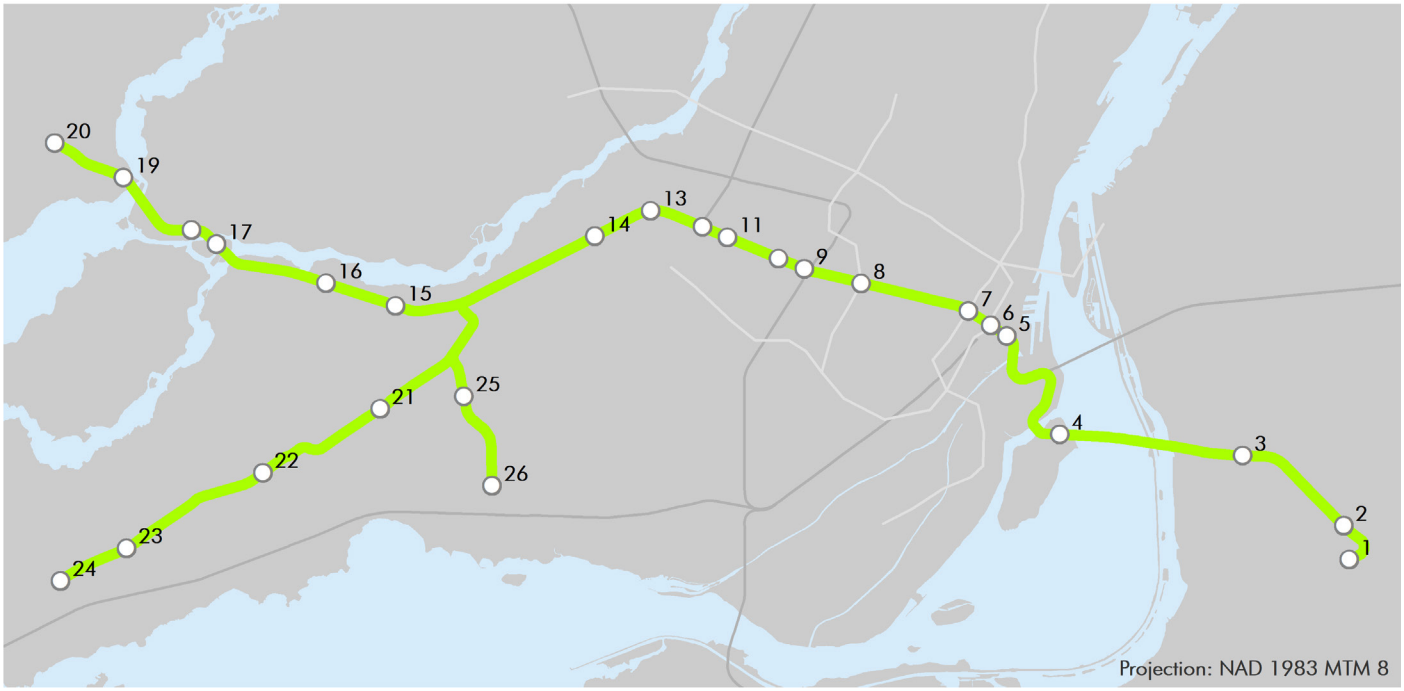
- **Les intentions d'utiliser le REM** ont diminué de 7% entre 2019 et 2022. Pour chacune des trois vagues de sondage, les femmes étaient moins susceptibles d'utilisées le REM que les hommes.

- Les **perceptions** envers les impacts anticipés du REM étaient globalement positives, surtout vis-à-vis les avantages attendus pour la région de Montréal et pour l'environnement.

1 Introduction

In Summer 2023, the Caisse de dépôt et placement du Québec (CDPQ) will begin operating the first branch of the Réseau express métropolitain (REM), a fully automated, 67-kilometer light-rail network in the Montréal region. When complete in 2027, the $7 billion project will link numerous suburbs and the Montréal Pierre Elliott Trudeau International Airport to downtown with frequent, highspeed rail service (Figure 1.1). The project is planned to open in several phases: the first branch to the South Shore will open in Summer 2023, the second two branches will open by the end of 2024, and the final branch to the airport is expected to open in 2027.


Du Quartier REM station



REM stations

1 - Brossard
2 - Du Quartier
3 - Panama
4 - Île-des-Soeurs
5 - Griffintown-Bernard-Landry
6 - Central Station
7 - McGill
8 - Édouard-Montpetit
9 - Canora
10 - Ville de Mont-Royal
11 - Côte-de-Liese
12 - Montpellier
13 - Du Ruisseau
14 - Bois-Franc
15 - Sunnybrooke
16 - Pierrefonds-Roxboro
17 - Île-Bigras
18 - Sainte-Dorothée
19 - Grand-Moulin
20 - Deux-Montagnes
21 - Des Sources
22 - Fairview-Pointe-Claire
23 - Kirkland
24 - L'Anse-à-l'Orme
25 - Marie-Curie
26 - YUL-Aéroport-Montréal-Trudeau

REM line
Metro
Commuter train
Data Sources:
CDPQ Infra, STM
0 2.5 5 10 Km
N

Figure 1.1 Réseau express métropolitain (REM) line and stations

As one of the largest public-transit investments currently being built in North America, this state-of-the-art, universally accessible light-rail network is expected to fundamentally alter travel and land-use patterns across the Montréal region. The REM's construction is already impacting local built-environments and travel behaviours (Daley et al., 2022; Karmann et al., 2023; Rodrigue et al., 2022), with additional impacts projected over the coming decades on the health and wellbeing of residents. In addition to positive impacts on the health of local populations (Coomes et al., 2022; Edwards, 2008; Tétreault et al., 2018; Wasfi et al., 2013), public transit improvements have been associated with environmental (Beaudoin et al., 2015; Miller et al., 2016), social (Currie & Stanley, 2008; El-Geneidy et al., 2016; Foth et al., 2013), and economic benefits (Bowes & Ihlanfeldt, 2001; Cervero & Duncan, 2002).

Due to the considerable impacts that the construction of the REM is having on the metropolitan area, there is a need to understand people's changing perceptions and behaviour before, during, and after the project's implementation. For this purpose, the Montréal Mobility Survey has been implemented as a multi-wave data-collection process which intends to provide longitudinal insights into respondents' perceptions of the REM's impact, and therefore improve overall understanding of such infrastructure developments. A total of three waves of surveys have been collected so far: wave one during the months of October and November of 2019, wave two in October and November of 2021, and wave three in October and November 2022.

The surveys were administered in the Montréal Census Metropolitan Area (CMA) to participants of 18 years of age and older, including a total of 3,533 valid responses in wave one, 4,063 valid responses in wave two, and 4,065 responses in wave 3. Recruitment for each wave was done directly by the TRAM team through online and in-person methods, and additional recruitment was undertaken by the Leger market-research agency.

In addition to collecting multiple waves of data, the Montréal Mobility Survey includes the collection of a panel dataset, which includes people who answered at least two waves of the survey. The longitudinal and panel design of the Montréal Mobility Survey has become particularly relevant since the outbreak of the COVID-19 pandemic. This report makes use of the substantial data collected by the team before (2019) and during (2021, 2022) the COVID-19 pandemic to control for the effects of the pandemic on travel behaviour.

Due to construction delays, the opening of the first branch of the REM was postponed from 2021 to 2023, preventing the inclusion of data from the operational period of the project in this report. The following wave of data collection in Fall 2023 and its analysis will allow for a comprehensive assessment of the impacts of the REM—before, during and after construction—on health, wellbeing, and travel behaviour.

This report focuses on the collection, validation, and analysis of waves 1 to 3 of the Montréal Mobility Survey. Section two presents a detailed description of the survey methods, including the recruitment, data-cleaning, and validation processes. Section three presents the sample's general characteristics and how they compare to census data. Section four details general travel behaviour and telecommuting patterns. Sections five, six, and seven examine changing opinions of the REM across the three waves of data collection, including the impacts of REM's construction, residents' intentions to use the REM, and respondents' perceptions regarding the anticipated impacts of the REM once it becomes operational. The evidence generated from these longitudinal assessments will be relevant to policies in the Montréal CMA, where future REM extensions are being studied, and beyond, as other regions weigh similar investments to promote health, travel, environmental, social, and economic objectives.

2 Recruitment and Validation Methods

2.1 Recruitment

Recruitment of wave three participants was performed between November and December 2022. Similar to the recruitment strategies used for the first two waves of the survey, various recruitment techniques recommended by Dillman et al. (2014) were employed to ensure the representativeness of the sample. Two URLs were used to circulate the survey and recruit participants in English and French: www.mobilitymontreal.ca and www.mobilite-montreal.ca. While all respondents filled out the survey online, recruitment was performed by the TRAM team using both in-person and online methods. In-person methods included the distribution of approximately 10,000 bilingual flyers advertising the survey to homes within a 1-kilometer buffer around REM stations. Online methods included recruitment through paid advertisements on Facebook and Instagram for people within the Montréal CMA, with a focus on people within half a mile (around 800 meters) of REM stations. Additionally, recruitment of the panel sample was done by contacting all participants of previous waves who provided their e-mail addresses to invite them to participate in wave three.

To complement recruitment done directly by the TRAM team, additional recruitment was performed by Leger, a company specializing in public opinion and surveys in Canada. The company contacted respondents from their proprietary stable of potential survey respondents who live in areas surrounding future REM stations. Recruitment for the panel sample was also done by Leger by contacting the same respondents who previously answered waves one and/or two.

Since emails from Leger respondents were not available to the TRAM team, a unique identifier (or "token") was created for each respondent and was used to link responses from panel respondents. Table 2.1 presents a summary of the pre-validation responses recruited by TRAM and Leger for all three waves.

Table 2.1 TRAM and Leger total recruitment (pre-validation)

Recruited by	Wave 1	Wave 2	Wave 3
TRAM	3,675	4,670	4,147
Leger	2,267	2,317	2,275
Total	5,942	6,987	6,422

In keeping with best practices for survey recruitment (Dillman et al., 2014), incentives were employed to encourage participation in the survey. The following prizes were advertised to respondents and distributed based on a draw after finishing data collection:

1 x iPad Air
7 x Kindles
1 x Fitbit watch
1 x Monster S320 Superstar Speaker
2 x Echo Dot Speakers
2 x Fire TV sticks
3 x Truefree Wireless Earphones
9 x $25 Amazon Gift Cards
18 x $10 Tim Hortons Gift Cards

2.2 Data Validation

A thorough data-cleaning procedure was applied to the three waves of the Montréal Mobility Survey as well as the panel responses. The cleaning process was subdivided into several sequential steps, each of which constituted a filter and modified the number of valid responses. Some of these steps were cross-sectional, meaning that each wave was cleaned and validated only using information from said wave. Other steps were based on panel data, from which it was possible to perform further validation by comparing the answers of survey respondents from multiple waves. The cleaning procedure applied this year differs slightly from the one applied after the collection of the second wave in that it included one additional filter: removing observations with work or school locations on bodies of water. It is important to apply the same cleaning procedure to all waves of the survey to ensure consistency in the exclusion criteria of unreliable responses. Because of this, the same procedure that was applied to wave three was also applied retroactively to the two previous waves. What follows is a description of each step of the cleaning process, which were applied sequentially in the order presented here:

1. Incomplete answers: All surveys that were not answered to completion were dropped.
2. Multiple IP addresses 1: If more than two surveys were submitted from the same IP address, all observations from this IP were dropped.
3. Repeated e-mail: If the same e-mail was submitted for more than one survey, all observations from this address were dropped.
4. Multiple IP addresses 2: If more than one survey was submitted from the same IP address, and at least one of these came from the survey company Leger, all observations from this IP were dropped.
5. Age above 90: If a person indicated that they were born more than 90 years previous to the survey year, their response was dropped.
6. Invalid home location: If home location was

either not provided, outside of the Montréal CMA, or located in an invalid location (e.g., on water or on a bridge), the observation was dropped.

7. Work or school outside of CMA: If a work or school location was outside of the Montréal CMA, or located in an invalid location (e.g., on water or on a bridge), the observation was dropped.

8. Project awareness: If the person said that they were aware of the REM project in a previous wave but not in a posterior wave, the observation was dropped. This filter is only for people who participated in multiple waves.

9. Answer speed: Surveys in the top 5% of speed of completion were dropped. It must be noted that different groups of respondents, depending on their answers, got different sets of questions. Each of these groups were cleaned according to their own respective top 5% speed.

10. Age and height change: If a person's reported age changed inconsistently across waves, or if their height changed more than 3cm from one wave to another, the observation was dropped. This filter is only for people who answered multiple waves.

The results of the cleaning process are summarized in Table 2.2, showing how many observations were dropped in each of the steps. The results of the data validation for all cross-sectional and the panel responses is presented by wave participation in Table 2.3. A total of 2072 participants have responded to two or more waves of the survey, 408 of which have responded to all three waves.

Table 2.3 Number of valid observations for all cross-sectional and panel responses

Survey waves	Valid observations
2019 only	2,410
2021 only	2,213
2022 only	2,468
2019 and 2021	475
2021 and 2022	962
2019 and 2022	227
2019, 2021, 2022	408

Table 2.2 Number of dropped and validated observations by filtering step

	Step	2019		2021		2022	
		Dropped	**Remaining**	**Dropped**	**Remaining**	**Dropped**	**Remaining**
0	Raw Database	-	5,942	-	6,987	-	6,422
1	Incomplete answers	1,794	4,148	1,862	5,125	1,575	4,847
2	Multiple IP addresses 1	67	4,081	67	5,058	43	4,804
3	Repeated e-mail	10	4,071	74	4,984	24	4,780
4	Multiple IP addresses 2	180	3,891	212	4,772	140	4,640
5	Age above 90	2	3,889	3	4,769	1	4,639
6	Invalid home location	53	3,836	124	4,645	64	4,575
7	Invalid work or school	37	3,799	35	4,610	63	4,512
8	Project awareness	-	-	243	4,367	149	4,363
9	Answer speed	196	3,603	229	4,138	227	4,136
10	Age and height change	83	3,520	80	4,058	71	4,065
Final Cleaned Database		**3,520**		**4,058**		**4065**	

3 Sample Characteristics

3.1 Demographic Characteristics

Across the three waves, the samples' demographic characteristics show a fair distribution among different genders, age groups, income brackets, visible-minority statuses, and employment types (Table 3.1). To contextualize these percentages, we compare them with the population of the Montréal CMA based on the 2021 census (Statistics Canada, 2023). An increase in sample size is remarkably observed between wave one and the following waves. In wave three, the representation of women was restored to an adequate percentage compared to the census after facing a drop in wave two. Nearly 75% of participants were between the ages of 25 and 64 inclusively across all three waves. This percentage was divided similarly between the age groups 25 to 44 and 45 to 64 (with the exception of wave one, where the former group had a relatively higher percentage). Compared to the census, all income brackets are consistently represented within the three waves of data collection, except for the group with the lowest income (under 30k). The percentage of employed respondents remains similar to the census across the three waves. An improvement in the representation of the population who are not in the workforce is observed in waves two and three.

Table 3.1 Demographic characteristics for the three waves compared with Montréal CMA census

		wave 1 (2019)	wave 2 (2021)	wave 3 (2022)	Montréal CMA
Total N		3,533 (100%)	4,063 (100%)	4,065 (100%)	4,291,635*
Gender	Man	1,600 (45.29%)	2,419 (59.54%)	2,143 (52.72%)	2,104,785 (49.04%)
	Woman	1,877 (53.13%)	1,558 (38.35%)	1,856 (45.66%)	2,186,900 (50.96%)
	Other	56 (1.59%)	86 (2.12%)	66 (1.62%)	—
Age Group	18 to 24	446 (12.62%)	217 (5.34%)	172 (4.23%)	349,315 (8.14%)
	25 to 44	1,490 (42.17%)	1,479 (36.40%)	1,472 (36.21%)	1,188,620 (27.7%)
	45 to 64	1,172 (33.17%)	1,547 (38.08%)	1,590 (39.11%)	1,123,015 (26.17%)
	65 to 74	341 (9.65%)	636 (15.65%)	636 (15.65%)	424,845 (9.90%)
	75 and over	84 (2.38%)	184 (4.53%)	195 (4.80%)	347,620 (8.10%)
Income Bracket (in CAD)	Under $30,000	526 (14.89%)	393 (9.67%)	359 (8.83%)	264,985 (14.44%)
	$30,000 to $59,999	969 (27.43%)	873 (21.49%)	919 (22.61%)	444,140 (24.20%)
	$60,000 to $89,999	742 (21.00%)	897 (22.08%)	857 (21.08%)	371,750 (20.25%)
	$90,000 to $149,999	909 (25.73%)	1,179 (29.02%)	1,192 (29.32%)	448,105 (24.41%)
	$150,000 and over	387 (10.95%)	721 (17.75%)	738 (18.15%)	306,375 (16.69%)
Visible Minority	Visible minority	702 (19.87%)	575 (14.15%)	600 (14.76%)	1,143,790 (27.19%)
	Not a visible minority	2,831 (80.13%)	3,488 (85.85%)	3,465 (85.24%)	3,062,550 (72.81%)
Work Status	Employed	2,350 (66.52%)	2,560 (63.01%)	2,673 (65.76%)	2,117,410 (60.75%)
	Unemployed	191 (5.41%)	149 (3.67%)	120 (2.95%)	193,130 (5.54%)
	Not in the workforce	563 (15.94%)	951 (23.41%)	940 (23.12%)	1,175,125 (33.71%)
	Student	588 (16.64%)	338 (8.32%)	262 (6.45%)	—

*Population of Montréal in 2021

3.2 Home and Work Locations

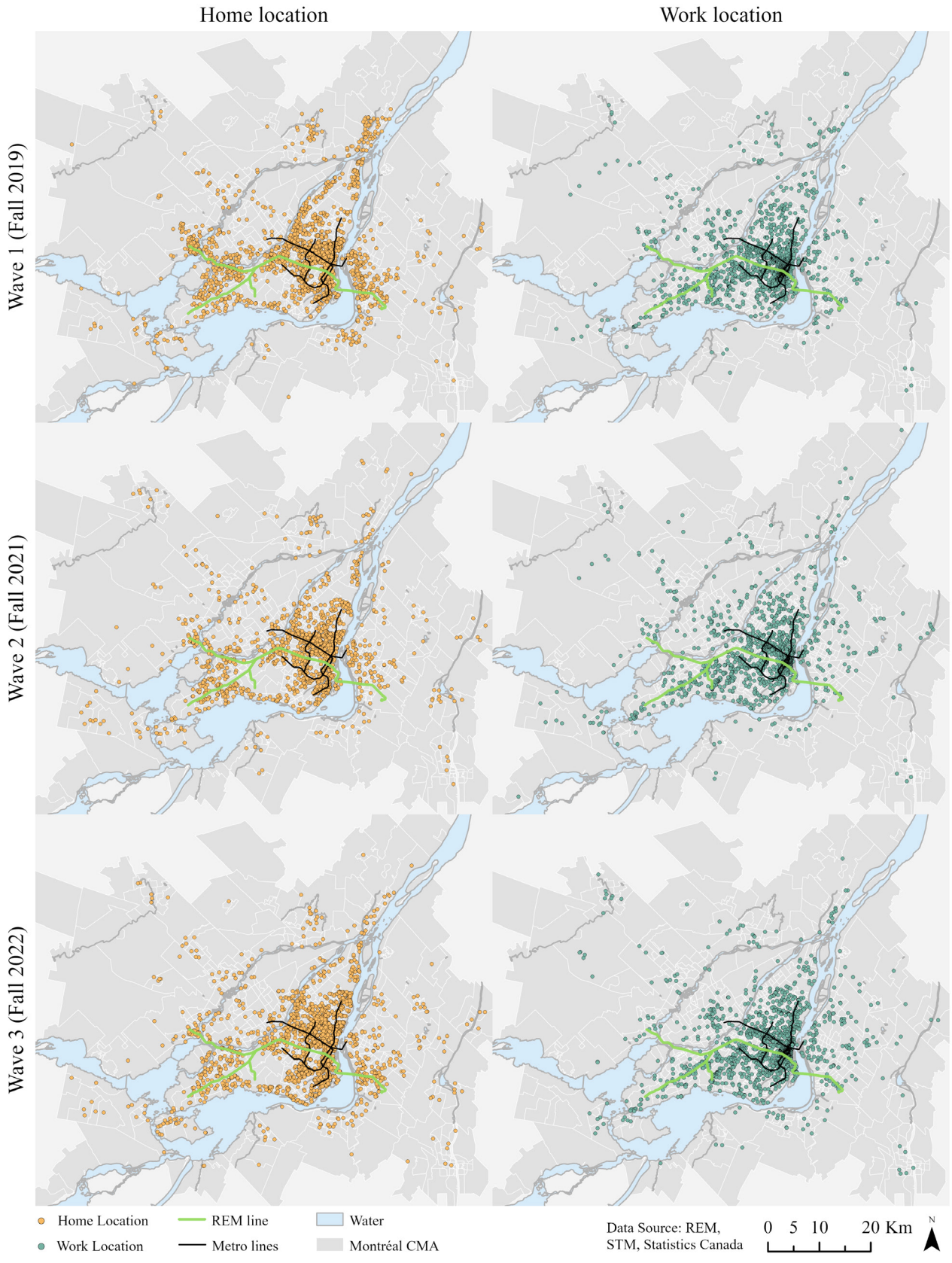


Figure 3.1 Home and work locations of working respondents for the first three waves of the survey

3.3 Home and School Locations

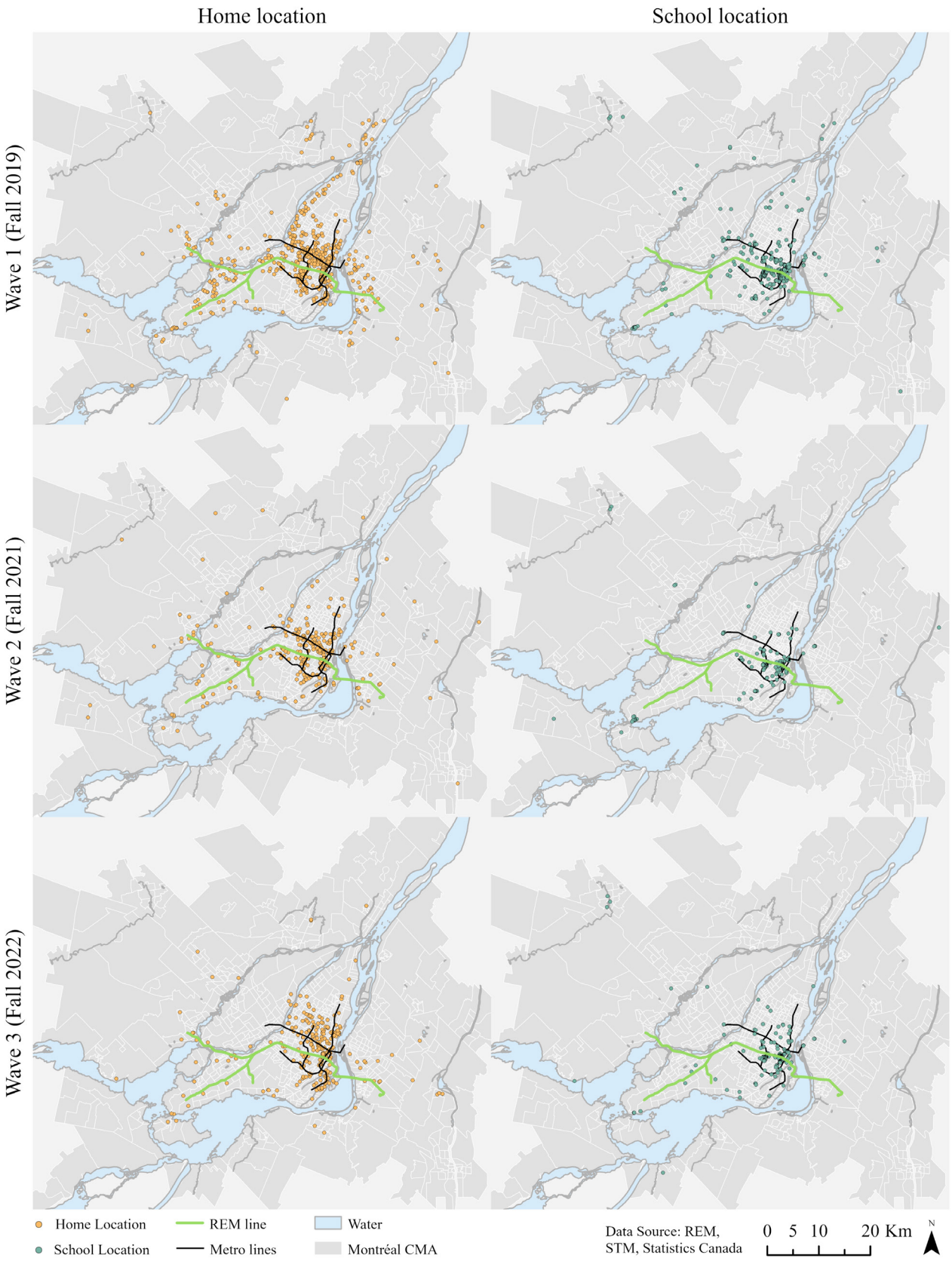


Figure 3.2 Home and school locations of student respondents for the first three waves of the survey

4 Travel Behaviour

4.1 Weekly Travel

Across the three waves, participants reported the number of trips they performed during the previous week for four specific purposes (work, school, shopping, and healthcare) and three travel modes (car, transit, and active travel). The average trip frequency by travel mode for all reported purposes is presented in Figure 4.1. Results show a reduction of approximately 25% in total trip frequency during the pandemic from 2019 to 2021, which was later maintained in 2022. Transit and active modes suffered steep declines, while the frequency of car use increased.

The data from panel respondents provided an opportunity to evaluate travel-behaviour changes over time. Figure 4.2 presents a diagram of changes in panel respondents' dominant transport modes from 2019 to 2022 (N=615) for all reported purposes. A respondent's dominant mode is defined as the one being used for more than 50% of all their reported trips. Respondents without a dominant mode were classified as multimodal. For these results to be a better representation of the Montréal CMA, responses were weighted to match their wave one mode choice to the mode-use patterns observed in the 2018 Montréal Origin-Destination Survey. The results presented in Figure 4.2 indicate a slight increase in car and active-mode dominance, while public transit suffered the steepest decline.

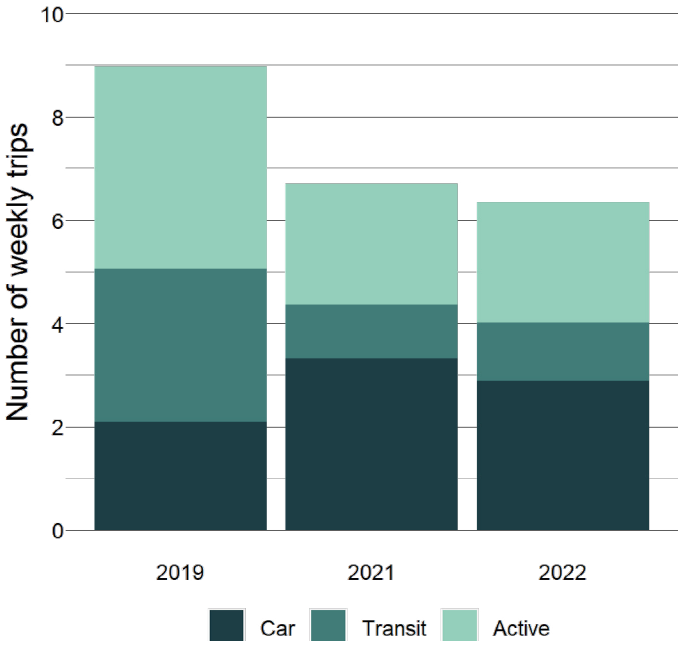


Figure 4.1 Average weekly trip frequency by mode and year (wave)

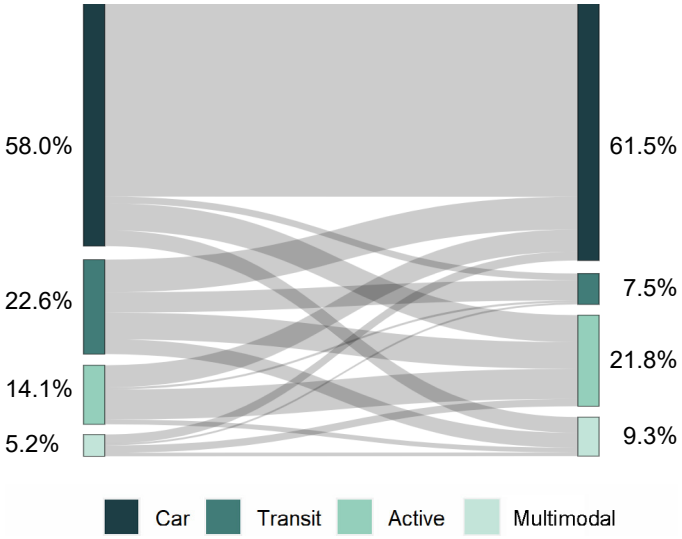


Figure 4.2 Changes in dominant mode from 2019 (left) to 2022 (right) (N= 615)

4.2 Commute Modal Share

The commute modal share throughout the three waves in comparison with the Montréal CMA is displayed in Figure 4.3. The main mode of travel used to commute to work is presented under four categories: walking, cycling (including bike sharing), public transit (metro, bus, BRT, or commuter rail), and car (driving, ride hailing, or carpooling). For respondents with multiple travel modes for a single trip, the mode that they travelled the furthest with was considered their main mode. Overall, throughout the three waves, the sample had a much higher share of transit users and active travelers when compared to the Montréal population where car users constitute 75% of commuters. The highest percentage of car users between the waves is seen in wave two, where they account

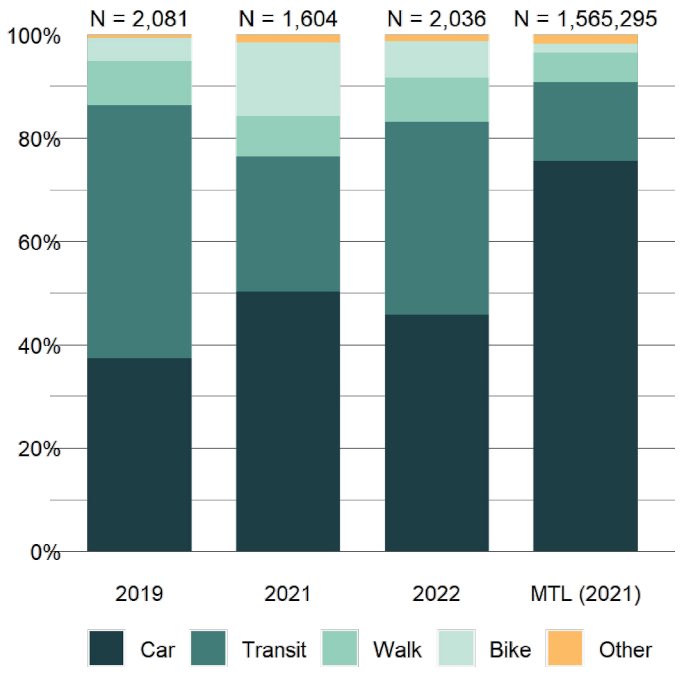


Figure 4.3 Commute modal share

for 50% of the users, which is 25% less than the Montréal population. Looking at the changes between waves, a decrease in the number of trips is observed in wave two (2021) compared to wave one (2019) as a result of the COVID-19 pandemic. An increase in the percentage of car and cycling trips (13% and 10%, respectively) and a significant decline in transit trips (23%) is visible in wave two when compared with wave one. In wave three, the number of trips almost matches that of wave one, with a relative recovery for transit (an increase by 11% from wave two, and an absolute percentage of 37%). However, car users constitute the highest share of respondents in wave three (45%) as opposed to wave one where transit users constituted the majority of surveyed commuters (49%). Throughout the three waves, the percentage of pedestrians remained nearly the same at around 8%.

4.3 Telecommuting

The data collected by the team before (2019) and during (2021, 2022) the COVID-19 pandemic provides a unique opportunity for evaluating changes in the frequency of telecommuting (working from home) and conducting hybrid work (a combination of workplace and remote working). Figure 4.4 illustrates how the popularization of telecommuting due to the pandemic has been maintained over time, even when most travel restrictions were lifted. However, telecommuting patterns in terms of weekly frequency changed between 2021 and 2022. Figure 4.5 shows that, whereas telecommuting 5 days per week was the most common telecommuting pattern in 2021, in 2022 a hybrid schedule became more common. Moreover, the increasing popularity of telecommuting brought on by the pandemic has not led to a reduction in commuting equally across travel modes. Figure 4.6 shows that most workers that telecommute, either exclusively or hybrid, were previously commuting by transit. Thus, a large portion of the reduction in transit ridership can be attributed to this effect.

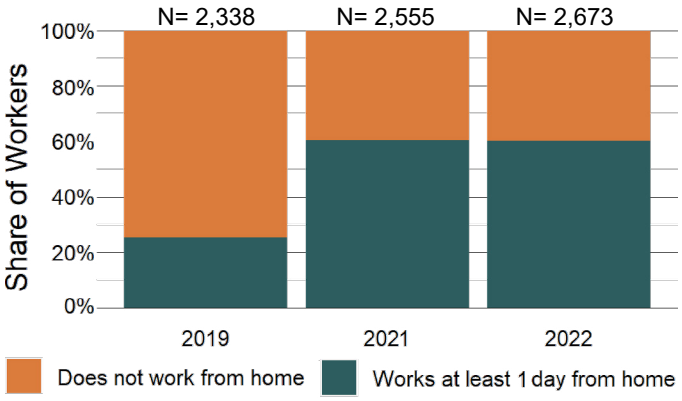
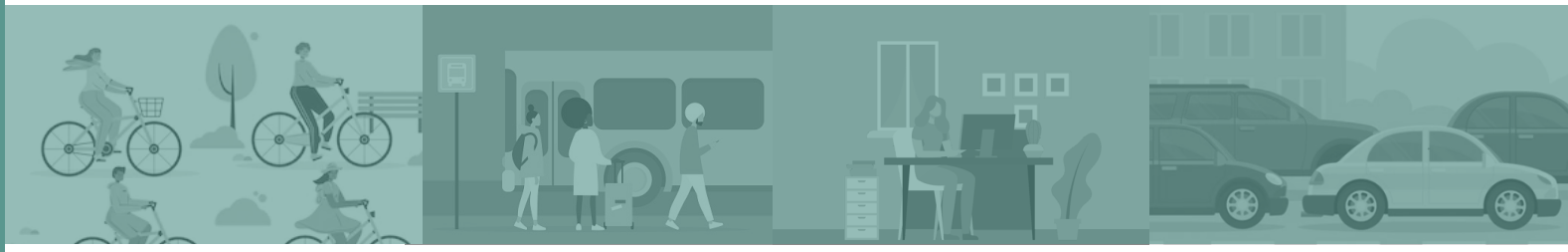


Figure 4.4 Share of telecommuting workers



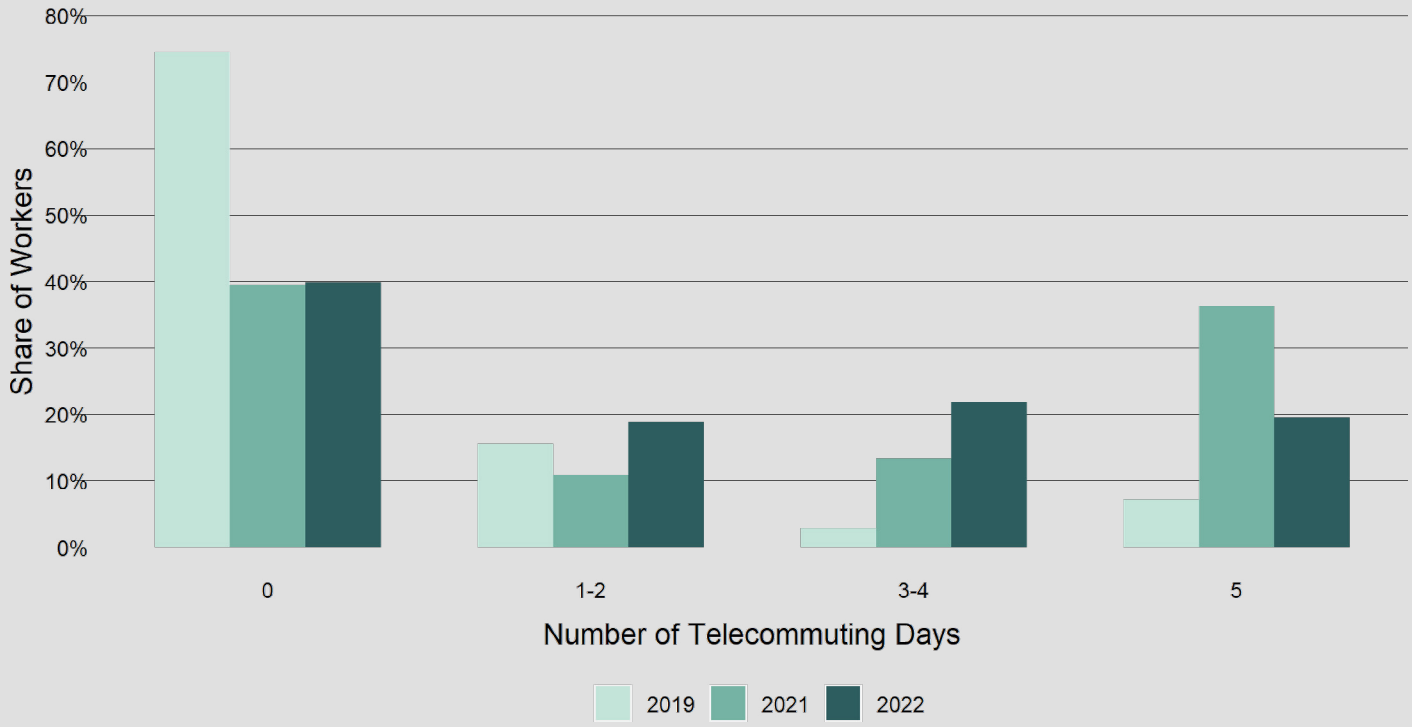


Figure 4.5 Weekly telecommuting frequency by year (wave)

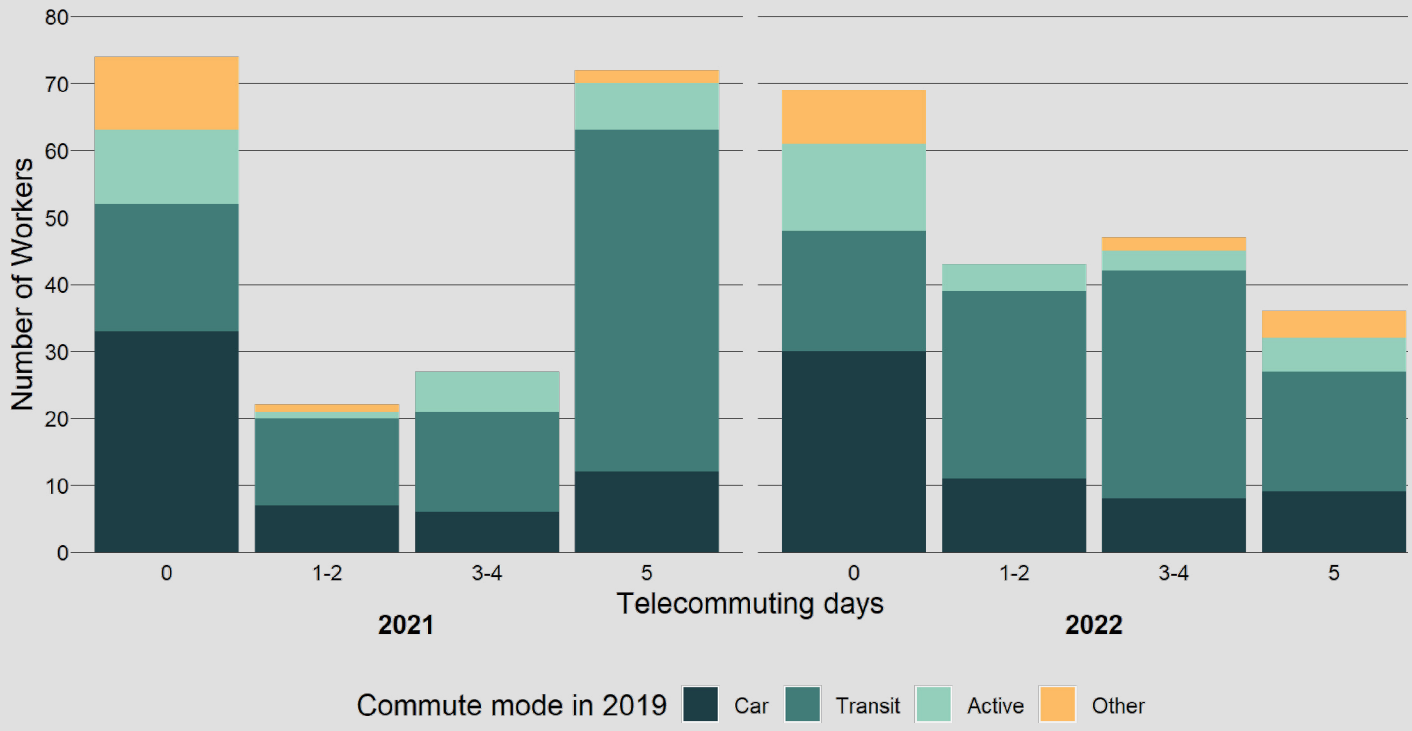


Figure 4.6 Telecommuting frequency in 2021 and 2022 by pre-pandemic commute mode

5 Construction Impacts

5.1 Overall Perceptions of Construction Impacts

Across all three waves, the Montréal Mobility Survey gathered information regarding the impact of REM-related construction on respondents' travel and wellbeing. These questions were posed to individuals who reported that REM-related construction was currently occurring near their home, work, or school. Opinions on the impact of construction activities were largely stable across all three waves. This trend is notable, given that the extent and location of construction, as well as respondents' travel patterns, shifted notably during this period of time.

Beliefs regarding whether construction would force respondents to change their travel were largely unchanged across the three waves. Few expected their mode to change: ~15% of respondents found it likely, ~22% were neutral, and ~63% unlikely (Figure 5.1). A more common concern among respondents was that the construction would force them to take a new route when commuting, with 30% agreeing or strongly agreeing. The least frequent travel concern was a fear that construction would increase the risk of traffic crashes, with 11% believing this (Figure 5.2). The one travel question which showed notable changes across the three waves relates to whether respondents felt sufficiently informed about the travel alternatives available to them. The percentage of respondents agreeing that they felt well informed about alternatives rose from 36% to 42%, suggesting a potential improvement in public communication efforts on construction-induced disruptions over the course of the project (Figure 5.3).

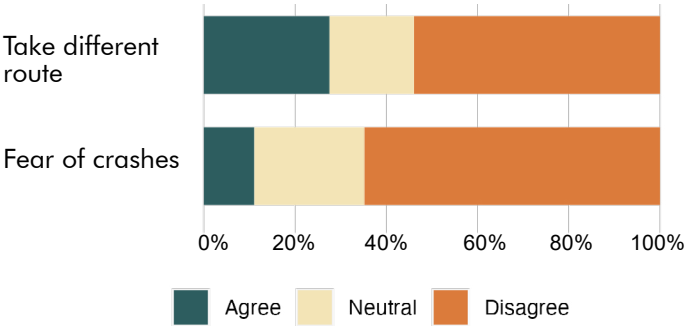


Figure 5.2 Perceived impact of current REM construction on travel (wave 3, N = 1,487)

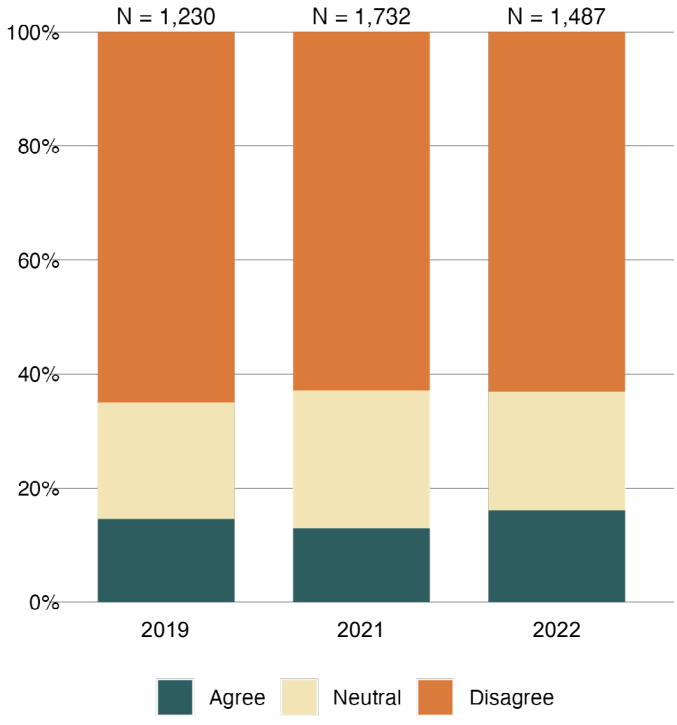


Figure 5.1 Likelihood to change mode due to current REM construction

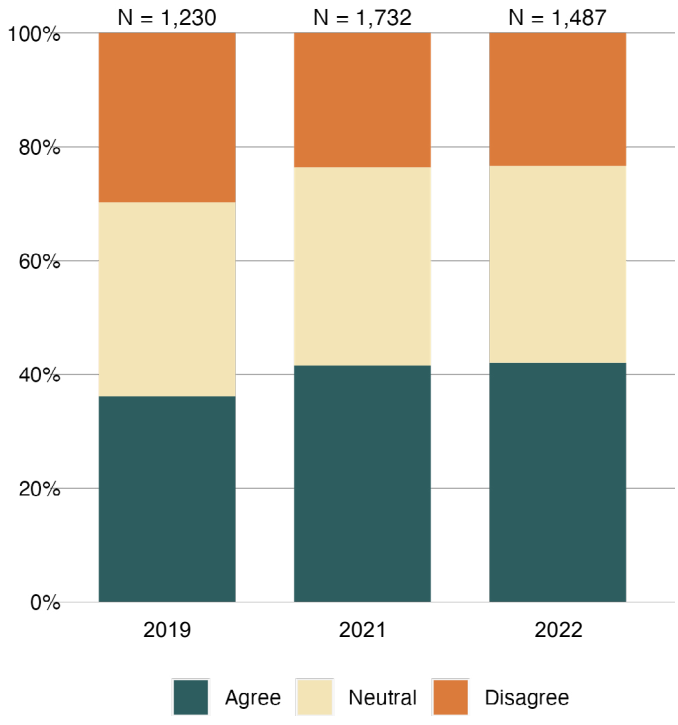


Figure 5.3 Perception that sufficient information about travel alternatives is available

Responses regarding the impacts of REM-related construction on wellbeing were consistent across all three waves. Respondents were most likely to indicate that construction was having a negative impact on their mood, with 22% of wave-three respondents agreeing or strongly agreeing with this statement. Air and/or noise pollution was also a significant topic, with 19% of respondents reporting this concern. In terms of construction-related stress, 13% of respondents reported that the REM construction was making them anxious (Figure 5.4). The frequency of these concerns remained mostly stable across the three waves, with only the pollution question showing movement – a small uptick in concern over time.

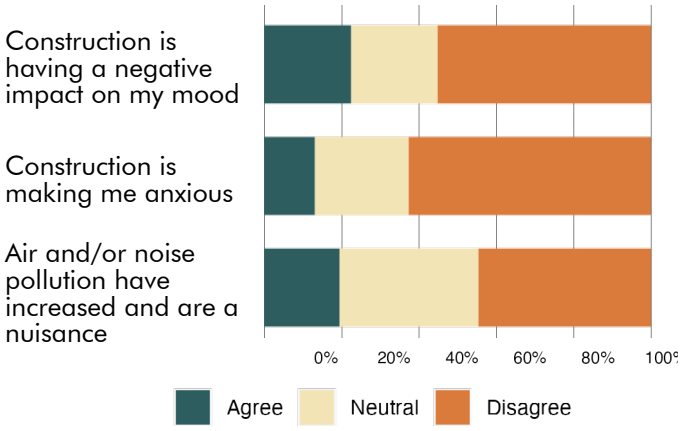


Figure 5.4 Perceived impact of current REM construction on wellbeing (wave 3, N = 1,487)

5.2 Gendered Construction Impacts

Responses to the construction-impact questions were aggregated by gender to examine gender dynamics in response to REM-related construction activities. Firstly, no significant differences were found between how informed men and women felt regarding available travel alternatives during construction activities, suggesting similar impact from public communication efforts. That said, the survey results revealed that women were unequally impacted by REM-related construction activities, being more likely than men to take a different route on their commute and to express concern regarding their wellbeing due to the construction activities.

While both men and women were equally likely to have to adopt a new mode due to construction (16%), more women reported having to take a different route (31% compared to 25% of men) (Figure 5.5). The increased prevalence of route change among women could be attributed to various gender dynamics explored in the literature, including the unequal burden placed on women for mobilities of care, which includes activities such as grocery shopping, escorting family members, and other daily travel needed to complete care-related activities (Ravensbergen et al., 2023; Villafuerte-Diaz et al., 2023). Further research is needed to understand the socially mediated factors that influence the travel needs of affected users differently, which may contribute to route changes during construction as well as other disruptive impacts, such as increased travel times and stress for women. Exploring the initial modal changes and travel patterns of impacted users may also point to which aspects of trips are most frequently disrupted. In addition to the uneven gender dynamics in travel-route changes, women reported higher rates of discomfort for each of the four questions regarding the perceived impacts of the REM construction on wellbeing (Figure 5.6). Specifically, 23% of women perceived levels of pollution to have gone up, compared to 17% of men. Construction anxiety was also more prevalent among women, with 17% experiencing it compared to 10% of men.

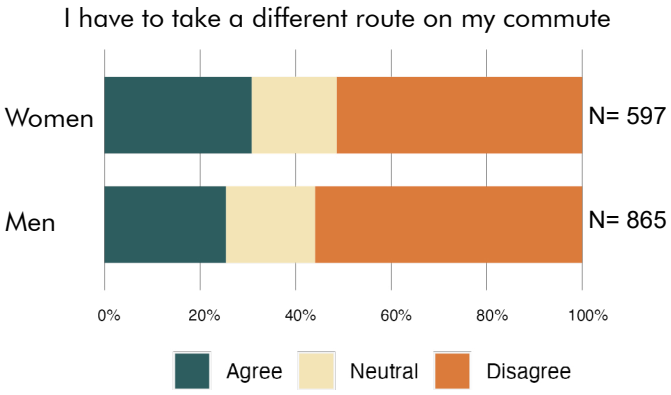


Figure 5.5 Impact of current REM construction on travel route by gender (wave 3)

Notably, more women reported being concerned about construction-induced crashes (14% as compared to 9% for men). The greatest difference was related to mood, with 27% of women confirming that they were negatively impacted, in contrast to only 19% of men. For all four questions, a similar-sized gender gap was found across the three waves, showing that women were unevenly impacted by construction activities and pointing to the need for gender-informed strategies within infrastructure planning and development projects.

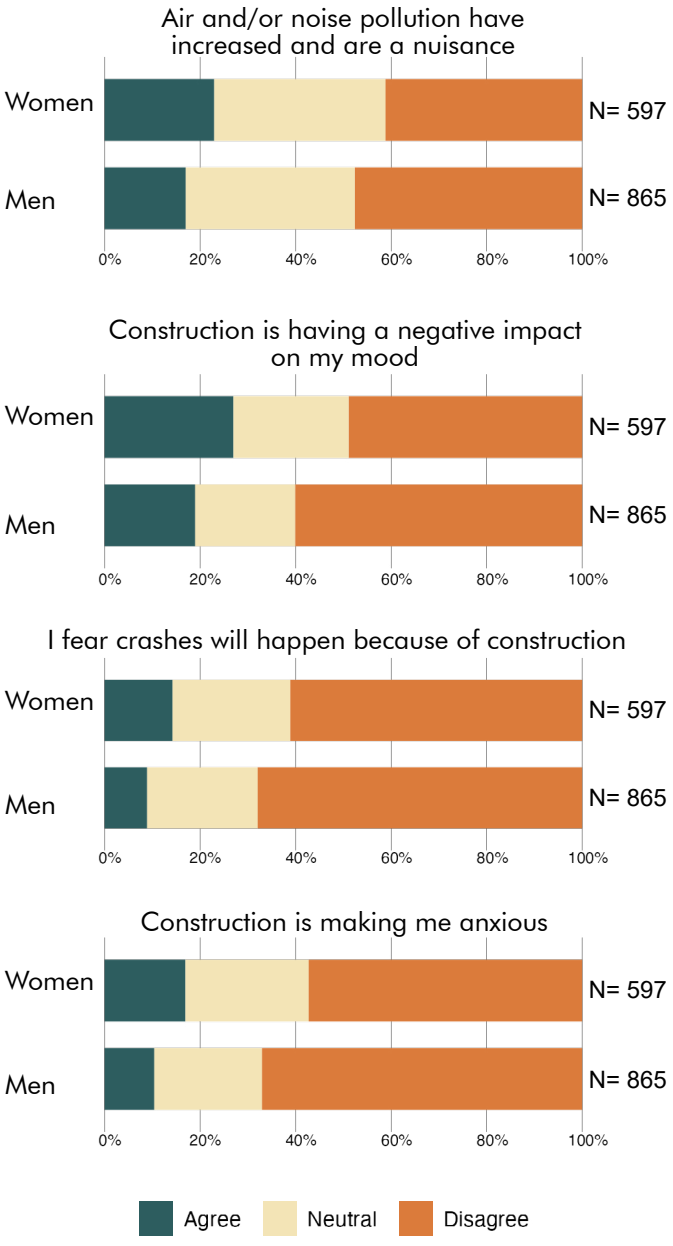


Figure 5.6 Perceived impacts of the REM construction on wellbeing by gender (wave 3)

5.3 Impact of Closure of Deux–Montagnes Commuter Train

One of the most notable impacts of the REM construction was the replacement of the Deux-Montagnes commuter-train line (Figure 5.7). This line, which had 28,015 riders per day in 2018, was permanently closed in 2020 due to REM-related construction in the Mount Royal tunnel. Past users of the Deux-Montagnes line who had not changed the location of their home or work were asked to report how their travel had been affected. These questions included sharing their new transportation modes, as well as their feelings regarding how their travel experiences changed.

Most of the Deux-Montagnes riders switched to cars (30%) or a combination of car and telecommuting (26%). Only a quarter of respondents were riding transit exclusively, and a further 18% were using a combination of transit and telecommuting (Figure 5.8). Additional research is needed to identify whether certain types of former Deux-Montagnes riders (e.g., low-income groups) were more likely to continue using transit. It will be important to understand whether individuals who stopped using transit will use the REM when the Deux-Montagnes branch of the REM opens (currently slated for the fourth quarter of 2024).

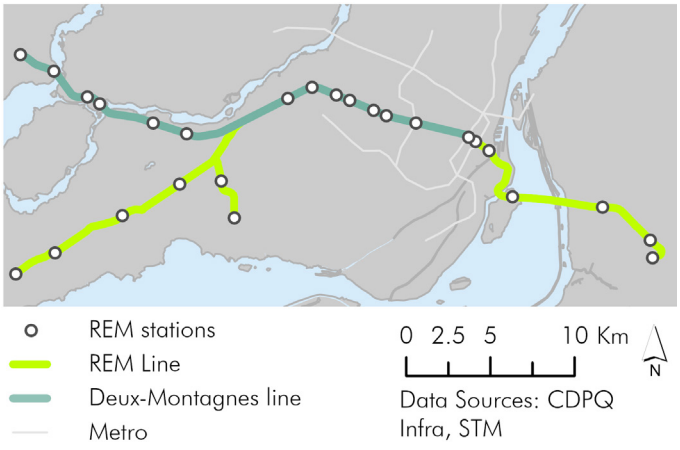


Figure 5.7 Deux-Montagnes REM line replacing the commuter train line

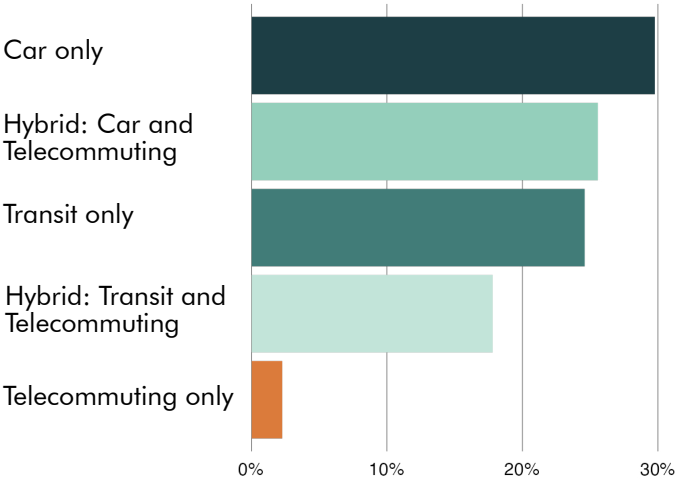


Figure 5.8 Perceived impact of DM line closure on travel (wave 3, N = 309)

A large portion of former Deux-Montagnes riders indicated that their trips had gotten worse due to the closure of the line. The most commonly cited challenges included less direct trips (76% agreed), and less comfortable trips (64% agreed) (Figure 5.9). Respondents also reported high levels of anxiety related to the closure, both generally and during trips on alternatives (51% and 41%, respectively).

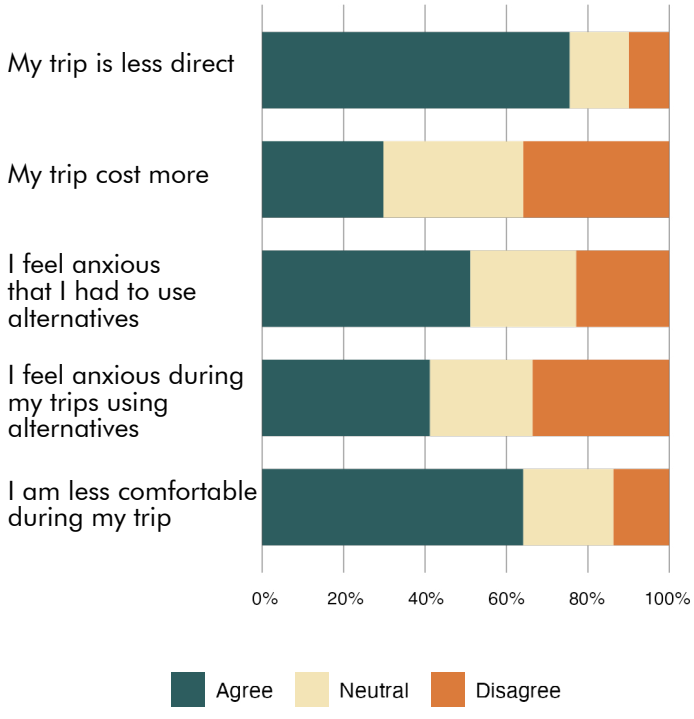


Figure 5.9 Perceived impact of DM line closure on travel and wellbeing (wave 3, N = 131)

This anxiety may have been exacerbated by the need for additional clarity on construction impacts and alternatives. While 60% noted that they knew about the closure in advance, only 36% felt that alternatives were well communicated to the public (Figure 5.10). Ultimately, only 35% of former Deux-Montagnes riders were satisfied with travel alternatives. Further research is needed to understand the relationship between these feelings of dissatisfaction and future usage of the Deux-Montagnes branch of the REM.

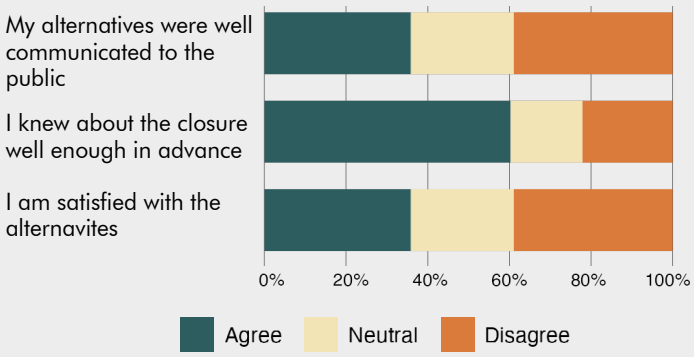


Figure 5.10 Perceived quality of communication and planning of DM line closure (wave 3, N= 131)

6 Intention and Perception

6.1 Intention to use the REM by mode

Throughout the three waves of the survey, participants were asked about their intentions to use the REM, with possible answers ranging from very likely to very unlikely. This question was included to understand different individuals' likelihood to use the light-rail network as well as to provide insights into the relationship between expected REM ridership and other factors, such as gender. The respondents' answers demonstrated a general decline in intentions to use the REM over the three waves. There was an overall decrease of seven percentage points, with a 5% decline between wave two and wave three. The first subgroups whose intentions were compared were inhabitants living within 1.2km of the nearest REM station, and inhabitants living further than this distance. This distance was chosen considering that research has shown that 85% of Montréal transit users walk 1.2km or less when accessing commuter-rail stations from their homes (El-Geinedy et al., 2013). This subset was further divided into car-dominant transport users (representing individuals who use a car for over 50% of their weekly trips) and sustainable transport users (who use public or active transport for over half of their trips).

Inhabitants living within 1.2km of the REM were substantially more likely to intend to use the REM than their counterparts living further away (Figure 6.1). In wave three, car-dominant individuals who lived within 1.2km of a REM station were 28% more likely to use the REM than car-dominant individuals living further. Similarly, sustainable-transport users who lived in proximity to a station were 24% more likely to use the REM than sustainable-transport users living 1.2km outside. Proximity to a REM station appeared to be more important than current transportation mode: car-dominant individuals living in proximity to a REM station were more likely to use the REM than sustainable-transport users living further than 1.2km from a station. Variation in responses across the three waves was minimal. The only sub-group with notable inter-wave changes in their intentions to use the REM were car-dominant transport users living further than 1.2km from a REM station, whose intentions to use the light-rail network decreased over the three waves by 14%.

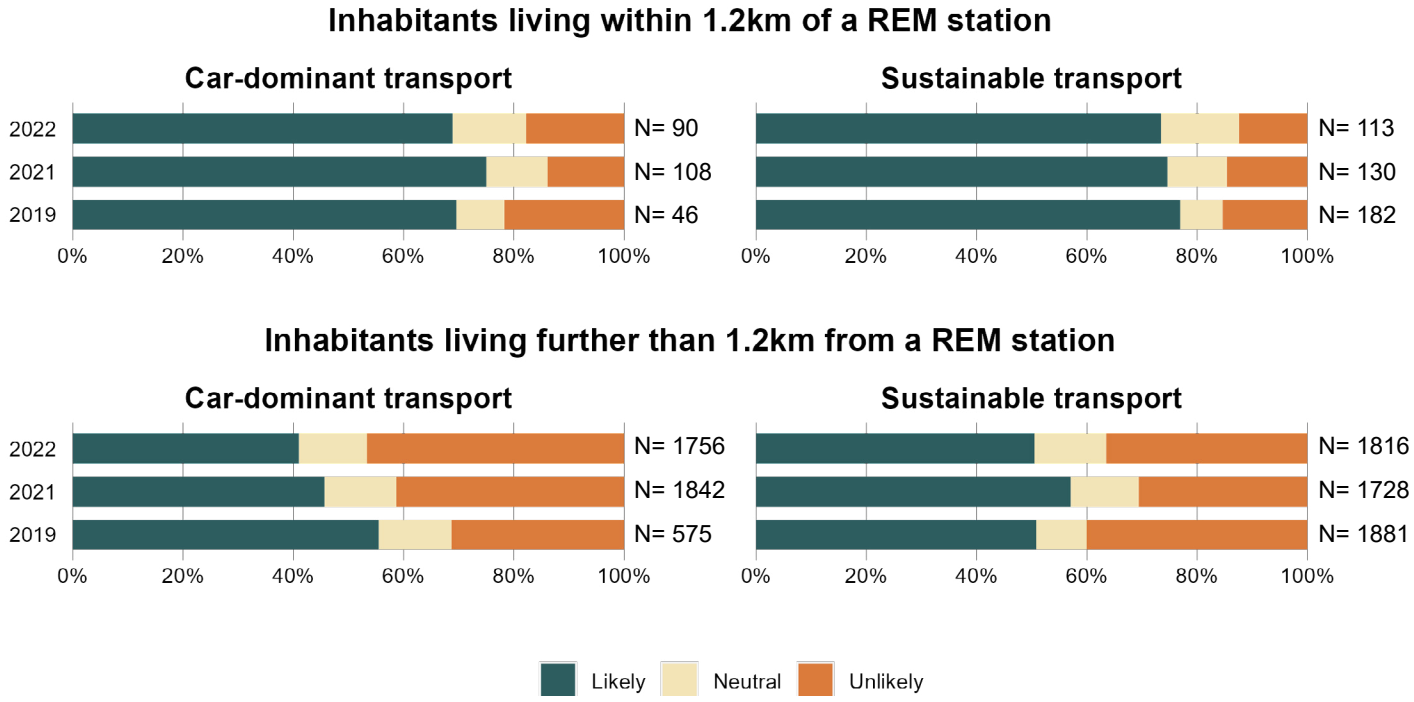


Figure 6.1 Intention to use the REM by current travel behaviour

6.2 Intention to use the REM by purpose of travel

The survey identified the specific purposes for which prospective riders planned to use the REM. The five main types of activities that were derived from the survey were work, school, shopping (including grocery shopping), leisure, and airport trips. Figures 6.2 depicts anticipated trip purposes for prospective REM riders who live within 1.2km of the REM, and Figure 6.3 displays these trip purposes for respondents living further than 1.2km from the stations.

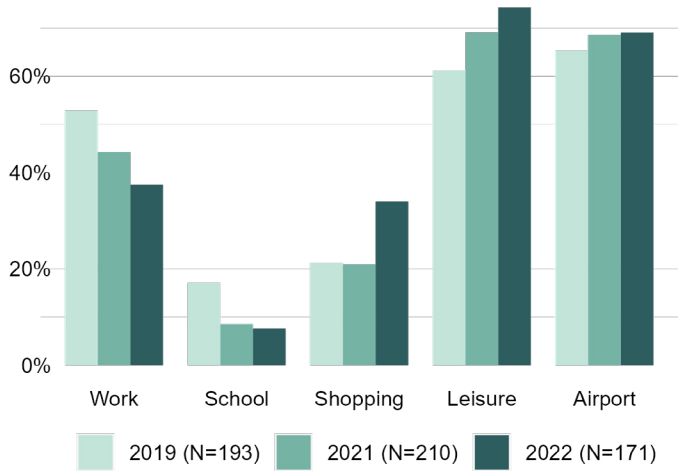


Figure 6.2 Intentions to use the REM by purpose of travel for respondents living within 1.2km of a REM station

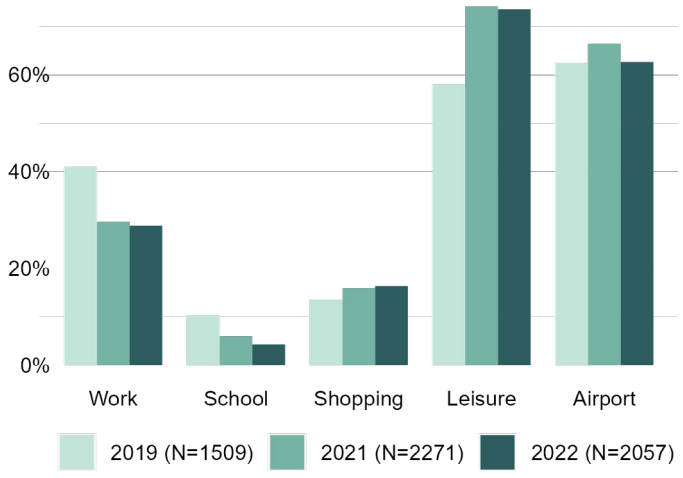


Figure 6.3 Intentions to use the REM by purpose of travel for respondents living further than 1.2km from a REM station

Across all waves and residential locations, respondents overwhelmingly planned to use the REM for leisure and airport trips. In wave three, individuals living within 1.2km of a REM station reported a 74% likelihood to use the REM for leisure trips and 69% likelihood to use it for airport trips. Individuals living at a greater distance reported a 74% and 63% likelihood for the same purposes, respectively. The two purposes that had the most increase in intention to use across waves were shopping trips and leisure trips. This was true for inhabitants living both inside and outside the 1.2km buffer zones. Contrastingly, there was a general decrease in likelihood to use the REM for work and school trips. Intentions related to work-related travel decreased by 16% for respondents living in proximity and 12% for respondents living further from the REM from wave one to wave three. Similarly, there was a general 8% drop in intentions to use the REM for school trips. Intentions to use the REM to travel to and from the airport remained nearly identical. The decrease in intentions to use the REM for work and school trips over time might be related to the rise in telecommuting between wave one and wave three.

6.3 Intention to use the REM by gender

Responses regarding intentions to use the REM were grouped by gender to identify whether the responses diverged between men and women. The analysis revealed a general trend where both men and women's likeliness to use the REM decreased over the three waves, with a 9% and 8% reduction respectively. However, there was a notable difference between men and women's baseline intention to use the REM, with men reporting an 59% intention to use the REM and women indicating only 50% in wave three (Figure 6.4). This disparity stayed consistent across waves, with women being between 8-9% less likely than men to use the light-rail system. This gender gap can be explained by several

factors. As identified by Villafuerte-Diaz et al. (2023) in the analysis of the wave-one data, women are as likely as men to use the REM for work purposes; however, they are less likely to use it for leisure and discretionary reasons. Some possible explanations for this trend include the widening income gap between men and women as a result of the COVID-19 pandemic (Fortier, 2020), the disproportionate burden placed on women for care responsibilities due to socially mediated gender obligations (Ravensbergen et al., 2022), and women having less opportunities for leisure and discretionary travel (Villafuerte-Diaz et al., 2023). Future research will help to inquire deeper into the intersectional social factors that lead to the patterns identified regarding intended light-rail ridership as well as the potential for gender-informed urban policies.

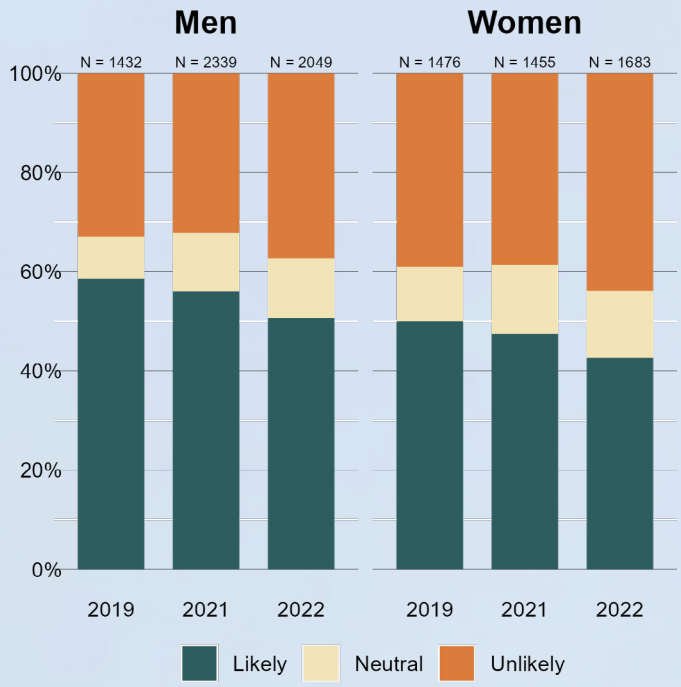


Figure 6.4 Intention to use the REM by gender

6.4 Perceptions of the REM

All three waves of the survey included questions regarding respondents' perceptions of the REM to monitor changes in social acceptability. Wave one collected data on three different anticipated impacts of the REM once it becomes operational: impacts on the greater Montréal area, the environment, and residents' neighborhoods. Waves two and three also asked for respondents' opinions on the REM's expected impact on businesses. To compare the perceptions of respondents from different residential locations, the analysis of responses was separated into subsets of respondents living within 1.2km of a REM station, and respondents living outside of this buffer zone. Given these limited changes in perceptions were observed between the three waves for most statements, only data from the latest wave are presented.

For respondents living in proximity to the REM stations, agreement levels regarding the anticipated impacts of the REM were mostly positive. Figure 6.5 reveals that these respondents most strongly agreed with the REM's beneficial impacts on the Montréal region (82% overall agreement), followed by its positive neighborhood impacts (73% overall agreement), and environmental impacts (72% overall agreement). Agreement levels for perceived impacts on business were slightly lower for this group (66% overall agreement) and had the highest level of neutral responses (8-15% larger than the three other questions).

In comparison, respondents living further than 1.2km from the REM had different perceptions in response to these questions, as shown in Figure 6.6. While these respondents shared generally positive opinions regarding the expected impacts of the REM on the Montréal region (80% overall agreement) and on the environment (73% overall agreement), the agreement levels were notably lower for impacts on businesses and local neighborhoods. Agreement levels were 14% lower for impacts on businesses (52% overall agreement) and 38% lower for impacts on neighborhoods (35% overall agreement) compared to respondents living within 1.2km from a REM station. These two questions also saw the highest level of neutral responses (between 37 and 42%), further suggesting reduced engagement with business and neighborhood impacts for individuals living further from the REM stations. Only the question related to business impacts saw notable changes over time. Among respondents living further than 1.2km from a REM station, the perception that the project would help businesses decreased by 7% from wave one to wave three. Overall, perceptions regarding the anticipated impacts of the REM were positive, particularly in terms of environmental and regional benefits.

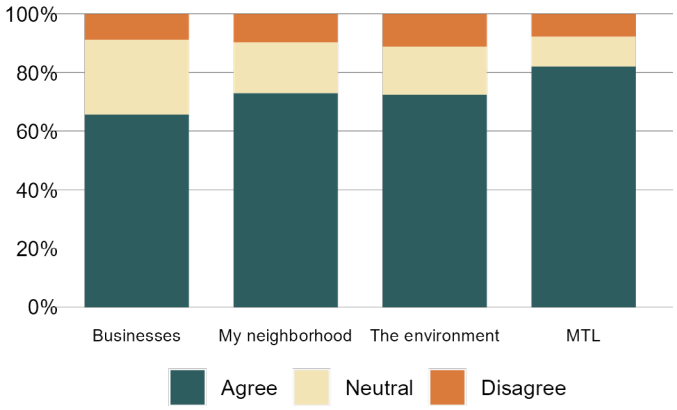


Figure 6.5 Perception of positive impacts of the REM on different aspects once completed for wave 3 respondents living within 1.2km (N=207)

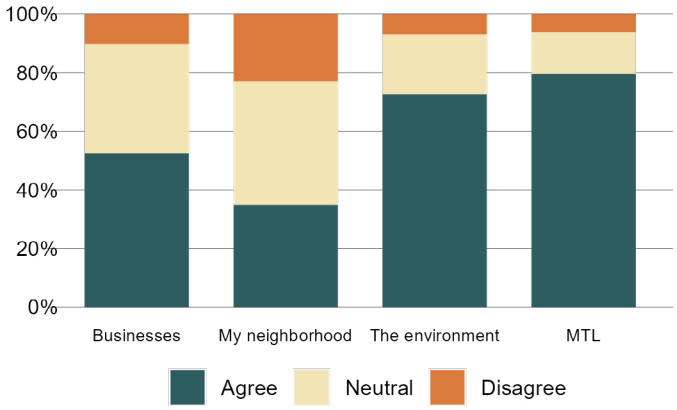
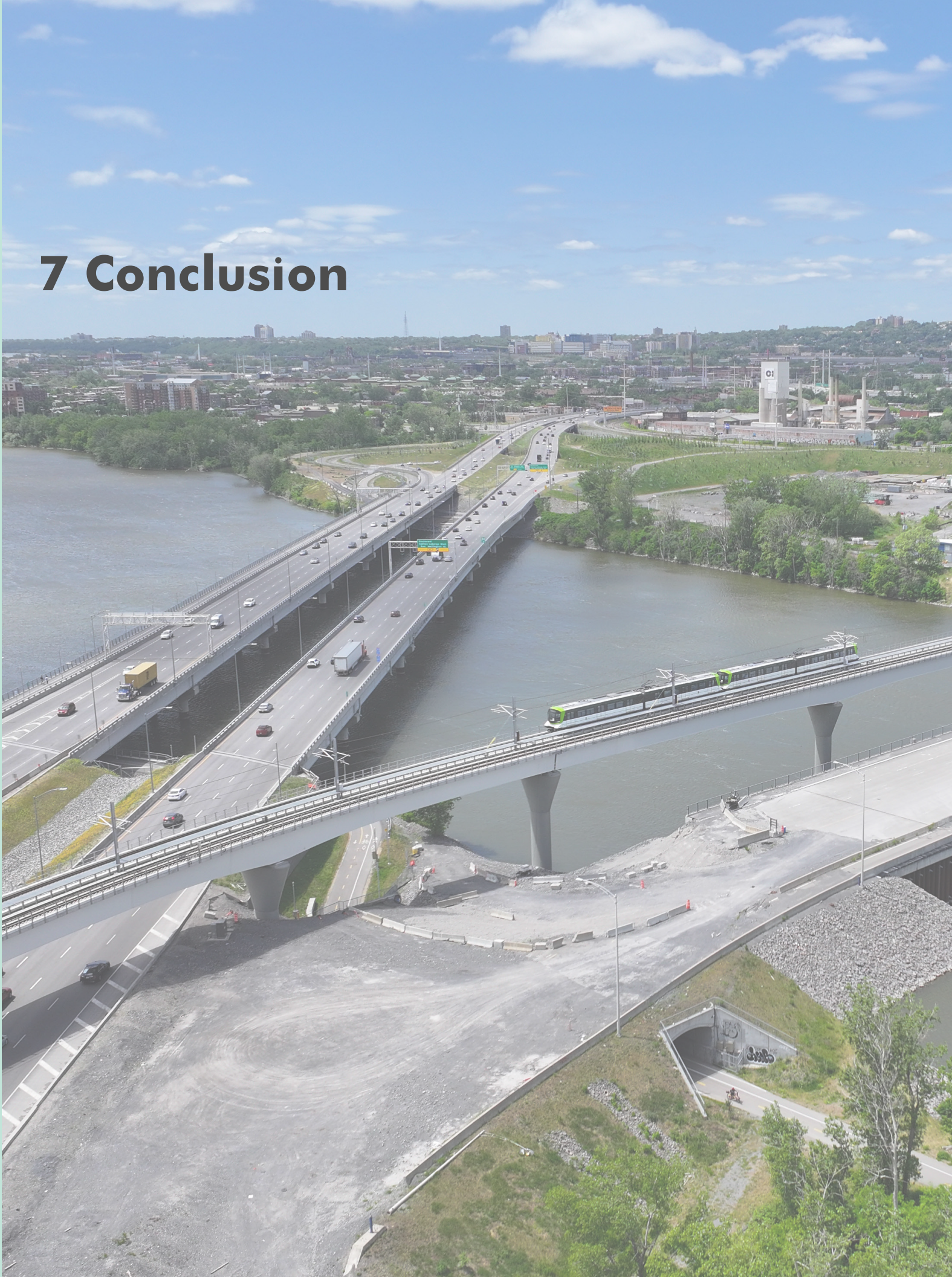


Figure 6.6 Perception of positive impacts of the REM on different aspects once completed for wave 3 respondents living further than 1.2km (N=3,588)

7 Conclusion



The construction and opening of the REM represent a generational opportunity to examine the relationship between largescale public-transit projects and a variety of societal outcomes. To provide a comprehensive understanding of the impacts of this monumental public-transport investment, this report has presented the results of a multi-wave data-collection process, including three waves of surveys collected between 2019-2022. Overall, the samples from wave one (N=3,533), wave two (N=4,063), and wave three (N=4,065) were found to be representative of the targeted population, with a slight underrepresentation of lower-income households. For the fourth wave of data collection scheduled for Fall 2023, the research team will continue to recruit participants through various means with the goal of maximizing the range of research potential.

The findings related to the different themes covered in the three waves of the survey and the panel dataset have allowed for some significant comparisons. When observing changes in travel behaviour, respondents reported an increase in automobility, while public-transit ridership decreased across responses from 2019 to 2022, with a relative public-transit recovery between 2021 and 2022. In line with the COVID-19 pandemic, telecommuting increased considerably between responses from 2019 to 2021, and remained at relatively high levels in 2022 when considering hybrid work (a combination of workplace and remote workdays).

Perceptions regarding the impacts of the REM construction remained mostly stable across the three waves, while the percentage of respondents reporting that they felt well informed about transport alternatives increased, suggesting that public-communication efforts improved between 2019-2022. At the same time, our survey results reveal that women were unevenly inconvenienced by negative construction impacts, meriting attention to a variety of gender and transport dynamics. Respondents' intentions to use the REM decreased to some extent between 2019-2022. Women were consistently found to be less likely to use the REM than men across the three waves of data collection, requiring consideration of wider gender inequities. These findings point the need for careful thinking and planning interventions to decrease car dependency across the region, to minimize negative construction impacts in the development of major public-transport projects (especially for women), and to ensure the equitable distribution and inclusivity of major public-transport investments.

One of the most significant findings of this report relates to perceptions of the anticipated impacts of the REM once it becomes operational. Across the three waves, perceptions were largely positive, especially regarding expected environmental and regional impacts. Collectively, these survey findings provide an optimistic outlook for the future of light-rail transit and wider sustainable transportation investments, both within the Montréal region and beyond.

Due to postponement of the opening of the first branch of the REM until Summer 2023, this report has focused on changing perceptions and travel intentions relating to the light-rail network before and during construction. The following wave of data collection in Fall 2023 and its analysis in 2024 will allow for a comprehensive assessment of the impacts of the REM—before, during and after implementation—on health, wellbeing, travel behaviour, and social-equity outcomes. We hope that the lessons gleaned from this study and future research will not only be applicable to projects of similar scale, but also to smaller ones that aim to create healthier environments and a more resilient and equitable future.

References

Beaudoin, J., Farzin, Y. H., & Lawell, C.-Y. C. L. (2015). Public transit investment and sustainable transportation: A review of studies of transit's impact on traffic congestion and air quality. Research in Transportation Economics, 52, 15-22.

Bowes, D., & Ihlanfeldt, K. (2001). Identifying the impacts of rail transit stations on residential property values. Journal of urban Economics, 50(1), 1-25.

Cervero, R., & Duncan, M. (2002). Land value impacts of rail transit services in Los Angeles County. Report prepared for National Association of Realtors, Urban Land Institute.

Coomes, K. E., Buonocore, J. J., Levy, J. I., Arter, C., Arunachalam, S., Buckley, L., Berberian, A., Gunasti, J., & Perera, F. (2022). Assessment of the health benefits to children of a transportation climate policy in New York City. Environmental Research, 215, 114165.

Currie, G., & Stanley, J. (2008). Investigating links between social capital and public transport. Transport reviews, 28(4), 529-547.

Daley, J., Rodrigue, L., Ravensbergen, L., DeWeese, J., Butler, G., Kestens, Y., & El-Geneidy, A. (2022). Foot-based microscale audit of light rail network in Montreal Canada. Journal of Transport & Health, 24, 101317.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method (4th ed.). Wiley.

Edwards, R. D. (2008). Public transit, obesity, and medical costs: Assessing the magnitudes. Preventive Medicine, 46(1), 14-21. https://doi.org/https://doi.org/10.1016/j.ypmed.2007.10.004

El-Geneidy, A., Levinson, D., Diab, E., Boisjoly, G., Verbich, D., & Loong, C. (2016). The cost of equity: Assessing transit accessibility and social disparity using total travel cost. Transportation research part A: policy and practice, 91, 302-316.

Fortier, N. (2020). COVID-19, gender inequality, and the responsibility of the state. International Journal of Wellbeing, 10(3).

Foth, N., Manaugh, K., & El-Geneidy, A. M. (2013). Towards equitable transit: examining transit accessibility and social need in Toronto, Canada, 1996–2006. Journal of Transport geography, 29, 1-10.

Karmann, J., Najjar, M., Ottoni, C., Shareck, M., Lord, S., Winters, M., Fuller, D., & Kestens, Y. (2023). "They didn't have to build that much": A qualitative study on the emotional response to urban change in the Montreal context. Emotion, Space and Society, 46, 100937.

Miller, P., de Barros, A. G., Kattan, L., & Wirasinghe, S. (2016). Public transportation and sustainability: A review. KSCE Journal of Civil Engineering, 20(3), 1076.

Ravensbergen, L., Fournier, J., & El-Geneidy, A. (2022). Exploratory Analysis of Mobility of Care in Montreal, Canada. Transportation research record, 03611981221105070.

Rodrigue, L., Daley, J., Ravensbergen, L., Manaugh, K., Wasfi, R., Butler, G., & El-Geneidy, A. (2022). Factors influencing subjective walkability: Results from built environment audit data. Journal of Transport and Land Use, 15(1), 1-21.

Statistics Canada. (2023). 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Retrieved May 24, 2023 from https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E

Tétreault, L.-F., Eluru, N., Hatzopoulou, M., Morency, P., Plante, C., Morency, C., Reynaud, F., Shekarrizfard, M., Shamsunnahar, Y., Faghih Imani, A., Drouin, L., Pelletier, A., Goudreau, S., Tessier, F., Gauvin, L., & Smargiassi, A. (2018). Estimating the health benefits of planned public transit investments in Montreal. Environmental Research, 160, 412-419. https://doi.org/https://doi.org/10.1016/j.envres.2017.10.025

Villafuerte-Diaz, J., Victoriano-Habit, R., Soliz, A., & El-Geneidy, A. (2023). Who Does Light Rail Serve? Examining Gendered Mobilities and Light-Rail Transit in Montreal, Canada. Transportation research record, 03611981231158318.

Wasfi, R., Ross, N., & El-Geneidy, A. (2013). Achieving recommended daily physical activity levels through commuting by public transportation: Unpacking individual and contextual influences. Health & Place, 23, 18-25. https://doi.org/https://doi.org/10.1016/j.healthplace.2013.04.006

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