CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

Hamilton

TABLE OF CONTENTS

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

TABLE OF CONTENTS

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

EXECUTIVE SUMMARY

This is the first iteration of the Core Asset Management (AM) Plans completed by the Corporate Asset Management (CAM) office in partnership with over fifty asset owners and key stakeholders across the City. The intent of these first plans is to meet Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure (O. Reg. 588/17) requirements including establishing the current levels of service, and setting a benchmark for the City's core assets (water, wastewater, stormwater, roads and engineered structures) in order to identify continuous improvement items for the next iteration of the AM Plans. The intent is also to support addressing findings from the Roads Value for Money Audit (AUD21006) report related to asset management.

A key output of an AM Plan is the infrastructure funding gap. Hamilton's current infrastructure position represents a social investment that has been built up progressively over the last 150 years predominantly due to underinvestment, including a lack of permanent infrastructure funding from senior levels of government, as well as large spikes of growth throughout the years. Hamilton's challenge is to determine how it will manage the gap over the long term to ensure that the City can continue to deliver its services sustainably today and across future generations.

Over the 10-year planning horizon Hamilton's funding gap for core assets is estimated to be $1,959 million or $195.9 million annually (see Table 1) with a low-medium data confidence. Moving forward, the City will continue to improve its asset lifecycle data, and this will allow for more informed choices as how best to mitigate any impacts and address the funding gap itself. This gap in funding future plans will be refined over the next three (3) years to improve the confidence and accuracy of the forecasts in alignment with O. Reg. 588/17 requirements and to present proposed levels of service and a funding strategy by 2025 for all City assets. There are no specific financial commitments required at this time from this AM Plan however findings from Report PW22048 will be used to inform the 2023 tax and rate supported budget process. It should be noted that this funding gap relates to core assets (water, wastewater, stormwater, roads and engineered structures) only and as additional asset classes are added to the program and the City applies asset management practices more robustly, it is expected that this gap will increase.

The total replacement cost for all core assets is approximately $21.3B. Overall, core assets are an average of Fair condition, and are an average of 28 years of age with 50% of service life remaining. However, the data confidence levels for these assets are shown as low to medium, indicating that as the City continues to improve data confidence for these assets, these values will change. By only having sufficient funding to renew assets at the above stated ratios, the City will be required to make difficult choices that could include a reduction of the level of service, ability to accept more risk and potentially higher costs to maintain assets. These choices could result in increased customer complaints, potential damage to the City's reputation and risk of fines or legal costs.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

Over the next 3 years Hamilton will be updating the Long-Term Financial Plan (LTFP) to connect the current tax and rate financing strategies to the asset management plans and the levels of service Hamilton provides. This will be a critical task for Hamilton to assist with the undertaking of timely renewals, ensuring both legislative compliance (indicating that the City has no choice) and the continuation of services.

Table 1: Summary of Assets

Asset Category	Replacement Value (B)	Average Age (Years)	Average Condition	Renewal Funding Ratio	10 Year O&M & Renewal Funding Ratio	Funding Gap per year (M)	Funding Gap over 10 years (M)
Water	$4.3	34	Fair	75%	85%	$20	$202
Data Confidence	Low	Medium	Low	Low-Med	Low-Med	Low-Med	Low-Med
Wastewater	$7.3	30	Fair	46%	70%	$49.8	$498
Data Confidence	Low	Medium	Medium	Low-Med	Low-Med	Low-Med	Low-Med
Storm Water	$3.1	22	Good	9.5%	42%	$31	$312
Data Confidence	Medium	Medium	Low	Low-Med	Low-Med	Low-Med	Low-Med
Road Network	$5.1	16	Fair	14%	66%	$87	$866
Data Confidence	Low	Low	Medium	Low-Med	Low-Med	Low-Med	Low-Med
Engineered Structures	$1.5	33	Good	33%	67%	$8.1	$81
Data Confidence	Medium	Medium	Medium	Low-Med	Low-Med	Low-Med	Low-Med
TOTAL	**$21.3**					**$195.9**	**$1,959**

The AM plans detail how the City plans to manage and operate the assets at the current levels of service through managing its life cycle costs. These costs are categorized by life cycle phases which includes acquisition, operations, maintenance, renewal and disposal. Over the 10-year planning horizon Hamilton will acquire $1.728 billion worth of core assets and is expecting to invest $3.448 billion in operations and maintenance. Adding additional assets over time significantly impacts the operational and maintenance resources required to sustain the expected or mandatory level of service. It should be noted that a significant amount of operational and maintenance expenditures are mandatory due to legislative requirements and cannot simply be avoided or deferred. Additionally, over the 10-year planning horizon, Hamilton is expecting to invest $913 million in renewals for the five (5) assets covered under this AM Plan. Continually deferring renewals create risks of higher financial costs, decreased availability, and decreased satisfaction with asset performance. At this time Hamilton has minimal disposals planned for its core asset classes.

Data Confidence is referenced throughout the report based on asset management best practice and indicates how confident the City is in the data provided. If the data was obtained using reliable documentation or methodology, then the data has higher confidence than if it was

estimated. It was difficult to confirm the accuracy of the data, as such the confidence has predominately been estimated based on completeness. It is a continuous improvement item to continue to assess the data accuracy for assets and implement improvements.

Although the City considers condition as the preferred measurement for planning, many assets in the City do not yet have a process to determine condition. For assets where there was no known condition information, or inspections were not completed in a manner in which the conditions could be converted to a standardized scale, the condition was assumed based on remaining service life.

In January 2022, the CAM Office released its first two (2) surveys related to asset management for core assets on the Engage Hamilton Site (Roads and Water Services Review page). The number of survey respondents for this initial survey only represents a small portion of the population. Some key findings include that 54% of survey respondents rate the road surface as Poor or Very Poor while almost 79% felt safe using the roads in a motorized vehicle. 89% of survey respondents have not experienced an unplanned water service interruption while 87% feel that drinking water is somewhat safe to drink or better. The full results were used to assist with defining customer levels of service within each AM Plan. Future surveys will be released on a regular basis for each service area to ensure the City is continually receiving feedback on City services.

Since demand is not yet an extensive requirement in O.Reg 588/17 for the July 1, 2022 deadline, this section is not as robust as some other sections of the report. It is an obligation for the report by July 1,2025 and will be expanded in future iterations. Some key demand drivers identified throughout the AM Plans are population change, regulatory changes/obligations, changes in demographics, seasonal factors, consumer preferences and expectations, technological changes, economic factors and environmental awareness/commitments.

Navigating the climate crisis has been a key area of focus for the City of Hamilton, which is represented by historical efforts to understand the challenges that climate change poses to City assets. As part of this work, an inventory of projects/initiatives has been created and can be found in the Climate Change Adaptation sections of the AM Plans. There will be more robust incorporation of climate initiatives in future AM Plans.

Hamilton has begun to undergo a shift in how it evaluates risk in accordance with its infrastructure planning. While high level risks have been identified in the AM Plans, at this time, the City does not have sufficient data to present risks and trade-offs. This information will be presented in the 2025 AM Plan regarding proposed levels of service.

The CAM office recognizes the importance of continuous improvement as an essential part of the asset management journey. As the City embraces asset management practices, it is important to recognize that the City is early in this journey and will acknowledge findings through the Improvement Plan and future iterations of the AM Plans. Improvement findings include categories such as data inconsistencies (e.g. lack of asset registries, gaps, duplication, low

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

confidence, multiple sources, outdated), asset condition (lack of condition assessments, lack of process), lack of governance structure which impacts staff understanding their roles and responsibilities related to asset management and lack of clearly defined asset ownership. Condition was largely based on estimated service life for the majority of assets and as such, a low confidence level was assigned as age is not always an indicator of condition. In addition, replacement costs were based on in-house costs which were not always based on current market rates.

In summary, the CAM Office has made good progress in both the finalization of the Core AM Plans and the development of the Corporate Asset Management Program. Asset Management is a journey. Some great first steps have been taken in not only meeting the requirements under O.Reg 588/17 but also in developing a corporate wide asset management program that will support the City in making better informed decisions about our assets and the services that we provide.

The CAM Office will continue to lead asset management through governance, expertise, monitoring, research support, reporting and assurance of consistent practices. Through the efforts of the CAM Office, enhanced asset management practices will become ingrained in the City's culture at all levels of the corporation.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

1.0 INTRODUCTION

The City of Hamilton is located on the western tip of Lake Ontario and has a population of approximately 570,000. The City is geologically unique as it is bisected by the Niagara escarpment which splits the City into upper and lower parts, and presents unique challenges with respect to transportation network connectivity and water works service delivery, which are the strategic levels focused on in this Core Asset Management Plan.

In 2001, the new City of Hamilton was formed with the amalgamation of Hamilton and its surrounding communities: Ancaster, Dundas, Flamborough, Glanbrook, and Stoney Creek. As a result, the City acquired many assets in varying condition, and with varying levels of documentation. The City has been working for the last 20 years to collect and compile data for our assets to improve decision making City wide and accomplish our vision of being the best place to raise a child and age successfully. The following map shows the City of Hamilton separated by the five (5) communities with major landmarks including the Niagara Escarpment, Hamilton Harbour and Lake Ontario.

It is important to note that the City has acquired core assets over the last 150 years which have required significant effort to operate, maintain, renew, and dispose, and the purpose of this plan is to quantify and compile these existing efforts and identify areas for improvement.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

2.0 SCOPE

This is the first iteration of the Core Asset Management Plans (AM Plan) completed by the Corporate Asset Management (CAM) office using the Federation of Canadian Municipalities (FCM) approach to asset management in partnership with the Institute of Public Works Engineering Australasia (IPWEA) and NAMS (National Asset Management System) Canada framework for asset management.

The intent of these first plans is to meet Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure (O.Reg. 588/17) requirements listed below including establishing the current levels of service for core assets, and to establish a benchmark for the City's core assets in order to identify continuous improvement items for the next iteration of the AM Plans.

The City also acknowledges that GM Blue Plan assisted with the initial data collection for this report and the development of the O.Reg. 588/17 community and technical levels of service in the Core AM Plans.

3.0 DEFINITIONS

TERM	DEFINITION
Acquisitions	The activities to provide a higher level of service through either the construction of new assets, expanding an existing assets service capacity or assumption of donated assets.
Asset	An item, thing or entity that has potential or actual value to an organization. It can be tangible or intangible, financial, or non-financial and includes consideration of risks and liabilities**.**
Asset Management Plan	Document that specifies the activities, resources and timescales required for the asset network to achieve its objectives. Long-term plans (usually 10-25 years or more) that outline the asset activities and programs for each service area and resources applied to provide a defined level of services in the most cost effect way
Bridges	Structures which provide a roadway or walkway for the passage of vehicles, pedestrians or cyclists across an obstruction, gap or facility and are greater than or equal to 3 metres in span (Ministry of Transportation, 2008).
Critical Asset	Assets having potential to significantly impact on the achievement of Hamilton's objective and often refer to those assets necessary to provide services to critical customers. The assets that are likely to result in a more significant financial, environmental, and social costs in terms of impact These assets can be safety critical, environmentally critical or performance critical and can relate to legal, statutory, or regulatory requirements.
Culverts	Structures that provide an opening through soil typically as a channel/tunnel for water (e.g. stream, drainage) underneath a road or railway.
Customer	Any person who uses the asset/service or is affected by it. This definition does not require the person to be a ‘rate’ payer or contribute tax dollars to Hamilton.
Demand	The desire customers have for assets or services
Demand Management Actions	take to influence demand for services and assets. This can be done through either the supply side or the demand side. (Supply side - i.e. Minimize water leaks loss through leak detection. Demand side - i.e. Through pricing, regulation, education, and incentives)

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

TERM	DEFINITION
Disposal	Actions necessary to decommission assets that are no longer required.
Level of Service	Statements that describe the objectives or outputs of an organization or an activity it intends to deliver to its customers. Parameters include Safety, customer satisfaction, quality, quantity, capacity, reliability, responsiveness, environmental acceptability, cost, and availability
Lifecycle	The time that commences with the identification of the need for an asset and terminates with the decommissioning of the asset. 'Stages involved in the management of an asset Acquisition, Operations, Maintenance, Disposal, Renewal
Lifecycle Activity	The activities undertaken by the City to ensure an asset is reaches its intended useful life
Lifecycle Costs	The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, renewal, and disposal costs.
Linear assets	Assets which traverse multiple sites and are typically defined by length.
Maintenance	The ongoing management of deterioration. Activities Hamilton undertakes to retain an asset as near as practicable to its original conditions (excluding renewals). These activities do not increase the service life or potential however they slow down deterioration or delay when a renewal is necessary. These activities are grouped as either planned or reactive.
Major culverts	Culverts that have a span of 3 metres or larger.
Minor culverts	Culverts that span less than 3 metres. Refer to the Stormwater Section the AMP for information on minor culverts.
Major Retaining Walls	Structures that are considered retaining walls and are >2m in height considered part of an OSIM inspection
Minor Retaining Walls	Structures that are considered retaining walls, which are not considered part of an OSIM inspection
Operations	Regular activities to provide services at a specified standard which typically would include cleaning, inspections, security checks, grass cutting etc.
Overhead Sign Supports	Structures which support static signs (sign boards) or variable message sign systems

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

TERM	DEFINITION
Planned maintenance	Necessary activities that ensure the reliability or to achieve the useful life of an asset. These can be either periodic or preventative in nature.
Reactive maintenance	Immediate or emergency repairs required to return the asset to its desired condition
Renewal	The activities that return the assets service capability to a state which it had originally provided. This includes replacement or near total reconstruction of assets that are at the end of their lives.
Replacement cost	The cost Hamilton would have to pay to acquire an equivalent new asset with the same service potential on the reporting date
Resilience	The ability for Hamilton to withstand disruption, absorb disturbances, act effectively in a crisis, adapt to changing conditions including climate change, and grow over time.
Retaining Walls	Structures that hold back fill and are not connected to a bridge
Right of Way	A right of way is a type of easement granted over land for transportation purposes (e.g. road, sidewalk)
Risk – The effect of uncertainty	An effect is a deviation from the expected — positive or negative. Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of, an event, its consequence, or likelihood. Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood. In the context of the Risk Management standard- Effect of uncertainty on objectives.
Risk Management	Hamilton's coordinated activities to direct and control actions as well as inform decisions with regards to risk
Stormwater assets	Relate to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater**.**
Strategic Asset Management Policy (SAMP)	Document that details how Hamilton objectives are to be converted into asset management objectives, the approach and rules for creating all detailed asset management plans, defining all organizational definitions and how to integrate asset management organization wide to further support objectives and ensure informed decision making is possible.
Sustainability	A goal for how assets are to be managed. This represents meeting the needs of the future by balancing social, economic, cultural, and environmental outcomes and needs when making decisions today.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

TERM	DEFINITION
Useful Life	The period of time Hamilton expects to be available for use. It it's the expected time between placing the asset into service and removing it from service.
Vertical assets	Assets which can only occupy one site and are typically within a building or a facility which may be comprised of multiple components.
Wastewater assets	Relate to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater.
Water assets	Relate to the collection, production, treatment, storage, supply or distribution of drinking water.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

4.0 KEY STAKEHOLDERS

KEY STAKEHOLDER	ROLE IN ASSET MANAGEMENT PLAN
Customers/Public	- Participate in engagement to allow Hamilton to understand the communities desired level of service.
Mayor & Council	- Represent needs of community/shareholders, and - Review plan and consider recommendations in decision making.
City Manager & General Managers	- Support continuous improvement initiatives, and - Ensure service is sustainable. - Represent needs of community/shareholders, and - Review plan and consider recommendations in decision making.
Chief Road Official	- Asset owner for transportation assets, - Oversees asset management planning activities within their respective functional area with key outputs of operational and capital plans and budgets. - Sets service objectives and monitor's progress. - Allocate resources to meet planning objectives in providing services while managing risks, - Support continuous improvement initiatives, and - Ensure service is sustainable.
Director, Hamilton Water	- Asset owner for water, wastewater and stormwater assets, - Oversees asset management planning activities within their respective functional area with key outputs of operational and capital plans and budgets. - Sets service objectives and monitor's progress. - Allocate resources to meet planning objectives in providing services while managing risks, - Support continuous improvement initiatives, and - Ensure service is sustainable.
Director, Engineering Services	- Allocate resources to meet planning objectives in providing services while managing risks. - Support continuous improvement initiatives, and - Ensure service is sustainable.
Director, Transportation Operations & Maintenance (TOM)	- Allocate resources to meet planning objectives in providing services while managing risks, - Support continuous improvement initiatives, and - Ensure service is sustainable.
Director, Corporate Asset Management (CAM)	- Allocate resources to meet planning objectives in providing services while managing risks. - Creates a Corporate Asset Management Plan as a recognized and consistent tool for making business decisions related to forecasting and budgeting activities.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

KEY STAKEHOLDER	ROLE IN ASSET MANAGEMENT PLAN
	- Coordinates approach and stewardship to align asset management planning with the City's financial plans, budget and other relevant Acts, policies, frameworks, and plans.
Field/Operational Staff	- Verify asset data and regularly monitor condition of the assets for public safety, - Provide operational and maintenance service to the assets, - Report to senior management any progress, deficiencies and effectiveness of operations and maintenance activities.
Province of Ontario	- Establishes Legislation for core assets.

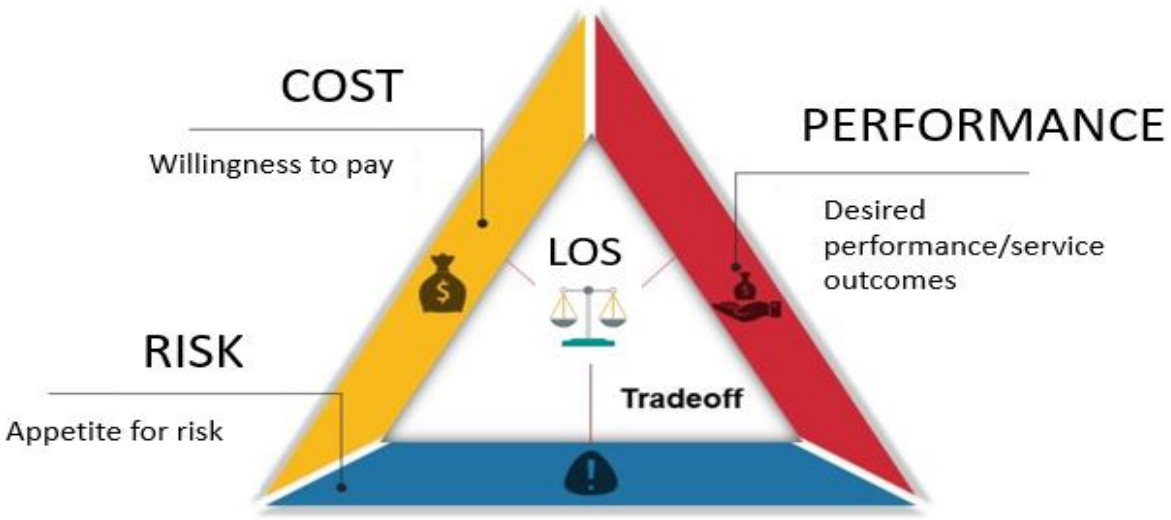
5.0 ASSET MANAGEMENT PLANNING

Asset management relates to the coordinated set of activities and practices an organization applies to achieve strategic objectives through balancing lifecycle costs, risks, and performance to deliver the agreed upon levels of service. In simpler terms, it is about making the right decisions so that the City is doing the right work, on the right asset, at the right time, for the right cost.

Historically, the City has viewed asset management from a lens of “managing assets” which involved specific activities such as completing inventories, performing condition assessments, completing lifecycle activities, and forecasting needs. While those activities are important parts of asset management, if the activities are not coordinated and strategic objectives are not defined, the City will experience disconnects between the activities being completed and the service needs expected by the customer.

These plans are intended to be a shift from “managing assets”, to a more holistic view of asset management where the City acts as a steward for assets that contribute to City services which are ultimately paid for and are in service for the customer. It is the City’s responsibility to manage costs, risks, and performance in the best interests of the customer, consult customers on their values with respect to these services, and use our technical expertise to set and achieve expectations, in the form of levels of service as shown below in Figure 1.

Figure 1 – Proposed Level of Service Approach



Many municipalities face similar challenges with their assets. Many assets’ have long useful lives which can continue through multiple generations, and these assets may cost a significant amount of money throughout their lifecycle. This means that one generation may build an asset

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

which does not require any substantial works in their lifetime but will lock in future generations with significant costs and risks. Considering the longevity of infrastructure assets in tandem with how the City only has a finite amount of money available to spend on an annual basis means that the City must have a plan in place to conduct and prioritize works so that we are setting up future generations for success. Some questions we are answering in these Asset Management Plans include:

- What do we own?
- What condition is it in?
- Where is it?
- What needs to be done?
- What is it worth?
- When does the work need to be done by?
- Do we have sufficient resources to do the work?
- If we do not have sufficient resources, what are the consequences?
- Are we meeting minimum legislative requirements?
- What level of service are our assets providing?
- How are our assets performing?
- What are our demand requirements?
- How do we manage current and future risks?
- What are the costs required and how do we prioritize competing interests?
- Are there assets that are not needed?
- How successful are we at managing assets?
- Are there areas for improvement?

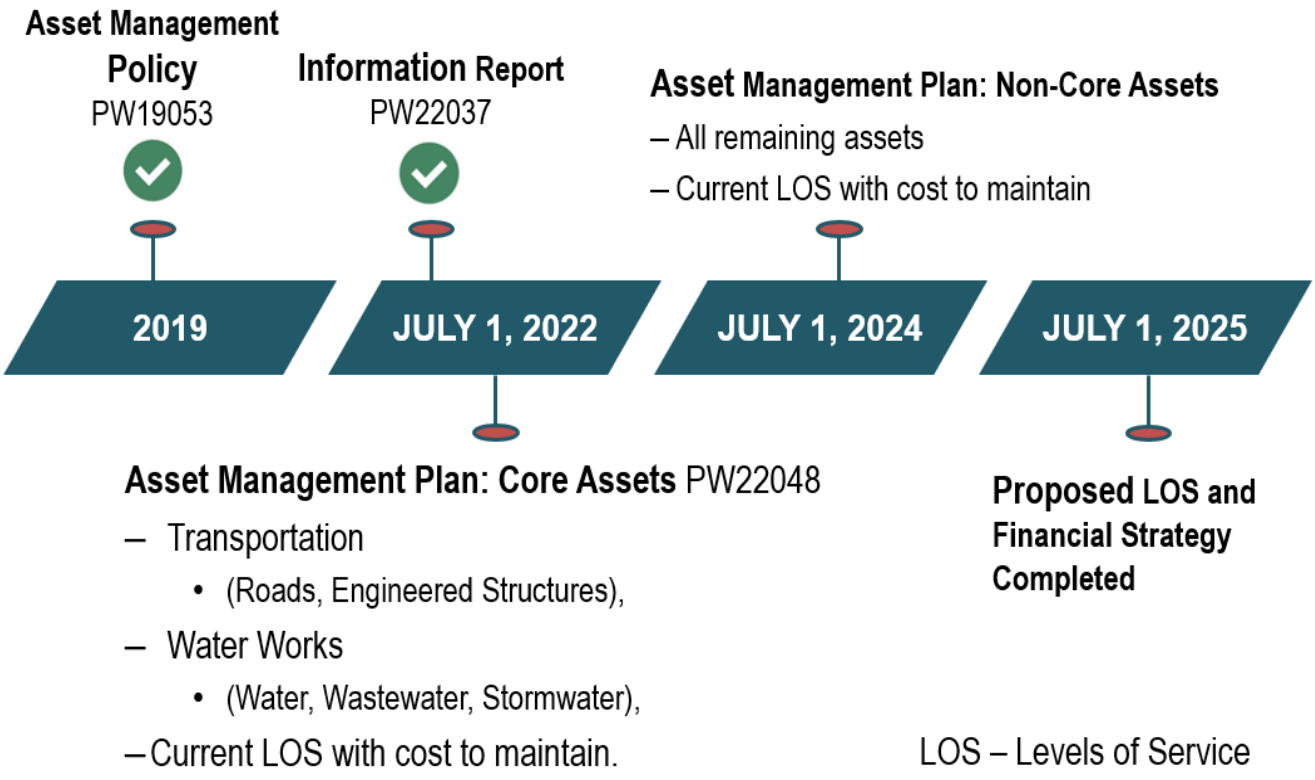
CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

5.1 O.REG. 588/17 OVERVIEW

In January 2018, the province enacted O.Reg. 588/17: Asset Management Planning for Municipal Infrastructure, which was created under the 2015 Federal Infrastructure for Jobs and Prosperity Act. This regulation was created because the province recognized that many Ontario municipalities were facing similar issues with existing infrastructure degrading faster than it was being repaired or replaced. The goals of the regulation were to: standardize asset management plans, spread best practices among municipalities, and improve infrastructure planning in municipalities.

O. Reg. 588/17 prescribed the timelines and requirements municipalities were to complete for the Strategic Asset Management Policy (SAMP), and Asset Management Plans (AM Plans). The regulation separated the AM Plan requirements into core and non-core assets and current and proposed levels of service. Core assets were assets supporting the delivery of the following services: roads, bridges & culverts, water, wastewater, and stormwater. Non-core assets were deemed to be any other assets supporting all other City services. Current levels of service are defined as the level of service the City is currently delivering considering lifecycle costs, performance, and risk, and proposed levels of service are the levels of service the City will be proposing to provide. A brief snapshot of the timelines and requirements for each iteration of the AM Plan is shown below in Figure 2.

Figure 2 – O. Reg. 588/17 Timelines



CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

These 2022 Core Asset Management Plans (AM Plan) is a continuation of the process set out in O.Reg. 588/17, which began with the 2019 Strategic Asset Management Policy, and includes information related to the current levels of service for core assets. The City will continue to proceed with achieving the timelines outlined in the figure above.

5.2 IPWEA & NAMS CANADA FRAMEWORK

Asset management regulations are not new globally, but they are new to Canada. Asset Management has been used globally by multiple governments especially in Australia and New Zealand. There are two (2) international standards that have evolved for asset management which are applied throughout the AM Plan documents: ISO 55000 –Asset Management Standard and ISO 31000 – Risk Management Standard.

The Federation of Canadian Municipalities (FCM) recognizes that there are globally recognized practices that best meet the requirements of O.Reg. 588/17 and therefore, these AM Plans follow the Institute of Public Works Engineering Australasia (IPWEA) and National Asset Management System (NAMS) Canada template and philosophy, while fulfilling the O.Reg. 588/17 timeline and requirements.

The five (5) key asset management principles for organizations to adopt through the IPWEA framework are included below. These principles will be adopted for all asset classes throughout the City:

1. Adopt a lifecycle approach – Apply a whole life methodology for managing infrastructure assets including acquisition, operations, maintenance, renewal and disposal;
2. Endorse evidence-based decision making – Utilize current infrastructure information to support asset planning and decisions;
3. Embrace continuous improvement practices – Implement and adopt asset management practices that formalize and document continuous improvement efforts across the organization;
4. Provide optimal value – Asset service levels will be clearly defined, communicated and fact-based on the realities of today; and,
5. Develop service knowledge – Developing this key competency across the organization will ensure Hamilton is able to balance costs, risk and performance and ensure long term sustainability is achieved.

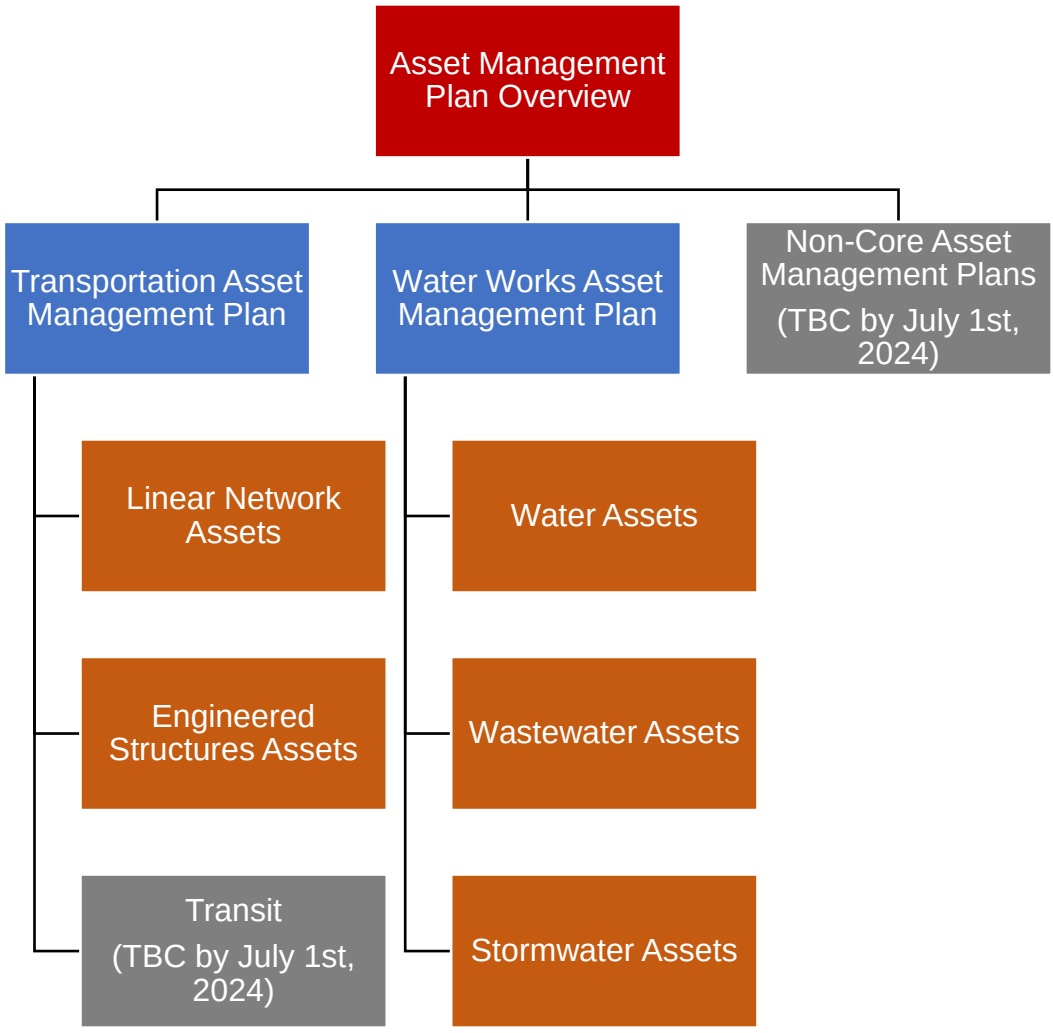
In addition, there are benefits to asset management across the organization, and these six (6) key benefits identified by IPWEA for asset management planning include:

1. Strong Governance and Accountability;
2. Improved Financial Efficiency;
3. More Effective and Sustainable Decisions;
4. Effective Risk Management;
5. Improved Social Outcomes; and,
6. Improved Customer Engagement.

5.3 ASSET MANAGEMENT PLAN NAVIGATION

Per Figure 3 below, the Asset Management Plan is composed of several detailed asset management plan documents which feed into this one Asset Management Plan Overview (AMP Overview). The AMP Overview provides context for all of the AM Plans, summarizes the City's general approach to asset management, and connects the AM Plans together by providing a summary of all the AM Plans completed to date. At the time of writing this report, there are currently three (3) reports including this AMP Overview, but as the City continues along the O.Reg. 588/17 timeline, more AM Plans will be added as shown below in Figure 3.

Figure 3 – Asset Management Plans Structure



5.4 STRATEGIC ALIGNMENT

The City's strategic goals and objectives are shaped by internal drivers such as Council approved strategies and plans, as well as external forces such as citizen expectations, and legislative and regulatory requirements. The specific legislative and regulatory requirements for service areas are provided in each AM Plan.

City objectives provide asset owners with direction regarding levels of service and asset investment priorities. This AM Plan will demonstrate how the City's objectives for core assets can influence levels of service and direct asset expenditures.

The relevant goals and objectives and how these are addressed in the Core AM Plan are summarized in Table 1.

Table 1: Goals and how these are addressed in this Plan

INTERNAL DRIVERS	GOAL	OBJECTIVE	HOW GOAL AND OBJECTIVES ARE ADDRESSED IN THE AM PLAN
Strategic Plan	Economic Prosperity & Growth	Services ensure communities are livable, sustainable, and vibrant, through the provision of infrastructure	The objective of the first iteration of the Core AM Plan is to quantify the current levels of service for core assets.
	Clean and Green	Hamilton is environmentally sustainable with a healthy balance of natural and urban spaces.	The AM Plans consider and identify risks and opportunities for climate change adaptation and resiliency.
	Community Engagement and Participation	Hamilton has an open, transparent and accessible approach to City government that engages with and empowers all citizens to be involved in their community.	The AM Plans engages our customers to understand service level values and expectations.
	Our People and Performance	Hamiltonians have a high level of trust and confidence in their City government.	The AM Plans strive to provide data driven evidence for effective decision making.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

INTERNAL DRIVERS	GOAL	OBJECTIVE	HOW GOAL AND OBJECTIVES ARE ADDRESSED IN THE AM PLAN
	Built Environment & Infrastructure	Hamilton is supported by state-of-the-art infrastructure, transportation options, buildings and public spaces that create a dynamic City.	The AM Plans address levels of service associated with their assets.
2018-2022 Council Priorities	Climate Change	The City is committed to improving the health of Hamilton's population through the reduction and prevention of outdoor air pollutant exposure and the mitigation of and adaptation to climate change.	The AM Plans consider and identify risks and opportunities for climate change adaptation and resiliency.
	Multi-Modal Transportation	The City is committed to providing transportation options that meet legislated standards for both personal travel and goods movement in an accessible, convenient, efficient and affordable manner.	The Transportation AM Plan addresses levels of service associated with transportation assets.
	Equity, Diversity and Inclusion	The City is committed to creating and nurturing a city that is welcoming and inclusive.	Future iterations of the AM Plans will incorporate an EDI lens.
	Integrated Growth and Development	The City of Hamilton is committed to planning for and implementing infrastructure in a manner that manages growth in a way that minimizes impact and creates opportunities for both residential and business development, while ensuring the city's overall long-term sustainability.	The Core AM Plans address demand management for assets.
	Trust and Confidence in City Government	The City of Hamilton is committed to promoting an open approach to government. Ensuring public information is readily available and accessible, by promoting	The AM Plans strive to provide data driven evidence for effective decision making.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

INTERNAL DRIVERS	GOAL	OBJECTIVE	HOW GOAL AND OBJECTIVES ARE ADDRESSED IN THE AM PLAN
		partnerships and by strengthening and improving its ability to consistently undertake coordinated, transparent and inclusive, evidence-based engagement practices, the City is committed to enabling residents, business owners and community stakeholders to become more involved in decision-making processes and find value in partnering and investing in City programs.	
	Fiscal Health and Financial Management	The City uses financial management tools to plan, direct, monitor, organize and control spending to ensure that the fiscal health of its finances, including its reserves and debt levels.	The AM Plans identify lifecycle needs and the infrastructure gap for assets.
Transportation Master Plan	Sustainable and Balanced Transportation	Integrate walking infrastructure needs into the City's 10 Year Capital Budget so that opportunities for seamless, lower-cost development of pedestrian infrastructure is captured.	The AM Plans identify lifecycle needs and the infrastructure gap for core assets.
	Economic Prosperity and Growth	Provide multi-modal access to/from and within employment lands	The AM Plans identify lifecycle needs and the infrastructure gap for core assets.
Climate Change Task Force	Sustainable Transportation	To change the modal split and investigate strategies so that more trips are taken by active and sustainable transportation than single use occupancy vehicles.	The AM Plans consider and identify risks and opportunities for climate change adaptation and resiliency.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

INTERNAL DRIVERS	GOAL	OBJECTIVE	HOW GOAL AND OBJECTIVES ARE ADDRESSED IN THE AM PLAN
Public Works Business Plan 2019-2022	Climate Resiliency	To improve Hamilton's climate resiliency by decreasing our vulnerability to extreme weather, minimizing future damages, take advantage of opportunities, and better recover from future damages.	The AM Plans consider and identify risks and opportunities for climate change adaptation and resiliency.
Strategic Asset Management Policy	Prioritization	Ensure the City continues to provide public services in the road right-of-way, bridges, culverts, drinking water treatment & distribution, wastewater treatment & collection, and storm water systems at defined levels of service.	The objective of the first iteration of the AM Plan is to quantify the current levels of service for core assets.
		Take a long-term view in making asset decisions, especially considering the municipal life cycle of infrastructure assets from acquisition to disposal.	The AM Plans identify lifecycle needs and the infrastructure gap for core assets.
		Clearly identify and respect defined infrastructure priorities. A clearly defined hierarchy for infrastructure priorities is a critical foundation for an effective asset management plan, as priorities should inform investment decisions. Priorities will be further described in the AM Plan.	The objective of the first iteration of the AM Plan is to quantify the current levels of service for core assets.
	Transparency	Infrastructure planning and investment should be made on information that is evidence based, and, subject to any restrictions or prohibitions, on the basis of information that is	The AM Plans have been developed based on available information and evidence based with

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

INTERNAL DRIVERS	GOAL	OBJECTIVE	HOW GOAL AND OBJECTIVES ARE ADDRESSED IN THE AM PLAN
		either publicly available or is made available to the public.	full disclosure to the public.
		In cases where the City becomes aware of information that has implications for City infrastructure planning, this should be shared with relevant public agencies that may be affected.	
	Health, Safety and the Environment	Ensure health & safety of workers involved in the construction and maintenance of assets is protected.	The AM Plans take into account health, safety and the environment in the risk evaluation process and management of infrastructure lifecycle. The AM Plans consider and identify risks and opportunities for climate change adaptation and resiliency.
		Ensure infrastructure is designed to be resilient to the effects of climate change.	
		Minimize the impact of infrastructure on the environment	
		Respect and help maintain ecological and biodiversity.	
		Endeavour to make use of acceptable recycled materials.	
	Community Focus	Infrastructure planning and investment should promote economic competitiveness, productivity, job creation and training opportunities.	A primary goal of asset management planning is to hear the voice of the community through regular engagement surveys and other means. In all ways, the needs of the public will be considered in the development of
		Promote accessibility for persons with disabilities	
		Promote community benefits, being the supplementary social and economic benefits arising from an infrastructure project that are	

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

INTERNAL DRIVERS	GOAL	OBJECTIVE	HOW GOAL AND OBJECTIVES ARE ADDRESSED IN THE AM PLAN
		intended to improve the community well-being (creating jobs, improving public space, for example).	infrastructure that support our services.
		Consider the needs of the public by being mindful of the local demographic and economic trends (seniors, commuters, tourists, etc.).	
		Foster innovation by creating opportunities to make use of proven technologies, practices and services (especially those developed in Ontario).	
	Coordination	Be mindful of and align with the other City policies, Strategic Plan, and other plans and strategies in effect. A description of connected plans is provided in further detail in the Asset Management Plan.	This is shown in this table.

5.5 ASSET REGISTRY & HIERARCHY

An asset registry is a single data source which contains an inventory of asset data including attribute information for each individual asset. This attribute information includes a record for each individual asset including condition, age, replacement cost, and asset specific information (e.g. length, diameter, material etc.). At this time, the City does not have an asset registry for core assets but is currently working on implementing an Enterprise Asset Management System (EAM) for Public Works and has multiple systems to manage assets as explained in Section 7.2.3. The asset registry should be structured in the form of an asset hierarchy explained below.

An asset hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The City's asset hierarchy is a functional hierarchy, which means that the hierarchy has been established based on what the asset owner needs or wants the asset or system to do. Generally, assets and systems are organized according to their primary function.

For the AM Plan the asset hierarchy includes the strategic, service area, asset class and asset levels defined below in Table 2. This hierarchy was used for asset planning, financial reporting and service planning and delivery.

It is important to note that the asset hierarchy used in an enterprise asset management system such as the EAM project (explained in Section 7.2.3) will drill down in more detail to the component level of the asset (e.g. pump for a pump station, engine for a vehicle). Since the AM Plan is intended to be a high-level planning document, the asset hierarchy is only provided to the level required for this purpose.

Table 2 – Asset Hierarchy Definitions

HIERARCHY LEVEL	DEFINITION
Strategic	The Strategic level is defined in alignment with the City of Hamilton's corporate priorities and involves decisions from high level stakeholders. The Strategic level should not represent any physical objects i.e., Assets or Systems.
Service Area	The Service Area level identifies subsets of a Strategic level with unique function and service, as defined by the respective Division. Like the Strategic level, the Service Area level should not represent any physical objects i.e., Assets or Systems.
Asset Class	This level further separates the service area level into distinct levels. It is a system used to drill down the service provided within a service area level.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

Asset	For the purposes of the asset hierarchy within the AM Plan, an asset is the lowest level where the City is reporting lifecycle activities.

The Strategic Levels that have been identified to contain core assets are Transportation and Water Works. The asset service hierarchies from strategic to the service area are shown below in Table 3. The hierarchy down to the asset level is provided at the beginning of each AM Plan and includes the service area level definitions.

Table 3: Asset Service Hierarchy

Strategic Level	Strategic Functional Definition	Service Area	Asset Class
Transportation	Provide safe, accessible, and efficient movement for people, goods, and services across the City.	Linear Network (Roads)	Road Pavement
			Active Transportation
			Traffic assets
		Engineered Structures	Engineered Structures
		Transit (Future Iteration by July 1st, 2025)	TBD
Water Works	Operate infrastructure that supports the supply of safe, clean drinking water, collection and treatment of wastewater, and collection of storm water.	Water	Vertical
			Linear
		Wastewater	Vertical
			Linear
		Stormwater	Vertical
			Linear

6.0 ASSET BACKGROUND INFORMATION

Throughout the AM Plans, background information includes information related to inventory, condition, replacement cost, and asset usage.

6.1 OVERALL SUMMARY OF ASSETS

An overall summary of the core assets defined in each AM Plan can be found below in Table 4. The total replacement cost for all core assets is approximately **$21.4B**. Overall, core assets are an average of **Fair** condition, and are an average of **27 years** with **52%** of service life remaining. However, it is evident that overall, the data confidence levels for these assets are shown as low to medium, indicating that as the City continues to improve data confidence for these assets, these values will change.

For detailed information for each service area, please refer to the Detailed Summary in each AM Plan.

Table 4 – Core Assets Summary

Strategic Level	Replacement Value	Average Age (% RSL)	Average Equivalent Condition
Transportation*	**$6.7B**	**25 years (49%)**	**3-Fair**
Data Confidence	Low	Low	Medium
Water Works	**$14.7B**	**29 years (54%)**	**3-Fair**
Data Confidence	Low	Medium	Medium
TOTAL	**$21.4B**	**27 years (52%)**	**3-Fair**

***Excluding Transit**

Data confidence is defined in Table 5. As previously mentioned, the data confidence is shown overall as low to medium. As indicated throughout the AM Plans, the City has completed many inventory projects, inspections and condition assessments over the last 20 years. However, it was also found that there is not yet an asset registry for many assets, resulting in many different inventory data sources with conflicting and missing information especially surrounding age data. Currently, there is also a lack of processes for documenting these inspections and assessments to be able to include them as part of the AM Plan. This means that condition was largely based on estimated service life (ESL) for the majority of assets which is a low confidence level as age is not always an indicator of condition. This also means since some assets' have a low

confidence in age data and no known condition data, condition was not able to be estimated for some assets and are shown to be unknown. This has been identified as a continuous improvement item.

In addition, replacement costs were based on in-house costs which were not always based on current market rates. Linear assets typically have a higher level of confidence in replacement costs because these assets are replaced more often. Vertical assets are not typically replaced as frequently and are often high cost assets which is why the replacement cost is often considered low. Improving the process for estimated replacement costs to use current market rates as often as possible has been identified as a continuous improvement item.

6.2 INVENTORY DATA

The information in the following sections indicates where the inventory data in the AM Plan reports were accessed from.

6.2.1 Key Existing Databases

The City maintains various databases to track asset inventory data. For core assets, the City of Hamilton currently manages asset data using the following systems shown below in Table 6. The City is in the process of implementing an EAM system which will consolidate all Public Works data into a single asset registry as explained in Section 6.5. Asset data for this report was collected from the database that was considered the most confident based on asset owner opinion.

Table 6 – Asset Databases

Database	Description	Data	Core Strategic Level
Infor Hansen Work Management System	Work management system used by various business units to store inventory data and manage work orders.	Information from ArcGIS database; Field inventory confirmations;	Transportation, Water Works
ESRI ArcGIS geodatabase	ArcGIS is a geographic information system (GIS) consisting of desktop, server and mobile applications used for storing, mapping and analyzing the City's infrastructure and geographic data.	Information from As Built drawings; Historically input assumed data that has not been verified; Inventories created using aerial data; Field inventory confirmations; Data provided by communities for information related to assets that were acquired during the 2001 amalgamation	Transportation, Water Works
Bridge Management System (BMS)	This tool manages bridge data, provides risk information for the asset, and engineering models and benefit/cost analysis to assist with project planning.	Consultant completed inventories	Transportation

6.2.2 Data Confidence

Data Confidence is referenced throughout the report and indicates how confident the City is in the data provided. If the data was obtained using reliable documentation or methodology, then the data has higher confidence than if it was estimated. At the time of writing the report, it was difficult to confirm the accuracy of the data, as such the confidence has predominately been estimated based on completeness and the current assumed accuracy. It is a continuous improvement item to continue to assess the data accuracy for assets and look for areas for improvement.

Table 5 – Data Confidence Grading Scale

Data Confidence Grading Scale		
Confidence Grade	**Reliability**	**Accuracy**
A - Very High	Data based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment.	Dataset is complete and estimated to be accurate +/- 2%
B - High	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings. For example, some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation.	Dataset is complete and estimated to be accurate +/- 10%
C - Medium	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available.	Dataset is substantially complete but up to 50% extrapolated data and accuracy estimate +/- 25%
D - Low	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis.	Dataset may not be fully complete, and most data is estimated or extrapolated. Accuracy +/- 40%
E - Very Low	None or very little data held.	Dataset does not exist or very little accuracy.

6.2.3 Enterprise Asset Management (EAM) System

After identifying eleven (11) different software systems currently used to track and manage over $20B in diverse and complex assets, the General Manager's Office in Public Works recognized in 2017 that a single Enterprise Asset Management System (EAM) system was required. Most of these systems were stand-alone solutions managing an individual section's infrastructure with no or limited integration with critical systems such as the Finance system, ESRI ArcGIS Mapping and other City systems.

The existing structure is also characterized by the following issues:

- Processes to manage assets and key work activities are not standardized across Public Works;
- Separate and non-integrated systems and tools;
- Some transfer of data between a small number of systems;
- Multiple versions of the same data, with inconsistencies;
- Multiple versions of data without data integrity;
- Low end-to-end process maturity across the asset lifecycle;
- Some areas managing data and work orders manually, with greater opportunity for error and degraded asset lifecycle, in addition to the associated inefficient manual processes; and,
- Difficulty and cost of providing transparency, repeatability and integrity of the information and consistency of decisions.

Public Works has a unique challenge collecting and managing asset related information due to the disparity between the existing systems and the limited ability of such systems to meet current needs. The current structure leaves most groups without access to aligned, unified and accurate data normally seen through an asset registry. A foundational piece to an EAM environment is the reliable and efficient access to unified and accurate data. This allows for better business process integration, timely decision making and streamlined process execution. A single, integrated EAM system will provide the ability to maintain data integrity across sections with the ability to mine data to improve performance and capital budget decisions. This would simplify and improve data integrity for reporting requirements for various parties and provide an asset registry for assets within the system. As well, streamlining and standardizing processes, designing workflows and hierarchies holistically throughout Public Works, and setting the asset hierarchies within standardized workflows within an integrated system, is a required foundational step in a successful asset management program. The hierarchy identified in Section 6.5 is the draft hierarchy for the EAM project.

In addition, an EAM system enables municipalities to develop comprehensive programs to manage the complete lifecycle of assets, including capital planning and prioritization, preventive, predictive, routine and unplanned maintenance and calibration, while improving the daily effectiveness of operations and technical staff. It also allows for better management of equipment and facilities to increase reliability and ensure compliance with laws, regulations and

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

industry-specific requirements. The ability to conduct advanced analytics to inform risk prioritization and capital funding priorities, and in some cases, allow some sections that are still paper based and manual to be updated and included in the data schemas is critical.

This prompted a feasibility study in 2018 which concluded that Public Works could reduce its technology footprint to only a few systems and resulted in receiving Council approval through Report PW19035/FCS19040 in January 2020 to proceed with Hexagon's Enterprise Asset Management (EAM) system over a 4-year implementation.

6.3 MUNICIPALITY'S APPROACH TO CONDITION

Condition is the preferred measurement for planning lifecycle activities to ensure assets deliver the agreed upon levels of service and reach their expected useful life. The City outlines the existing condition assessment methodology (if available) for each of the core assets in the Asset Management Plans.

6.3.1 Condition Scoring

Although the City considers condition as the preferred measurement for planning, many assets in the City do not yet have a process to determine condition. For assets where a condition program exists, and a condition score was output, those conditions were converted to the scale below in Table 7 and these conversions are shown in each section of the AM Plans.

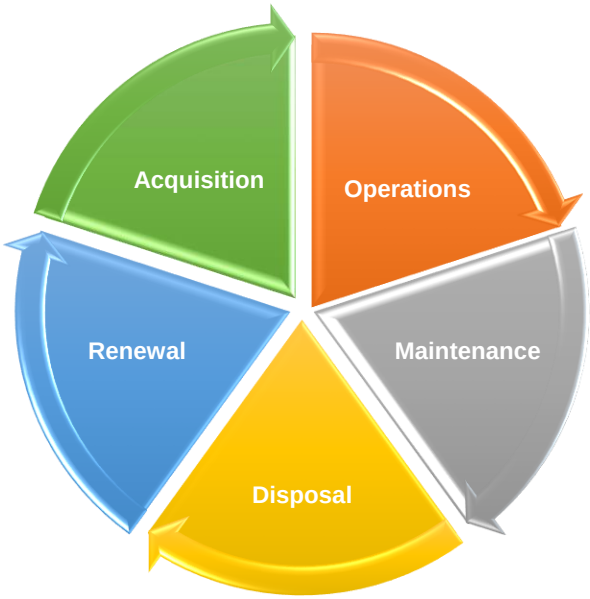
For assets where there was no known condition information, or inspections were not output in a way where the conditions could be converted, the condition was assumed based on remaining service life. In future, the City is investigating completing condition assessments for assets where no program exists. For some assets, condition assessments are not economical, but for many assets, regular inspections occur to ensure these assets are in working order. The City is investigations modifying these inspections to output a condition score.

Table 7 – Condition Scoring

EQUIVALENT CONDITION GRADING	CONDITION DESCRIPTION	% REMAINING SERVICE LIFE
1-Very Good	The asset is new, recently rehabilitated, or very well maintained. Preventative maintenance required only.	>79.5%
2-Good	The asset is adequate and has slight defects and shows signs of some deterioration that has no significant impact on asset's usage. Minor/preventative maintenance may be required.	69.5% – 79.4%
3-Fair	The asset is sound but has minor defects. Deterioration has some impact on asset's usage. Minor to significant maintenance is required.	39.5% - 69.4%
4-Poor	Asset has significant defects and deterioration. Deterioration has an impact on asset's usage. Rehabilitation or major maintenance required in the next year.	19.5% -39.4%
5-Very Poor	Asset has serious defects and deterioration. Asset is not fit for use. Urgent rehabilitation or closure required.	<19.4%

6.4 LIFECYCLE MANAGEMENT APPROACH

The lifecycle management plan details how the City plans to manage and operate the assets at the agreed levels of service through managing its life cycle costs. These costs are categorized by life cycle phases which includes acquisition, operations, maintenance, renewal and disposal.



Once Hamilton acquires an asset, the City then becomes obligated to fund the remaining lifecycle costs such as its operations, maintenance and likely inevitable renewal. These other lifecycle costs are far more significant than the initial construction or purchase cost and are often multigenerational. Since lifecycle costs are spread across multiple decades, it is essential that Hamilton approach its asset planning over the long term to ensure it effectively manages the asset and inform choices.

6.4.1 Acquisition Plan

Acquisitions are activities that either add new assets that did not exist before or improve an existing assets capability or function. The costs and activities that are included as part of the acquisitions and include: design, training, consulting, purchase costs and staff time to ensure the asset is ready for service and can be put into use. Hamilton acquires assets by either construction or through the assumption of assets through development agreements (i.e. donated assets). Typical acquisitions include:

- Extending water works services to unserviced areas;
- Expanding a road from 1 lane to 2 lanes;
- Assuming a storm water management pond from growth or development; and,
- Expanding a bridge to accommodate increased traffic volumes.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

Over the ten-year planning horizon Hamilton will acquire $1.728 Billion dollars worth of core assets. Once assets are acquired, the City then becomes the stewards of these assets and is responsible for all ongoing costs for the assets' operation, continued maintenance, inevitable disposal and their likely renewal. It is critical for Hamilton to improve its understanding of the connection between acquisitions and what future costs will be incurred because of these acquisitions.

The City is reviewing its acquisition process through the regular updating of the AM Plans to ensure that it proactively understands what assets are being acquired over the planning period and to ensure they are considered and funded properly across their lifecycle. Improved knowledge of both constructed and donated assets will allow multiple departments across the City to plan for the assets properly such as:

- AM to forecast the long-term needs and obligations of the assets;
- Operations and maintenance can include the assets in their planned activities (inspections, legislative compliance activities); and,
- Finance can ensure that assets are properly captured and recognized appropriately (Audited Financial Statements, TCA process, Provincial reporting such as the FIR)

Figure 4 – Projected Acquired Assets

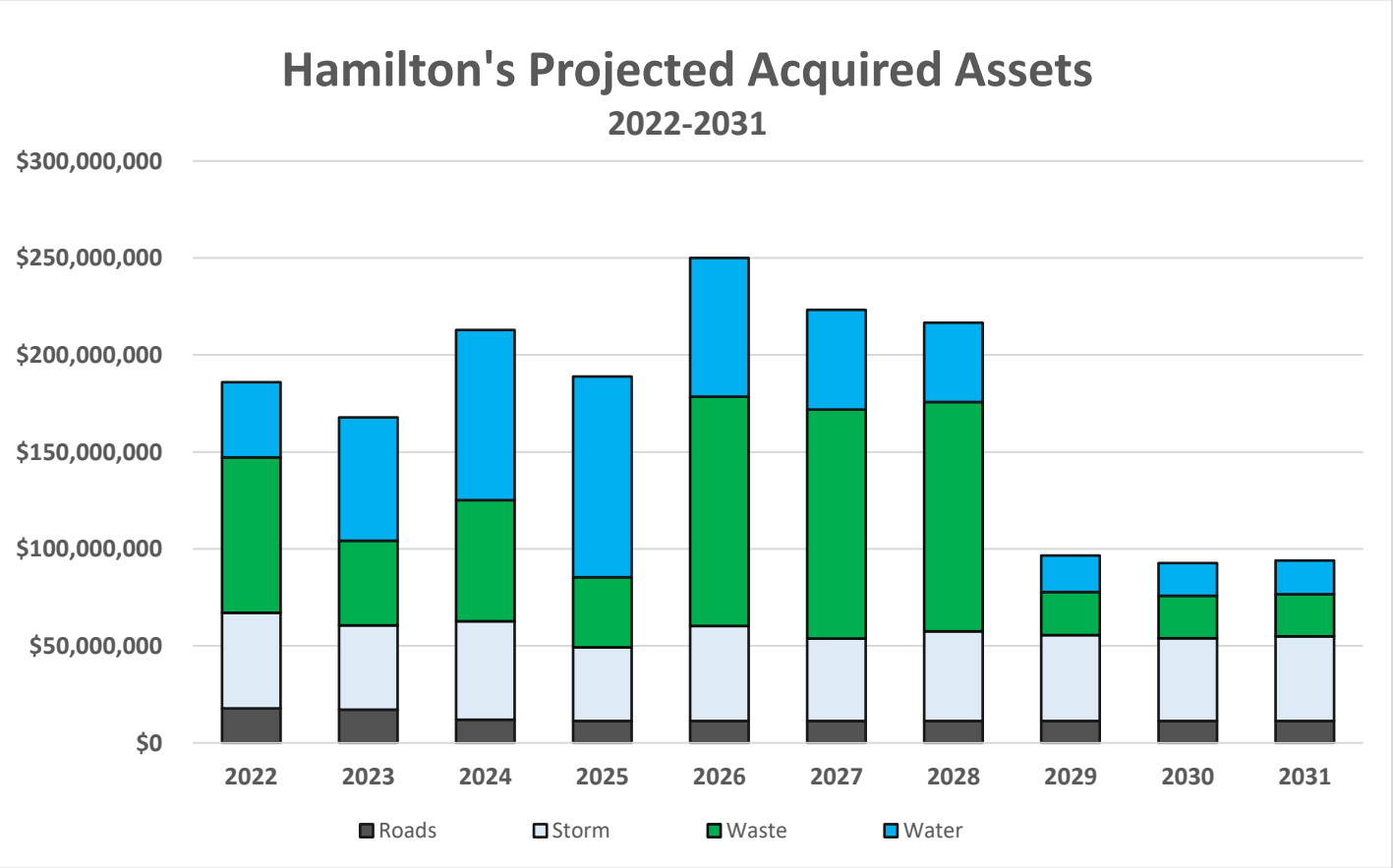


Figure 4 details the planned acquisitions for Hamilton's assets classes covered by these plans across the ten-year planning horizon (2022 – 2031) and includes both constructed and assumed assets. The most significant acquisitions come from the Water Works strategic level with $1.6 billion in acquisitions and Transportation is an additional $125.7 million of acquired assets. It is important to note that engineered structures are missing from this figure because at the time of writing the report there was insufficient data to complete the 10 years in the current forecast. Future iterations will include all known engineered structure acquisitions. All newly acquired assets require ongoing and significant funding to ensure that future levels of services can be maintained, and future generations can enjoy the level of service provided today.

The City has sufficient budget for its planned constructed acquisitions at this time. It will become critical to understand that through the construction or assumption of new assets, the City will be committing to funding the ongoing operations, maintenance and renewal costs which are very significant. The City will need to address what is considered affordable, how to best fund these ongoing costs as well as the costs to construct the while seeking the highest level of service possible.

Future AM Plans will focus on improving the understanding of Whole Life Costs and funding options however, at this time the plan is limited on those aspects. Expenditure on new assets and services will be accommodated in the long-term financial plan but only to the extent that there is available funding.

6.4.2 Operations & Maintenance Plan

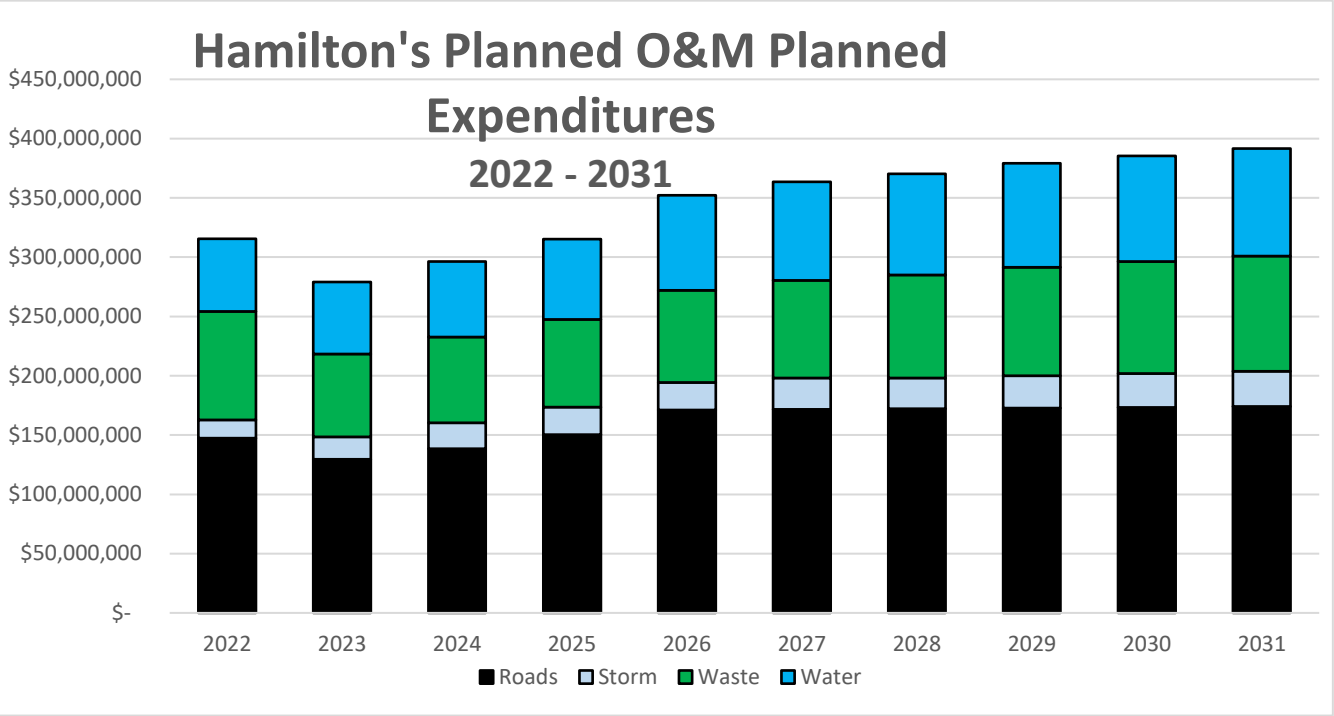
Operations and maintenance activities are an essential component to the lifecycle and are necessary to ensure that an asset is able to provide the service at its expected level. Without these necessary activities and interventions, the assets will not reach their expected useful life and will require costly renewals before their time. Hamilton will review and report on its operational and maintenance activities through the creation of future iterations of the AM Plans.

Operations include all regular activities to provide services. Examples of typical operational activities include snow ploughing, street sweeping, waterline flushing, biennial bridge inspections, and the necessary staffing resources to perform these and other activities.

Maintenance should be viewed as the ongoing management of deterioration. It includes all actions necessary for retaining or returning an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating. Examples of typical maintenance activities include pipe repairs, pothole repairs, bridge deck repairs, dredging storm water management ponds, equipment repairs along with appropriate staffing and material resources required to complete these works.

Proactively funding planned maintenance is always preferred compared to responding to high cost reactive maintenance. Hamilton will continue to review its maintenance planning to ensure it is maximizing its opportunities and investments and minimize the impacts and resources required for reactive maintenance.

Figure 5 – Planned Operations and Maintenance Expenditures



Over the 10-year planning horizon Hamilton is expecting to invest $3.5 billion in operations and maintenance for the 5 assets covered under the Core AM plan. Transportation will invest $1.6 billion to ensure roads are maintained at their current service level and Water Works will invest $1.85 billion to deliver their services at the current level.

Adding additional assets over time significantly impacts the operational and maintenance resources required to sustain the expected or mandatory level of service. It should be noted that a significant amount of operational and maintenance expenditures are mandatory due to legislative requirements and cannot simply be avoided or deferred.

Once an asset has been built, certain operational and maintenance costs are often considered 'locked in' with very little room for Hamilton to influence the mandatory activities. For example, if Hamilton builds 1 km of highway, it then becomes obligated by legislation to care for that section of road as prescribed by the Province. In this situation, Hamilton must follow the Minimum Maintenance Standards (MMS) and plough the road and repair potholes within specific timeframes which all requires resources that are in high demand.

There are operational and maintenance activities that Hamilton can influence once an asset has been constructed such as the frequency of cleaning or inspections as well as preventative maintenance programing. Hamilton will continue to identify and review its operational and maintenance lifecycle activities to ensure the optimal management of its assets.

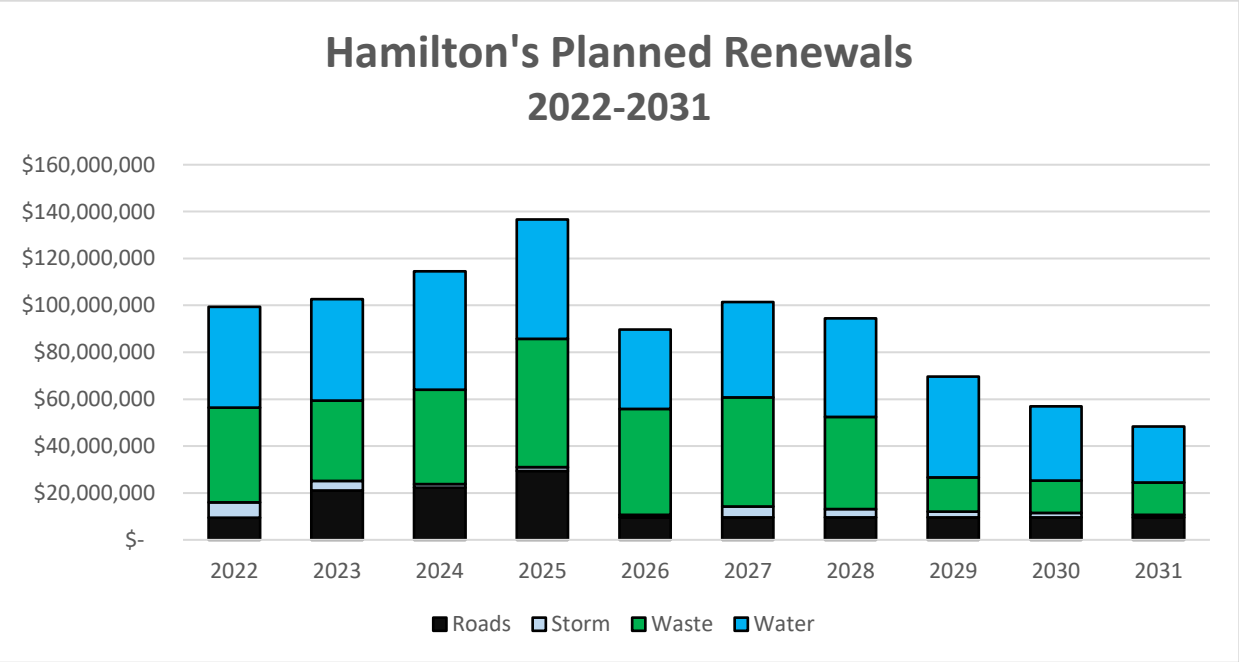
6.4.3 Renewal Plan

As infrastructure is used, it is normal to see a decline in its performance and inevitably, an asset will fail. Asset failure will create service interruptions and may pose a risk to public health and safety. Renewal activities replace an existing asset with an asset of similar type and purpose without changing its service capacity. This lifecycle activity is essential for the provision of service as no asset has an infinite service life. Without timely renewals, an asset typically requires extensive and high cost maintenance activities to ensure the asset can perform its intended function or possible disposal when maintenance efforts are no longer economically feasible.

Asset renewals are typically undertaken to either ensure the assets reliability or quality will meet the service requirements set out by the City. Renewal projects are often triggered by service quality failure and can often be prioritized by those that have the highest consequence of failure, have high usage, have high operational and maintenance costs and other deciding factors.

When renewals are programmed for the optimum time it ensures that services can continue with minimal interruption and that resources are optimized through the mitigation or avoidance of high cost maintenance and risk costs. Renewals being completed in a timely manner is critical to ensure that Hamilton can deliver its services over the long term at their expected level of service.

Figure 6 – Planned Renewals



Over the 10-year planning horizon, Hamilton is expecting to invest $913 Million in renewals for the five (5) assets covered under these AM Plans. Transportation will invest $139 Million to renew transportation assets to their current service level and Water Works will invest $774 Million

to renew existing assets. The forecasted costs above are consolidated from both the capital and operating budget.

Renewal investment is required to ensure the optimal delivery of service is possible. Continually deferring renewals create risks of higher financial costs, decreased availability, and decreased satisfaction with asset performance. Properly funded and timely renewals will ensure the assets perform as expected and it is recommended to continue to analyse asset renewals based on criticality and availability of funds for future AM Plans.

6.4.4 Disposal Plan

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, possible closure of service, decommissioning, disposal of asset materials, or relocation. Disposals will occur when an asset reaches the end of its useful life. The end of its useful life can be determined by factors such as excessive operation and maintenance costs, regulatory changes, obsolescence or demand for the structure has diminished.

At this time Hamilton has minimal disposals planned for its core asset classes. Future iterations of the AM Plan will improve upon disposal reporting and planning options. Hamilton will provide a summary of the disposal costs and estimated reduction in annual operations and maintenance costs.

6.5 LEVEL OF SERVICE APPROACH

Levels of service (LOS) are measures for what Hamilton provides to its customers, residents and visitors. Service levels are best described as the link between providing the outcomes the community wants, and the way that Hamilton provides those services. Ideally, Hamilton should provide the levels of service that the current and future community both want and are prepared to pay for. Hamilton's approach to developing levels of service is found below.

6.5.1 Level of Service Development

Levels of service are created considering four (4) main components: customer values, level of service statements, customer performance, and technical performance as shown below in Table 8.

Table 8 – Level of Service Definitions

Concept	Definition
Customer Values	What the customer can expect from their tax dollar in "customer speak", and include: ▪ What aspects of the service is important to the customer; ▪ whether they see value in what is currently provided; and, ▪ the likely trend over time based on the current budget provision. These values are gathered using an engagement survey and are used to develop level of service statements.
Level of Service Statements	Level of service statements utilize objectives to spell out exactly what the customer can expect from their tax/rate dollars and tie the customer and technical levels of service together. The LOS statements describe the outputs Hamilton intends to deliver to customers and commonly relate to service attributes such as: quality, reliability, accessibility, affordability, quantity, responsiveness, timeliness.
Customer Performance Measures	Relate to how the customer feels about the service, and so these measurements can be tangible and intangible. These should also be written in "customer speak" and are considered in terms of three (3) factors: ▪ Condition - How good is the service? What is the condition or quality of the service?

Concept	Definition
	▪ Function - Is it suitable for its intended purpose? Is it the right service? ▪ Capacity/Usage - Is the service over or under used? Do we need more or less of these assets?
Technical Performance Measures	Relate to what the City does to deliver the services and are tangible measurements. These should be used internally to measure performance against service levels and are technical in nature. Technical service measures are linked to lifecycle activities and annual budgets covering Acquisition, Operation, Maintenance, Disposal, and Renewal.

6.5.2 Customer Engagement

The City of Hamilton strives to engage with its users to track satisfaction with Hamilton's assets and services to ensure that the City understands customer values and formulates the correct customer performance measures.

In January 2022, the City released its first two (2) surveys related to asset management for core assets on the Engage Hamilton, Roads and Water Services Review page.

These surveys were released individually as to not overwhelm survey respondents. The Corporate Asset Management Office intends to release surveys on a regular basis for each service area to ensure the City is continually receiving feedback on City services.

A summary of the number of submissions for each survey is found below in Table 9:

Table 9 – Summary of Survey Submissions

SURVEY NAME	TOTAL SUBMISSIONS
Roads, Bridges and Culvert Survey	279
Drinking water, Stormwater and Wastewater Survey	184

While these surveys were used to establish customer values and customer performance measures, it's important to note that the number of survey respondents only represents a small portion of the population. The City will continue to improve the marketing strategy to ensure these surveys reach a larger audience. This has been identified as a continuous improvement item.

The results of the survey can be found in Appendix A. These results were used to formulate the customer values and performance measures included in each AM Plan.

6.5.3 Performance Measurement

Historically, the City of Hamilton has identified measuring performance as a priority. In 2017 the Public Works Balanced Scorecard was implemented where metrics were created by senior management based on department priorities, with a motivator of “how do you know that you had a good day?” Data is entered by staff on a pre-determined frequency (e.g. monthly, quarterly) depending on the type of metric. The information from this tool was the starting point to develop the technical performance measures for this iteration of the plan.

However, it was found that the metrics currently in the scorecard typically focused on operations and maintenance lifecycle activities and were measuring how the City is performing in accordance with legislative requirements. Since there are additional lifecycle stages beyond operations and maintenance, and customer preferences and expectations do not always match minimum legislated requirements as discussed in the AMPs, this suggests that these metrics should be revisited for future iterations of the plan to confirm that they are reflecting the entire lifecycle of the assets as well as customer values. This has been identified as a continuous improvement item.

When creating and revising technical performance metrics, the City will be ensuring that SMART criteria are used. The acronym has been defined below:

LETTER	CRITERIA	DEFINITION
S	Specific	Provide a clear description of what needs to be achieved.
M	Measurable	Include a metric with a target that indicates success.
A	Attainable	Set a challenging but realistic target which is agreed to by those who must complete the task.
R	Relevant	Ensure the metric can be applied to known problems
T	Time-based	Establish clear timeframe for achieving the outcome.

6.6 FUTURE DEMAND MANAGEMENT APPROACH

In asset management, demand is defined as the desire customers have for assets or services they use and that they are willing to pay for. These are the desires for either: new assets or services or current assets. Hamilton's approach to demand management is found below.

Since demand is not yet an extensive requirement in O.Reg. 588/17 for the July 1st, 2022 deadline, the demand sections are not as robust as some other sections of the report, however, it is an obligation for the report by July 1st, 2025, and will therefore be expanded in future AMP iterations.

6.6.1 Demand Management

Demand for services is typically measured considering how many customers use the assets. In order to manage demand, the City must plan and take action to influence demand for services or usage of assets. In addition, demand will inevitably change over time and will impact the needs and desires of the community in terms of the quantity of services (e.g. assumption of assets due to development growth) and types of service required (e.g. different assets are required to meet consumer preference).

Some key demand drivers identified throughout the AM Plans are:

- Population Change;
- Regulatory Changes/Obligations;
- Changes in Demographics;
- Seasonal Factors;
- Consumer Preferences and Expectations;
- Technological Changes;
- Economic Factors; and,
- Environmental Awareness/Commitments.

6.6.2 Growth Projections

GM Blue Plan assisted with the Growth Projection analysis for the report. The 2019 Development Charge Background Study thoroughly assessed the impact of growth on demand and the resulting capital and significant operating expenditures that are anticipated for core assets to 2031. These forecasts, results and recommendations are used in the asset management discussions for each asset category.

Per Table 10 below, the City's population is anticipated to reach 614,943 by early 2029 and 636,080 by mid-2031, resulting in an increase of 65,046 and 86,183 persons, respectively, over the 10-year and longer term (2019 to 2031) forecast periods. A requirement per O. Reg. 588/17 was to include the Greater Golden Horseshoe (GGH) projections for Hamilton, which shows that

the population is expected to be approximately 820,000 by 2051. Total employment, including work at home and no fixed place of work (NFPOW) for Hamilton is anticipated to reach 285,130 by early-2029 and 300,000 by mid-2031. This represents an employment increase of 46,114 for the 10-year forecast period and 60,984 for the 2019 to 2031 forecast period. A requirement per O. Reg. 588/17 was to include the Greater Golden Horseshoe (GGH) projections for Hamilton, which shows that employment is expected to be approximately 360,000 by 2051.

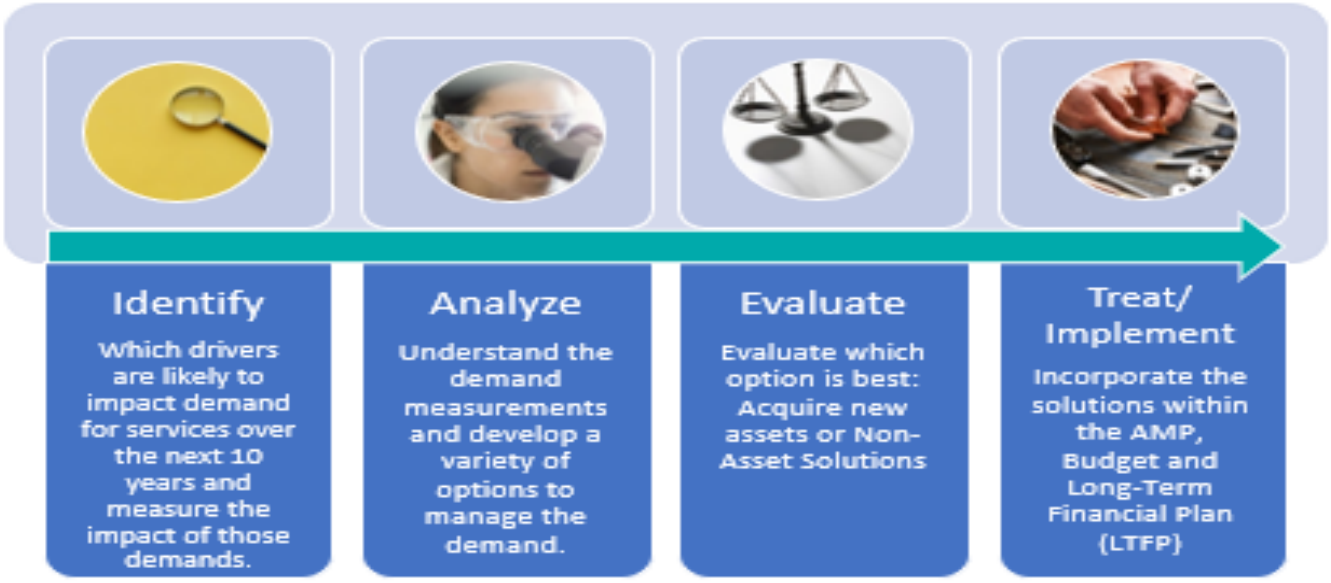
Table 10 – Population and Employment Projections

	2016	Early 2029	Mid 2031	2051
SOURCE	DC STUDY	DC STUDY	DC STUDY	GREATER GOLDEN HORSESHOE
Population	557,110	614,943	636,080	820,000
Employment	203,336	285,130	300,000	360,000

The 2031 DC Study numbers were used for population and employment drivers during the demand process.

6.6.3 Demand Management Process

When quantifying demand in the AM Plans, the four-step process shown below was used to develop a high-level demand management plan for key demand drivers identified for the service area. It is a continuous improvement item to identify additional demand drivers in future for the proposed levels of service requirement in O. Reg. 588/17 by July 1st, 2025.



6.7 CLIMATE CHANGE ADAPTATION APPROACH

Navigating the climate crisis has been a key area of focus for the City of Hamilton, which is represented by historical efforts to understand the challenges that climate change poses to City assets.

6.7.1 Background

In 2019, Hamilton City Council declared a climate change emergency and directed staff to form a Corporate Climate Change Task Force (CCCTF). The task force created overarching goals and areas of focus for both climate mitigation and adaptation and was the start of Hamilton's corporate-wide approach to reduce greenhouse gas (GHG) emissions, where the goal is to achieve net zero GHG emissions by 2050.

6.7.2 Asset Owner Response to Climate

In support of the CCTF, asset owners have responded by working to understand mitigation and adaptation opportunities. The goal is to increase our infrastructure's capacity to recover, adapt, and thrive in the face of adversity, chronic stresses and acute shocks that will be encountered in a future of changing climate conditions.

As part of this work, an inventory of projects/initiatives has been created and can be found in the Climate Change Adaptation sections of the AM Plans.

6.7.3 Asset Management Plan & Climate Change Adaptation

The impacts of climate change will likely have a significant impact on the assets the City manages and the services they provide. In the context of the asset management planning process, climate change can be considered as both a future demand and a risk.

Within the AM Plans, a high-level climate change management plan for key climate change drivers were identified for the service area and were considered as part of demand management. It is a continuous improvement to identify additional demand & climate change drivers in future for the proposed levels of service requirement in O. Reg. 588/17 by July 1st, 2025.

6.8 RISK MANAGEMENT APPROACH

With asset ownership comes inherent risk. Risk is defined as 'the effect of uncertainty on Hamilton's objectives'. Risk management is an essential component of effectively managing infrastructure assets. Hamilton will manage risk and opportunities through a formal risk analysis process. Through continuous application and expansion of the risk process Hamilton will ensure that it explicitly and continually considers risks to its objectives. This process will be completed as part of the AM planning process and will enable Hamilton to address risk proactively versus reactively.

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk in itself is dynamic, iterative, and responsive to change. To manage risk effectively, Hamilton will need to continuously monitor and consider risk to ensure the appropriate mitigation efforts are applied. By continuously monitoring risk Hamilton:

- Ensures evaluation of risk is an integral part of normal business process and part of the decision making process;
- Tailors its risk management to meet community needs and includes human, cultural and social factors;
- Ensures transparency in our decisions; and,
- Explicitly address the uncertainty that is incumbent on asset owners.

6.8.1 Risk Management Process

Hamilton has adopted an infrastructure-based risk process to ensure that all assets will be reviewed utilizing a standardized approach. This will ensure that Hamilton is able to measure and compare risks consistently across a broad spectrum of assets and services. The risk assessment process seeks to identify credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

An assessment of risks associated with delivery of service will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

HAMILTON RISK REVIEW PROCESS

Each step in the risk review process ensures specific questions are answered and a decision is made on how to resolve or mitigate the known risk with identified costs.

6.8.2 Risk Assessment

To ensure a consistent approach to risk, Hamilton has standardized its scales for both consequence (Table 11) and likelihood (Table 12) below. Hamilton will continue to improve the scales and ensure that they accurately reflect what the City believes is appropriate to consider.

Hamilton will utilize standardized risk categories across the City with respect to its assets and services. The risk categories are:

- Injury/Human Safety;
- Legal/Legislative (included in risk evaluation criteria);
- Environmental;
- Interruption/Reduction of services;
- Social & Cultural Outcomes (included in risk evaluation criteria);
- Financial; and,
- Reputational.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

Table 11 - Risk Consequence Scale

	REDUCTION / INTERRUPTION OF SERVICE	FINANCIAL	SAFETY	REPUTATION	ENVIRONMENTAL
1	Asset Failure - Little to No Interruption to service. (Few Customers)	< $2500	Potential for Minor Injury	Minimal to no concern	Negligible Impact (restored within 1 week)
2	Asset Failure - Minor Interruption to service. 4 Hours Downtime	$2.5K - $25K	Lost Time Incident, WSIB, Minor Injuries to few people	Internal Concerns	Minor Impact (Restored within 1 month)
3	Asset Failure - Serious Interruption to service. 4 - 24 Hours Downtime	$25k - 250K	Permanent Injury	Public Concerns, Phone calls, emails, council questions	Significant Short-Term Impact (up to 2 Months)
4	Asset Failure - Major Interruption to service. 1 Day-1 Week Downtime	$250K - $2.5 Million	Disabling Injury or Casualty	Local News, TV, Social Media	Significant Long-Term Impact (up to 1 Year)
5	Asset Failure - Catastrophic Interruption to service. > 1 Week of Downtime	> $2.5 Million	Multiple Casualties, Long Term Hospitalizations	National/International News Coverage	Major Long-Term Impact (< 1 year/permanent)

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified with the AM Plans. The residual risk and treatment costs of implementing the selected treatment plan will be incorporated into the next iteration of the plan.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

Table 12 - Risk Likelihood Scale

Scoring	Description	Range
1	Very Unlikely	< 1 per 100 Years
2	Possible	1 in 100 to 1 in 10 Years
3	Infrequent	1 in 10 to 1 in 2 Years
4	Regular	1 in 2 years to 10 per Year
5	Common	Over 10 Times per Year

Hamilton will explicitly document its risk consideration within the AM Plan to demonstrate how the City actively considers risk with regards to its assets and the services that are provided to the community. Hamilton will utilize various risk measurements including impact, probability, frequency, and consequences of these risks to inform decisions and optimize choices by either reducing, removing, mitigating or accepting the risk. Hamilton will continuously monitor and report on risk through operational initiatives which include but are not limited to:

- Asset management planning process;
- Condition assessments; and,
- Regular staff inspection programs.

Hamilton will incorporate risk review into its asset management planning to ensure:

- Desired levels of service will be achieved through the balance of cost, risk and performance;
- Prioritized projects can be funded appropriately and within the required planned time;
- Hamilton is compliant with all regulatory and legislative obligations; and,
- Hamilton is continually monitoring risk to identify new and emerging risks as they present themselves and to measure the effectiveness of the City's mitigation efforts over time.

6.8.3 Current Risk

Hamilton has begun to undergo a shift in how it evaluates risk in accordance with its infrastructure planning. For this iteration of the AM Plan staff helped inform a high-level risk evaluation that was utilized to help staff become familiar with the formalized risk process and develop a basic risk profile for the asset classes covered within the plans. The plans currently identify:

- Which assets are deemed to be critical;
- Assessment of some know high level risks;
- Risk mitigation and control efforts; and,
- Resilience approach.

At this time, the City does not have sufficient data to present risks and tradeoffs. This information will be presented in the 2025 AM Plan regarding Proposed Levels of Service.

6.9 FINANCIAL MANAGEMENT APPROACH

Effective asset and financial management will enable Hamilton to ensure its asset networks will provide the appropriate level of service for the City to achieve its goals and objectives. Reporting to stakeholders on service and financial performance ensures the City is transparently fulfilling its stewardship accountabilities.

Creating a Long-Term Financial Plan(LTFP) the connects the Budget to the AMP is critical for the City to ensure that the various networks lifecycle activities such as renewals, operations, maintenance and acquisitions can and do happen at the optimal time. Hamilton is under increasing pressure to meet the wants and needs of its customer while keeping costs at an affordable level and maintaining its financial sustainability.

Without funding asset activities properly for its asset networks, the City will have difficult choices to make in the future which will include options such as higher cost reactive maintenance and operational costs, reduction of service and potential reputational damage.

Future iterations of the plan will ensure that Hamilton:

- Creates and utilizes a LTFP that connects the budget to the AM Plans;
- Provide accurate costs within the planning horizon (30 years);
- Detail the costs to ensure a defined level of service can be achieved;
- Plan how to manage the financial gap that currently exists; and,
- Detail what cannot be done and the effects of underfunding infrastructure.

The City will be seeking to fully incorporate its asset networks into the LTFP. Aligning the LTFP with the AM Plan is critical to ensure all the network's needs will be met while the City is finalizing a clear financial strategy with measurable financial targets. The financial projections will be improved as the discussion on desired levels of service and asset performance matures.

6.9.1 Asset Renewal Funding Ratio

A key sustainability indicator for Hamilton's asset management plan is the asset renewal funding ratio. This ratio is an effective approach to report on how the City is accommodating asset renewals in an optimal and cost-effective manner from a timing perspective and relative to financial constraints. This also includes the risk the City is prepared to accept and service levels it wishes to maintain. The target renewal funding ratio should ideally be between 90% - 110% over the entire planning period. A low result generally indicates that service levels may be achievable however the expenditures are below this level because Hamilton has many assets that compete for finite funding resources or has constraints with acceptable debt levels.

Table 13 illustrates the Asset Renewal Funding Ratio for each service area.

Table 13 – Asset Renewal Funding Ratio

Engineered Structures	33%
Road Network	14%
Storm Water	9.5%
Wastewater	46%
Water	75%

By only having sufficient funding to renew assets at the above stated ratios, the City will be required to make difficult trade off choices that could include:

- a reduction of the level of service and availability of assets;
- increased complaints and reduced customer satisfaction;
- increased reactive maintenance and renewal costs; and,
- damage to the City's reputation and risk of fines or legal costs.

The lack of renewal resources will be addressed in future AM Plan's while aligning the AM Plans to the LTFP. This will allow staff to develop options and long-term strategies to address the renewal rate. The City will review its renewal allocations once the entire inventory has been confirmed and amalgamated.

6.9.2 Infrastructure Gap

Hamilton's current infrastructure position represents a huge social investment that has been built up progressively over the last 150 years. Continued acquisitions over that time compounded with insufficient resources to keep up with the necessary required works has created a 'gap' of funding. This gap represents the difference between what Hamilton currently spends versus the amount of investment required to ensure the optimal delivery of services. Hamilton's financial 'gap' has built up over decades predominantly due to underinvestment, including a lack of permanent infrastructure funding from senior levels of government, as well as large spikes of growth throughout the years. Hamilton's challenge is to determine how it will manage the gap over the long term to ensure that they can continue to deliver its services sustainably today and across future generations.

Currently there is insufficient budget to address the large backlog of renewal work projected by the AM Plans. There is sufficient budget to address the majority of the ongoing operational and maintenance needs for the planning period however with the assumption of assets over time and their increased costs there may be impacts to the service itself. Without some adjustment to available funds or other lifecycle management decisions there will be insufficient budget to address all planned lifecycle activities.

CORPORATE ASSET MANAGEMENT PLAN OVERVIEW

Over the 10-year planning horizon Hamilton's funding gap for core assets is estimated to be $1,959 million or $195.8 million annually as shown in Table 14 below.

Table 14 – 10 Year Planning Funding Gap

SERVICE AREA	ANNUAL FUNDING GAP ($M)	10 YEAR FUNDING GAP ($M)
Engineered Structures	8.1	81
Road Network	86.6	866
Storm Water	31.1	311
Wastewater	49.8	498
Water	20.2	202
Total	$195.8	$1,958

The gap was calculated utilizing identified renewal needs and planned operations and maintenance.

As the City continues to develop condition profiles and necessary works are identified based on their condition, it is anticipated operation and maintenance forecasts will increase significantly.

Future iterations of the plan will include the needs of all lifecycle activities to ensure that a fulsome analysis of the true infrastructure gap can be projected. Hamilton needs to mature further in its asset management knowledge to ensure that it fully capture the needs of its assets throughout their lifecycles and can confidently project the gap. As data and process documentation improve over time, Hamilton will be able determine the best methods to manage the gap.

The options to manage the gap include:

- Maintain Status Quo;
- Continue to defer projects out;
- Dispose/close underutilized assets;
- Reduce the expected level of service; and,
- Increase funding allocations.

Other options include adjustments to current operational and maintenance practices, constructing assets differently, utilizing debt strategies and accepting more risk.

Without sufficient funding the City may have to defer necessary lifecycle activities. Deferring important lifecycle activities is never recommended. The City will benefit from allocating

sufficient resources to developing its long-term financial plan to ensure that over time the City can fully fund the necessary lifecycle activities which ensures the assets are compliant, safe and effectively deliver the service the customers need and desire.

The lack of funding allocated for the backlog of renewals and the necessary lifecycle activities creates an additional issue which is intergenerational equity. Each year that Hamilton defers lifecycle activities it pushes the ever-increasing financial burden on to future generations. It is imperative the City begin addressing the lack of consistent and necessary funding to ensure that intergenerational equity will be achieved. Over time, allocating sufficient funding on a consistent basis ensures that future generations will be able to enjoy the same standards of living being enjoyed today.

Over time the City will continue to improve its lifecycle data, and this will allow for informed choices as to how best to mitigate those impacts and how to address the funding gap itself. This gap in funding future plans will be refined over the next three (3) years and improve the confidence and accuracy of the forecasts.

6.9.3 Long Term Financial Plan (LTFP)

Over the next 3 years Hamilton will be updating the LTFP to connect the current funding allocation within the budget process directly to the asset management plans and the level of services Hamilton provides. This will be a critical task for Hamilton to assist with the undertaking of timely renewals, ensuring legislative compliance and assuring the continuation of services.

The LTFP seeks to accommodate ongoing funding of existing service's lifecycle costs as well as new services and assets as required. The plan itself will connect the revenues and income raised annually and the intended expenditures to ensure the provision of service can be achieved. The LTFP will inform the financial strategy and the likely consequences of diverting from the AM Plans proposed activities. The LTFP ultimately will allow Hamilton to:

- Model financial implications of various service level scenarios to help inform long term planning options;
- Determine a combination of proposals that best meets the needs of the community; and,
- Ensure ongoing financial sustainability and intergenerational equity;

The LTFP will be reviewed annually in conjunction with the budget process and throughout each iteration of every asset management plan.

6.9.4 Financial Targets

Hamilton needs to determine financial targets that are appropriate to achieving its objectives for its infrastructure assets and services. Hamilton will adopt 3 key financial indicators to measure and report on its efforts to deliver its services. The Asset Renewal Funding ratio is mentioned above and is included in this iteration of the plan. Future plans will include 2 additional ratios:

- Operating Surplus Ratio – Assesses Hamilton's Financial Performance
- Net Financial Liabilities Ratio – Assess the ability of Hamilton to utilize debt effectively

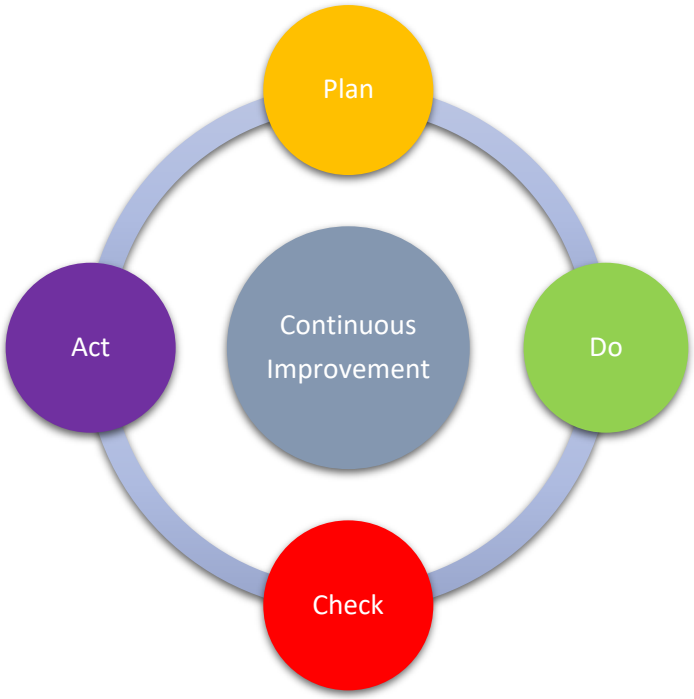
Hamilton has a fiduciary and social responsibility to ensure that it is meeting its financial obligations as it pertains to its assets and the services the City delivers. It must adopt a long-term view and endorse evidence-based decision making to ensure that:

1. Intergenerational Equity can be achieved;
2. Assets and services are affordable and deliver the desired level of service;
3. The infrastructure gap is effectively managed; and,
4. Good stewardship is assured.

Ultimately, the targets are intended to be planning tools and organizational goalposts to ensure Hamilton can monitor its financial performance and understand what financial tools it has at its disposals to manage the City Assets.

6.10 CONTINUOUS IMPROVEMENT & NEXT STEPS

The first AM Plan is a starting point to inform the City on what we own, how we manage it, when we will replace it, and the long-term costs and risks of ownership of these assets. By continuously developing our AM Plans, the City will realize the benefits of applying asset management principles across all service areas. The figure below shows the process for how the City proposes to perform continuous improvement over time.



The AM Plans have identified 100+ opportunities for improvement which will require further discussion and analysis to determine feasibility, resource requirements and alignment to current workplans. Future iterations of this AM Plan will provide updates on these improvement plans. Additional continuous improvement items will be identified in the AM Plan for Proposed Levels of Service due July 1st, 2025.

The section below outlines overall findings for continuous improvement across the AM Plans.

6.10.1 Asset Information Improvements

AM Plans start with the collection of data related to assets (e.g. location, condition, age etc.) called an asset registry. In many cases, registries do not exist or contain gaps (e.g. for many assets, age is not known). Data has been found to be outdated, duplicated and incomplete in some instances. A data confidence scale has been developed shown in Section 7.2.2 to quantify this issue, and data confidence values are presented for key numbers in the AM Plans. The

future implementation of the EAM system for Public Works described in Section 7.2.3 will aid with unifying and improving data integrity.

In addition, asset condition assessments are a key element in AM as without proper assessments, estimated service life (ESL) and age are used to approximate condition. This can result in grossly over or underestimating the actual condition leading to inaccurate forecasts. Similarly, with replacement costs, variation in data and the need to define a robust process has been identified as key areas of concern. The need for governance, consistency and process definition overall has been identified as important next steps and will occur through the development of the AM Program.

Finally, areas exist where asset ownership is unclear due to the complex nature of the City's many assets and their interconnectivity. Clarification will occur as AM governance and standardized processes are developed.

6.10.2 Level of Service Improvements

Level of Service (LOS) is critical for Asset Owners to understand. Currently, owners are learning about and beginning to embrace LOS and understand its connection to performance measurement.

Engagement with the community is paramount in understanding current service provision and desired future state, and the CAM office is proposing to release surveys regularly to continue to collect data to inform the plans. The number of survey respondents for this initial survey only represents a small portion of the population. The City will continue to improve the marketing strategy to ensure these surveys reach a larger audience.

Current technical performance metrics are typically measuring how the City is performing in accordance with legislative requirements for operations and maintenance lifecycle stages. Since there are additional lifecycle stages beyond operations and maintenance, and customer preferences and expectations do not always match minimum legislated requirements as discussed in the AM Plans, this suggests that these metrics should be revisited for future iterations of the plan to confirm that they are in fact reflecting customer values.

6.10.3 Demand & Risk Management Improvements

Since demand and risk management are not yet extensive requirements in O. Reg. 588/17 for the July 1st, 2022 deadline, these sections are not as robust as some other sections of the report,

but they are an obligation for the AMP by July 1st, 2025, and will be expanded on in future iterations of the report.

6.10.4 Financial Management Improvements

Currently, the City has identified a 10-year planning horizon to meet the requirements of O. Reg. 588/17. For future iterations of the AM Plan, the planning horizon will be increased to 30 years per standard AM practice. This ensures visibility to the horizon beyond the capital plan and provides greater transparency for the future.

As previously mentioned, since the replacement costs are at a low confidence level and the current infrastructure gap is largely based on the renewal requirement and backlog, the financials for the AM Plan are also at a low confidence level. As data improves, the financial projections will also improve. In addition, future iterations of the plan will ensure that Hamilton:

- Creates and utilizes a LTFP that connects the budget to the AM Plans;
- Provide more accurate costs within the planning horizon (30 years);
- Detail the costs to ensure a defined level of service can be achieved;
- Plan how to manage the financial gap that currently exists; and,
- Detail what cannot be done and the effects of underfunding infrastructure.

7.0 APPENDICES

7.1 Appendix “A” – Engage Hamilton Survey Results

- Appendix “A” – Engage Hamilton Survey Results (Roads and Water Services Service January 25 – February 18, 2022)

Project Report

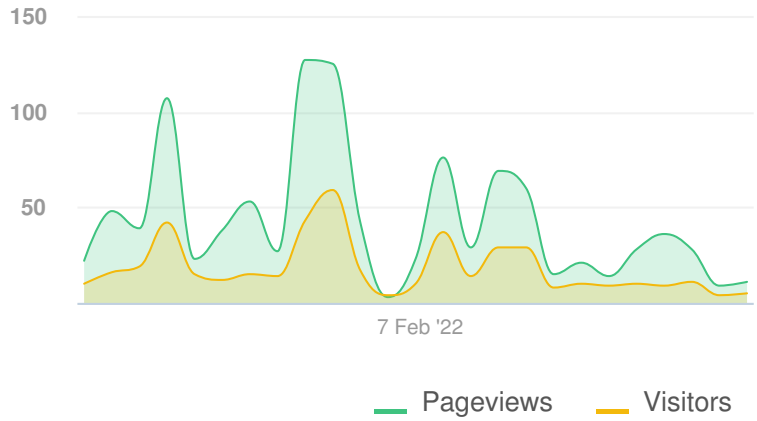
25 January 2022 - 18 February 2022

Engage Hamilton

Roads and Water Services Review

BANG THE TABLE engagementHQ

Visitors Summary



Highlights

TOTAL VISITS	MAX VISITORS PER DAY	NEW REGISTRATIONS
651	59	1

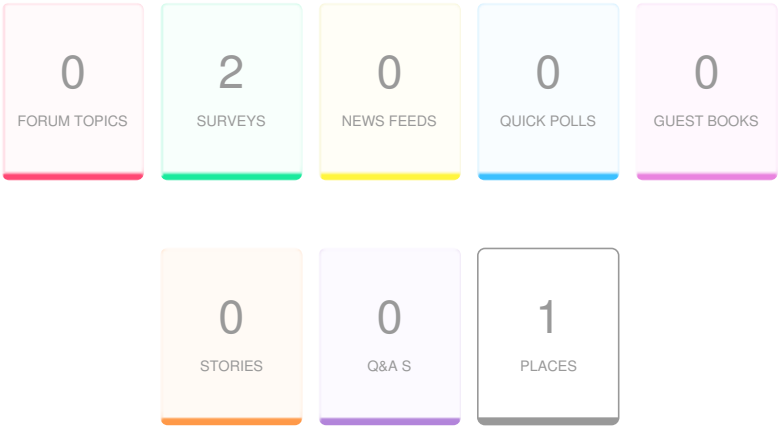
ENGAGED VISITORS	INFORMED VISITORS	AWARE VISITORS
355	424	569

Aware Participants	569
Aware Actions Performed	Participants
Visited a Project or Tool Page	569

Informed Participants	424
Informed Actions Performed	Participants
Viewed a video	0
Viewed a photo	0
Downloaded a document	0
Visited the Key Dates page	2
Visited an FAQ list Page	0
Visited Instagram Page	0
Visited Multiple Project Pages	71
Contributed to a tool (engaged)	355

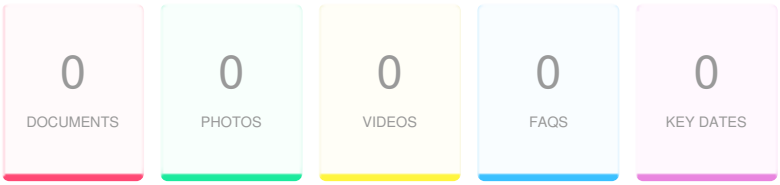
Engaged Participants	355		
Engaged Actions Performed	Registered	Unverified	Anonymous
Contributed on Forums	0	0	0
Participated in Surveys	13	1	332
Contributed to Newsfeeds	0	0	0
Participated in Quick Polls	0	0	0
Posted on Guestbooks	0	0	0
Contributed to Stories	0	0	0
Asked Questions	0	0	0
Placed Pins on Places	5	8	0
Contributed to Ideas	0	0	0

ENGAGEMENT TOOLS SUMMARY



Tool Type	Engagement Tool Name	Tool Status	Visitors	Contributors		
				Registered	Unverified	Anonymous
Place	Current Level of Service Map	Archived	41	5	8	0
Survey Tool	Asset Management - Roads, Bridges and Culverts	Archived	343	9	1	268
Survey Tool	Asset Management - Drinking water, Stormwater and Wastewater	Archived	227	8	1	174

INFORMATION WIDGET SUMMARY



Widget Type	Engagement Tool Name	Visitors	Views/Downloads
Key Dates	Key Date	2	2

ENGAGEMENT TOOL: PLACE

Current Level of Service Map

Visitors 41	Contributors 13	CONTRIBUTIONS 28

2022-01-26 13:56:47 -0500

CATEGORY
Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)

Road Surface condition poor
Address: 15 Governor's Road, Hamilton, Ontario L9H 2R1, Canada

http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83325

2022-01-26 13:59:21 -0500

CATEGORY
Traffic Deficiency (e.g. signal frequently out, sign missing)

Lighting Needed
Address: 92 Huntingwood Avenue, Hamilton, Ontario L9H 6X8, Canada

http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83326

2022-01-26 14:02:24 -0500

CATEGORY
Traffic Deficiency (e.g. signal frequently out, sign missing)

Sidewalk lighting
Address: 492 Governor's Road, Hamilton, Ontario L9H 6Y7, Canada

http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83327

2022-01-26 15:03:09 -0500

CATEGORY
Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)

Multiple cracks becoming potholes, fix the cracks before they become potholes. Gover nors rd needs a shave and pave now or it will require a full rebuild in a few years.
Address: 3430 Governor's Road, Hamilton, Ontario L0R 1T0, Canada

http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83355

2022-02-02 10:43:09 -0500

CATEGORY
Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)

Potholes and cracks
Address: 1141 Burlington Street East, Hamilton, Ontario L8L 0A5, Canada

http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83637

2022-02-07 22:01:39 -0500

CATEGORY
Reoccurring flooding (e.g. blocked culvert, drainage issue)

Storm water from Parkside Dr between Glen Rd. and Devon Pl. does not drain to swal es in Churchill Park
Address: 26 Parkside Drive, Hamilton, Ontario L8S 3Y1, Canada

http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83916

2022-02-07 22:09:54 -0500

CATEGORY
Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)

Entrance to Churchill Park gravel path at corner Parkside Dr and Devon Pl is not bike fr iendly
Address: 48 Parkside Drive, Hamilton, Ontario L8S 3X5, Canada

http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83917

ENGAGEMENT TOOL: PLACE

Current Level of Service Map

2022-02-08 21:58:39 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	road shoulder is eroding Address: 150 Macklin Street North, Hamilton, Ontario L8S 3S1, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-83984
2022-02-10 10:43:05 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Surface discontinuity Address: 452 Springbrook Avenue, Hamilton, Ontario L9K 0C1, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84044
2022-02-14 09:04:30 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Road shoulder at turn to Kirk dips and floods over with severe ice built up in winter even causing skidding into on coming traffic. Address: 2860 Kirk Road, Binbrook, Ontario L0R 1C0, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84220
2022-02-14 09:10:19 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Severe potholes from conservation heavy truck traffic during repairs that ripped up asphalt on stretch of road with major safety concern as vehicles speed through this section and dip. Already had few vehicles break wheel wells with impacts. Address: 5045 Harrison Road, Hamilton, Ontario L0R 1C0, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84221
2022-02-14 18:16:12 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Center Road from 7Th Concession to Campbellivile Road. Pot holes uneven pavement, cracks, crumbling shoulders. Road need complete rebuild. Address: 1571 Centre Road, Hamilton, Ontario L8N 2Z7, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84268
2022-02-14 18:19:03 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	From Highway 6 to MilburoughLine, Cracks, uneven pavement, pot holes pavement breaking up, Crumbling shoulders Address: 228 Carlisle Road, Carlisle, Ontario L0R 1H2, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84269
2022-02-14 18:24:46 -0500	MainStreet waterdowm from Parkside to #5. Needs to be ground down and repaved. Steet is nothing but bumps and cracks. Address: 50 John Street West, Hamilton, Ontario L8B 0E6, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84270

ENGAGEMENT TOOL: PLACE

Current Level of Service Map

2022-02-15 17:24:27 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Potholes Address: 553 Aberdeen Avenue, Hamilton, Ontario L8P 2S8, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84440
2022-02-16 16:09:02 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Hatt St West of Market to Bond St is in terrible condition. Address: 293 Hatt Street, Hamilton, Ontario L9H 2H5, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84558
2022-02-16 16:59:39 -0500 CATEGORY Reoccurring flooding (e.g. blocked culvert, drainage issue)	Icy sidewalks Address: 4 Oldmill Road, Hamilton, Ontario L9G 5E2, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84563
2022-02-16 17:04:04 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	No sidewalk Address: 431 Hamilton Drive, Hamilton, Ontario L9G 2A9, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84564
2022-02-17 10:22:06 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Multiple deep potholes in the right most northbound lane Address: 37 Dundurn Street South, Hamilton, Ontario L8P 4J9, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84669
2022-02-17 10:26:16 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	Deep potholes Address: 25 Fennell Avenue West, Hamilton, Ontario L9C 7V7, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84670
2022-02-18 13:44:43 -0500 CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	signage needed regarding bump in road at train tracks Address: 199 Wentworth Street South, Hamilton, Ontario L8N 2Z6, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?reporting=true#marker-84871

ENGAGEMENT TOOL: PLACE

Current Level of Service Map

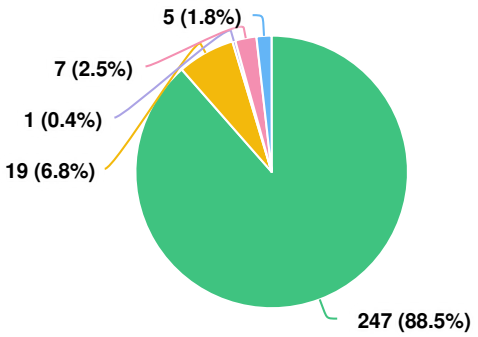
2022-02-18 15:03:16 -0500	CATEGORY Road Condition Deficiency (e.g. pothole, severe cracking, guide rail issue)	where the road crosses the railway tracks there is a significant grade change. If going more than 30 km per hour there is likelihood of hitting the asphalt. the speed on Wellin gton South is 50km until close to the tracks. then 40km with a badly placed sign too hig h to notice. no speed hump indicated Address: 199 Wentworth Street South, Hamilton, Ontario L8N 2Z6, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?repo rting=true#marker-84876
2022-02-18 15:20:09 -0500	CATEGORY Traffic Deficiency (e.g. signal frequently out, sign missing)	No Right on Red sign going southbound Address: 103 Queen Street North, Hamilton, Ontario L8R 3K5, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?repo rting=true#marker-84877
2022-02-18 15:25:11 -0500	CATEGORY Traffic Deficiency (e.g. signal frequently out, sign missing)	Speed change to 40KM beside school Address: 280 Locke Street South, Hamilton, Ontario L8P 4C1, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?repo rting=true#marker-84878
2022-02-18 15:28:19 -0500	CATEGORY Reoccurring flooding (e.g. blocked culvert, drainage issue)	downspout emptying on sidewalk Address: 175 Locke Street South, Hamilton, Ontario L8P 4B2, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?repo rting=true#marker-84879
2022-02-18 15:30:46 -0500	CATEGORY Reoccurring flooding (e.g. blocked culvert, drainage issue)	downspout emptying on sidewalk Address: 2 King Street East, Hamilton, Ontario L9H 1B8, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?repo rting=true#marker-84880
2022-02-18 15:36:53 -0500	CATEGORY Traffic Deficiency (e.g. signal frequently out, sign missing)	speed limit signs Address: 222 Ferguson Avenue South, Hamilton, Ontario L8N 1Z7, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?repo rting=true#marker-84881
2022-02-18 15:51:54 -0500	CATEGORY Reoccurring flooding (e.g. blocked culvert, drainage issue)	water over sidewalk from downspout Address: 53 Hyde Park Avenue, Hamilton, Ontario L8P 4M8, Canada http://engage.hamilton.ca/roadswaterservices/maps/current-level-of-service-map?repo rting=true#marker-84884

ENGAGEMENT TOOL: SURVEY TOOL

Asset Management - Roads, Bridges and Culverts

Visitors 343	Contributors 278	CONTRIBUTIONS 279

How would you best describe yourself?



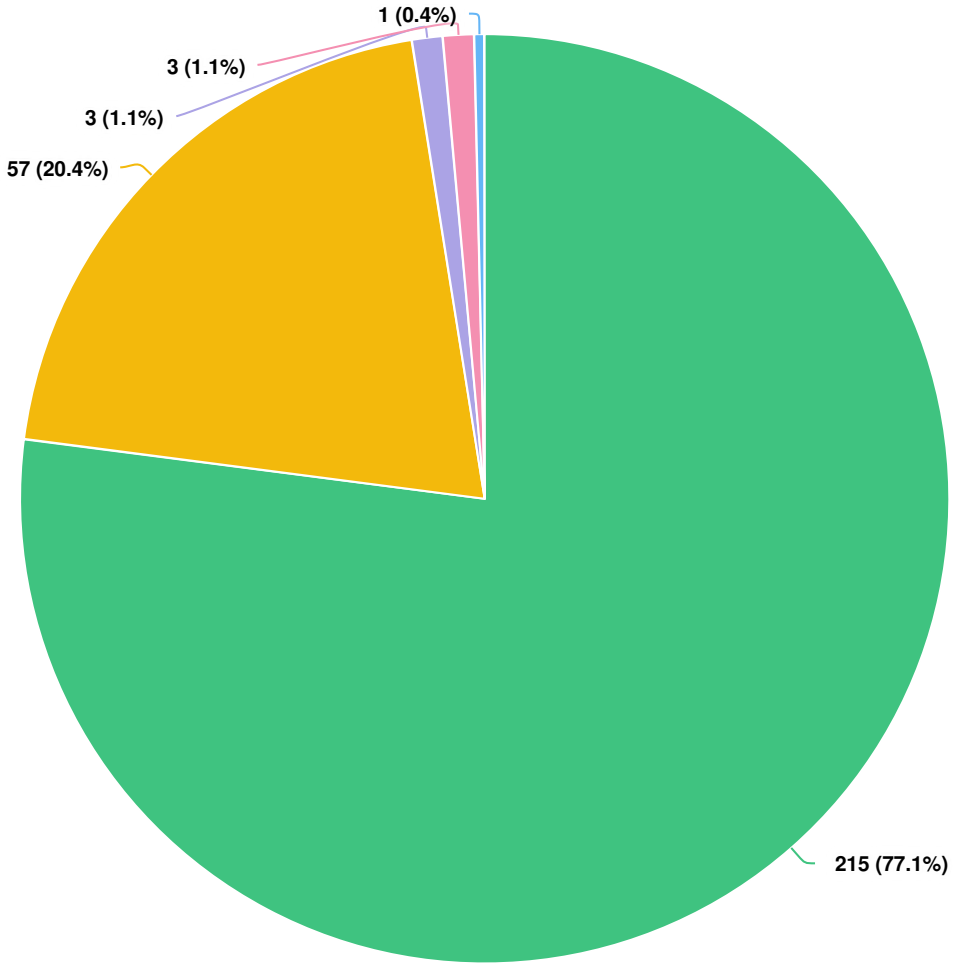
Question options

- I live in Hamilton
- I live in Hamilton and I also run a Hamilton-based business
- I don't live in Hamilton, but I run a Hamilton-based business
- I work in Hamilton (but I live somewhere else)
- Other (please specify)

Mandatory Question (279 response(s))

Question type: Dropdown Question

In the last 12 months, on average how often would you say you travelled on Hamilton's road network, using any mode of transportation? (walking, driving, riding, etc.)



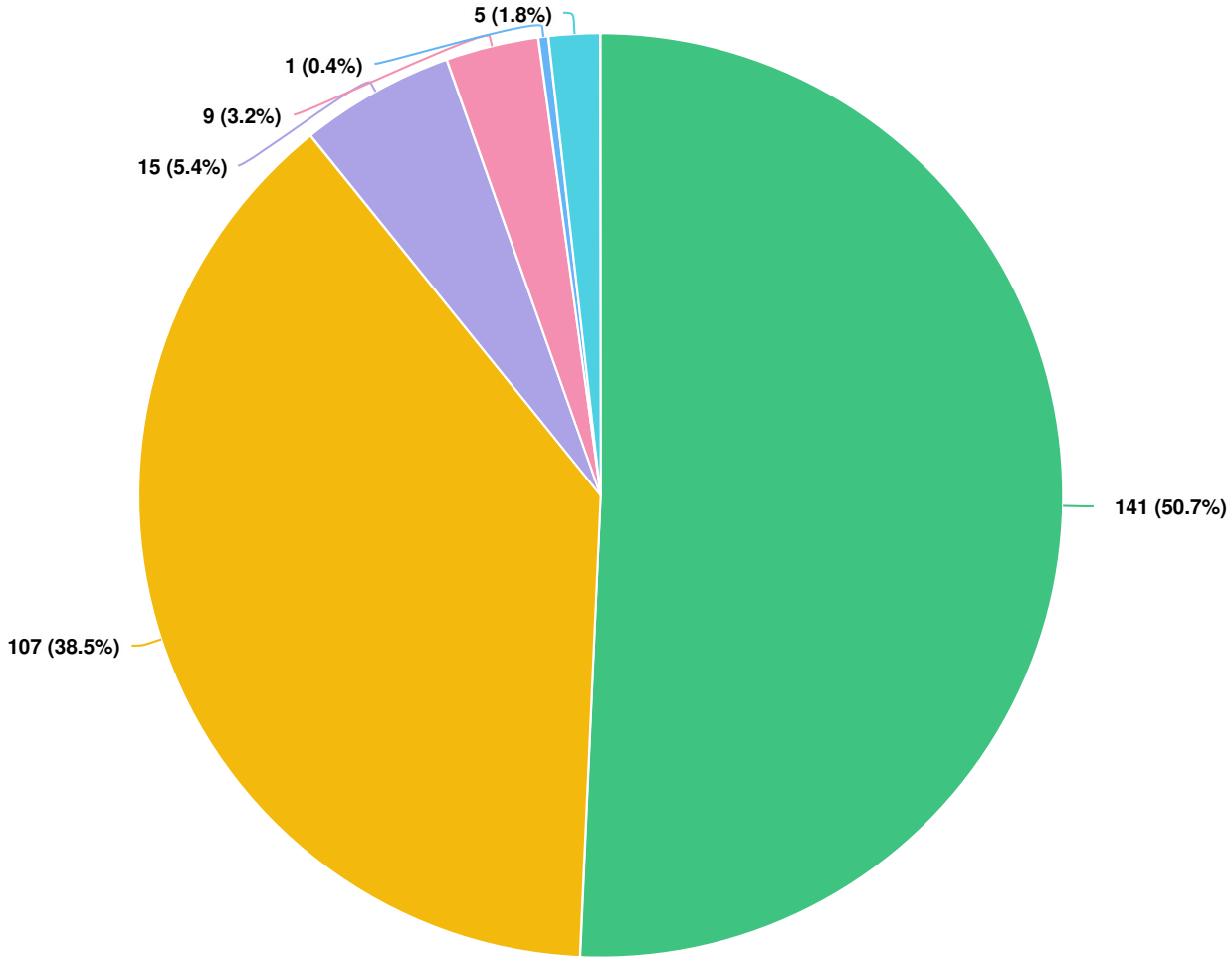
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely

Mandatory Question (279 response(s))

Question type: Dropdown Question

How often do you drive in a motorized vehicle? (i.e. car, motorcycle, etc.)



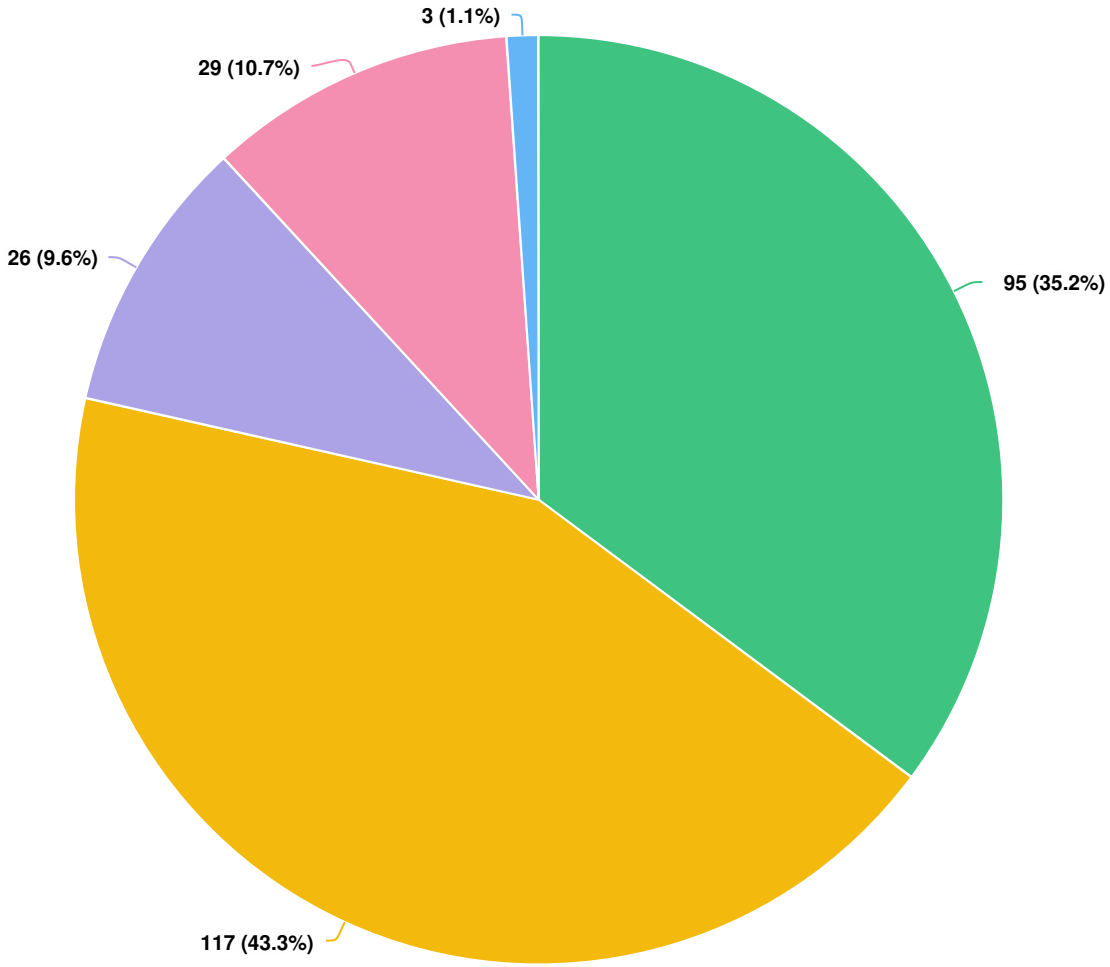
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely | Never

Optional question (278 response(s), 1 skipped)

Question type: Dropdown Question

How safe do you feel using the roads while driving in a motorized vehicle?



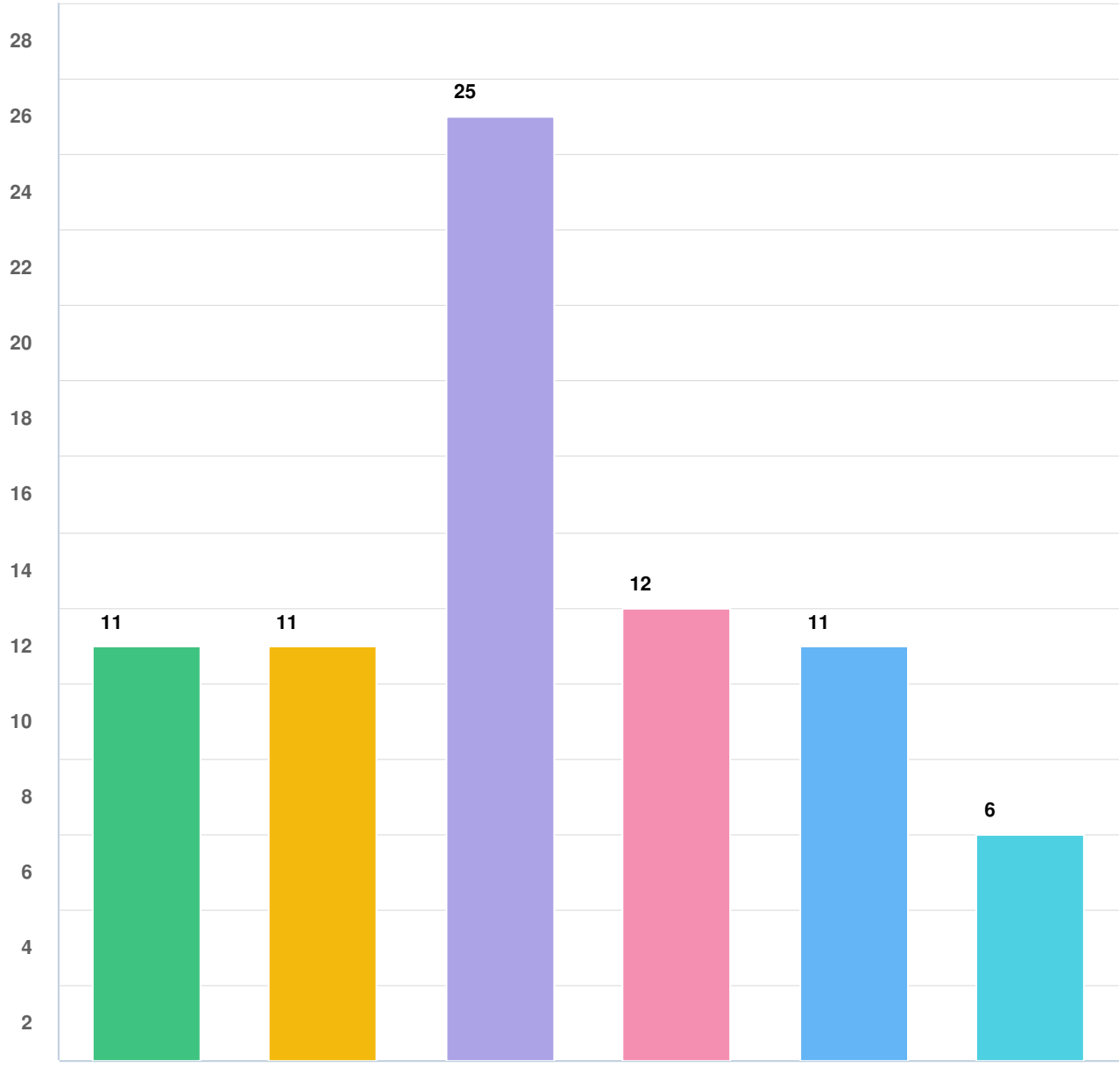
Question options

Very safe | Somewhat safe | Neutral | Somewhat unsafe | Very unsafe

Optional question (270 response(s), 9 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe driving in a motorized vehicle



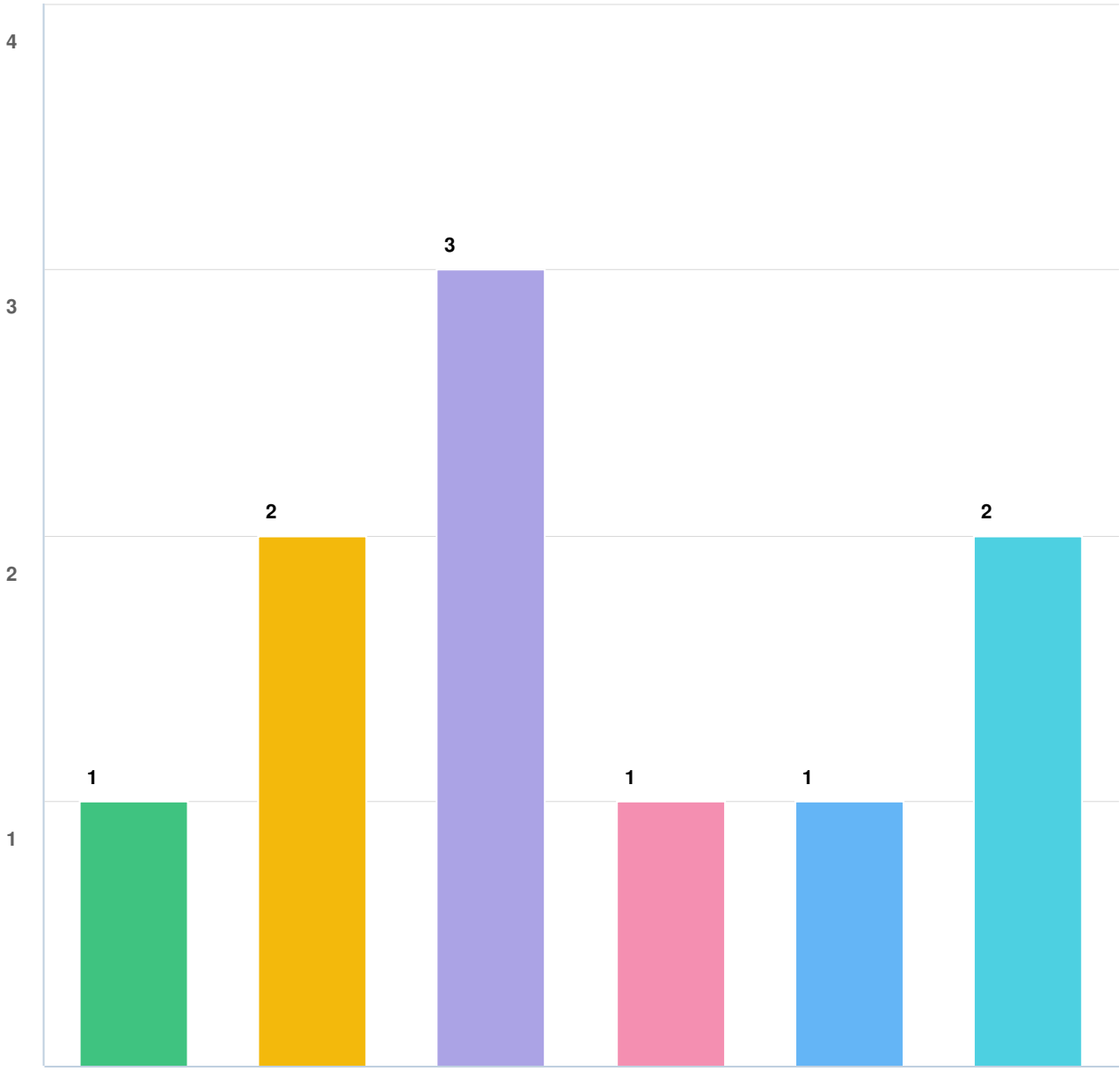
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (29 response(s), 250 skipped)

Question type: Checkbox Question

Select the top reasons you feel very unsafe driving in a motorized vehicle



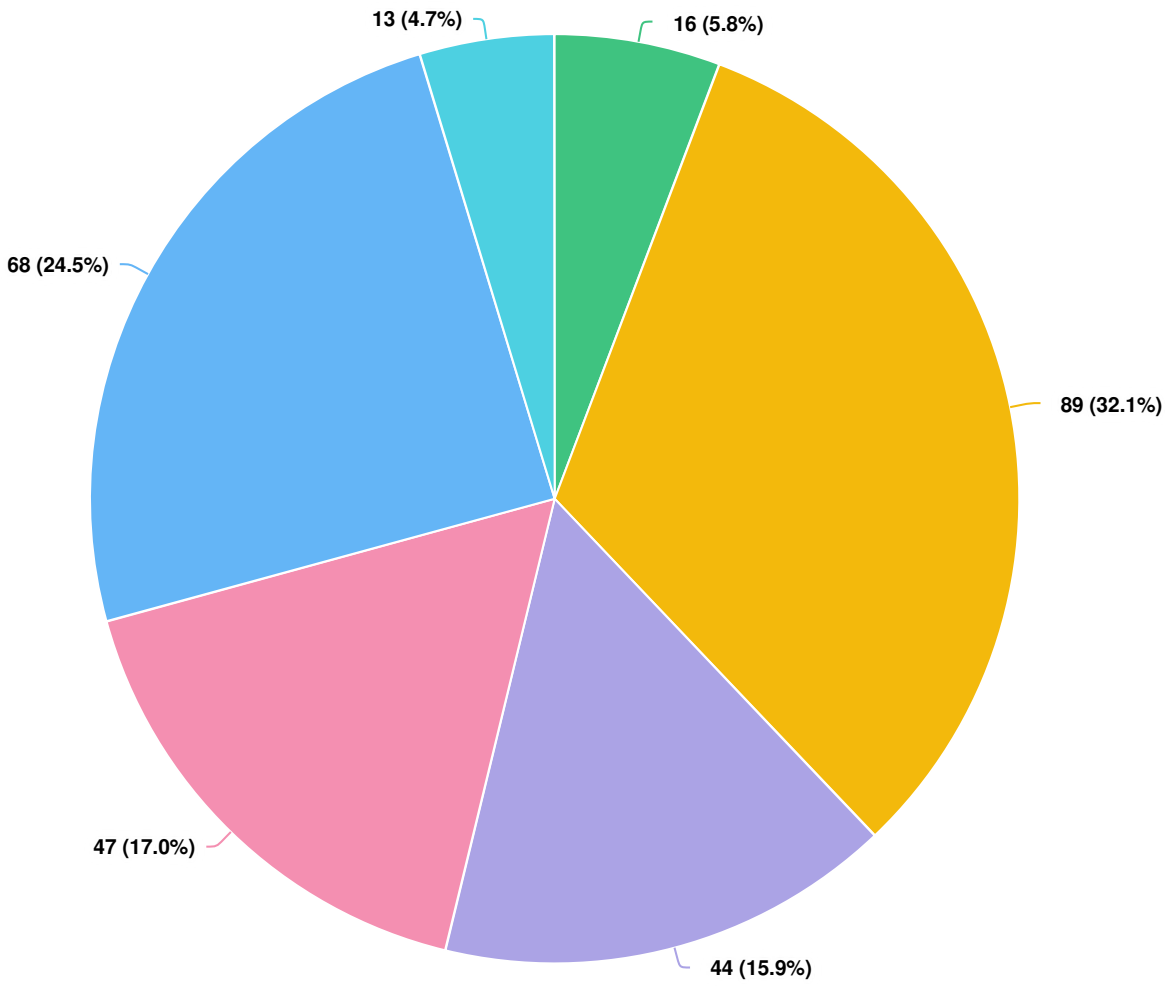
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (3 response(s), 276 skipped)

Question type: Checkbox Question

How often do you ride as a passenger in a motorized vehicle? (i.e. car, motorcycle, etc.)



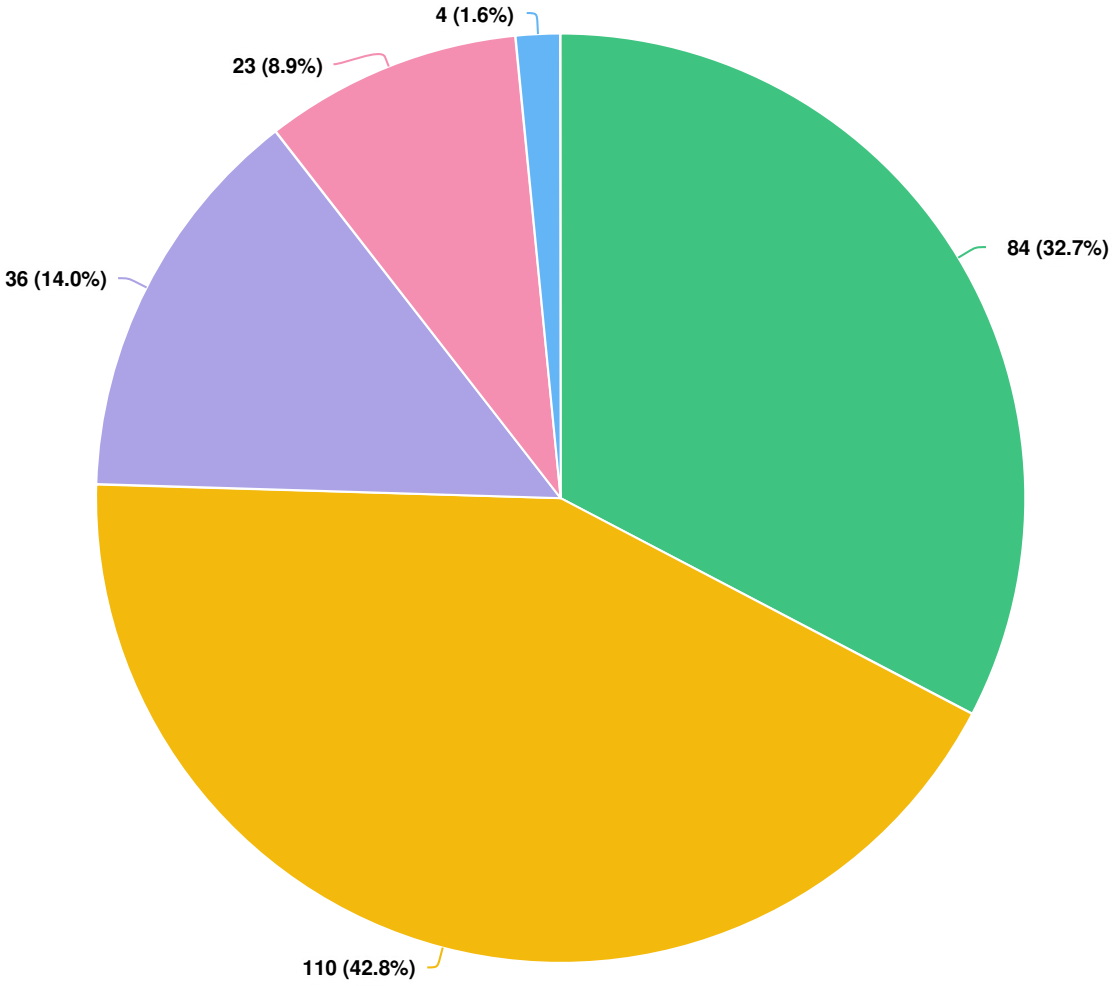
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely | Never

Optional question (277 response(s), 2 skipped)

Question type: Dropdown Question

How safe do you feel using the roads while riding as a passenger in a motorized vehicle?



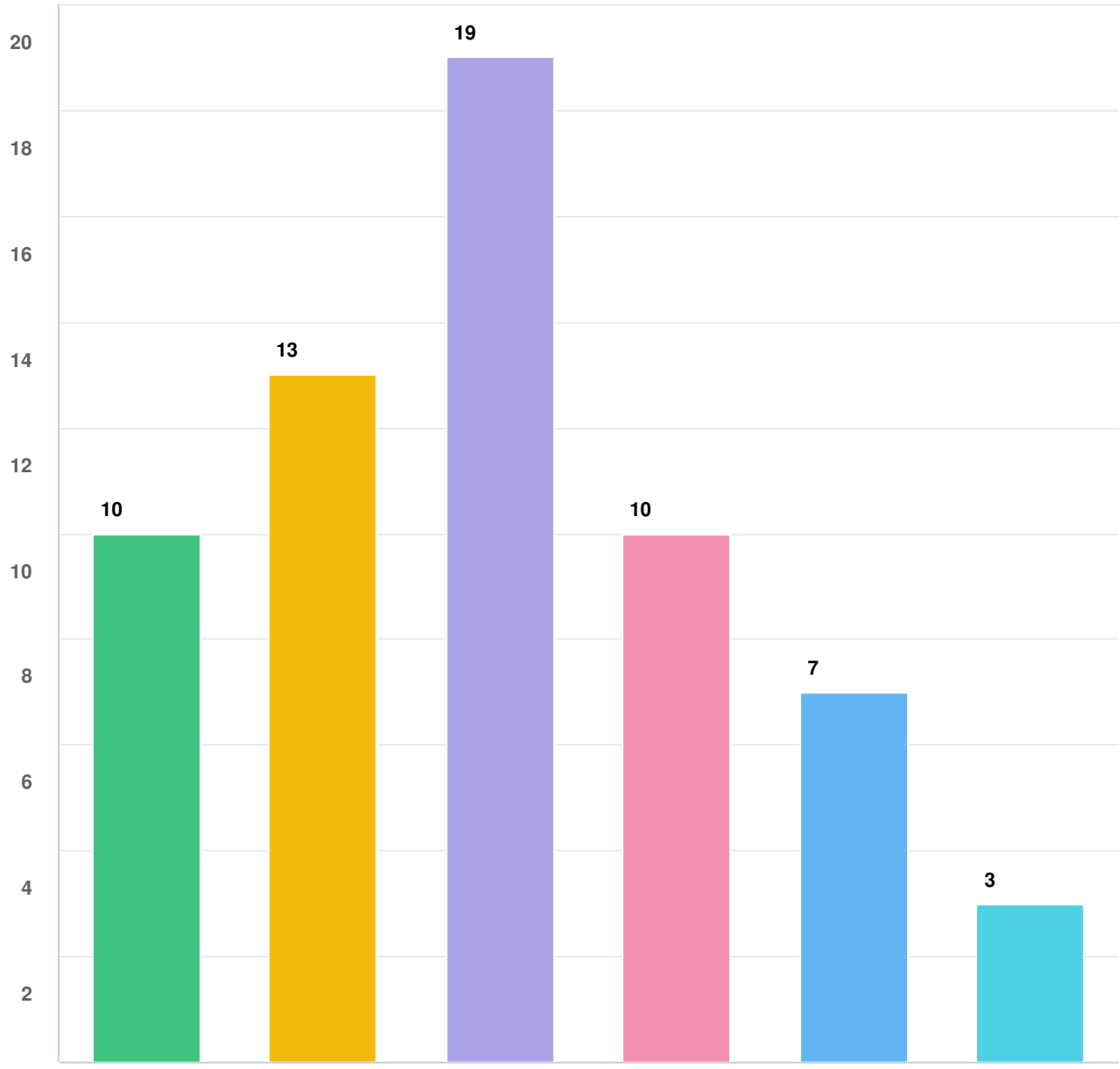
Question options

Very safe | Somewhat safe | Neutral | Somewhat unsafe | Very unsafe

Optional question (257 response(s), 22 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe riding as a passenger in a motorized vehicle



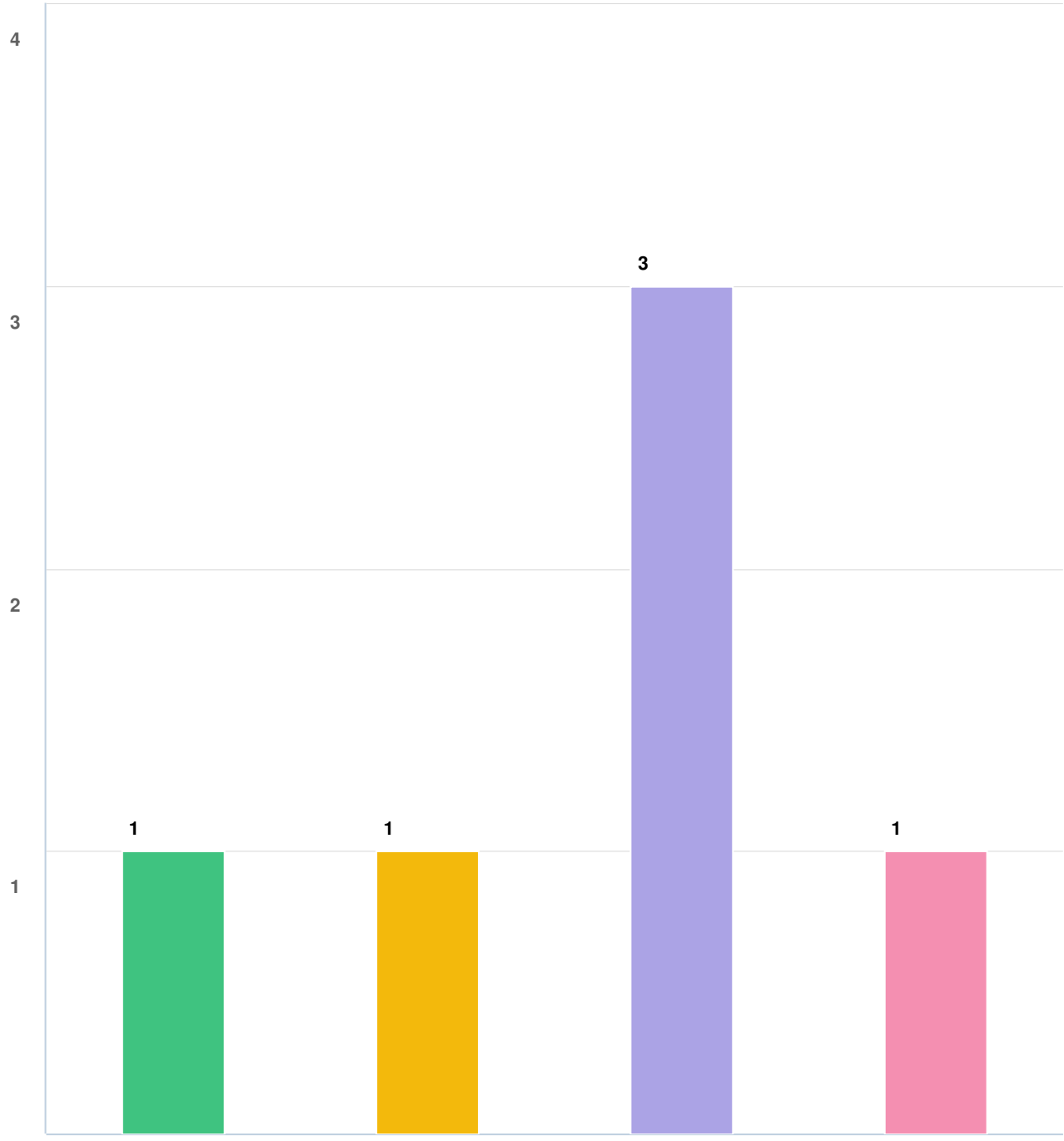
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (23 response(s), 256 skipped)

Question type: Checkbox Question

Select the top reasons you feel very unsafe riding as a passenger in a motorized vehicle



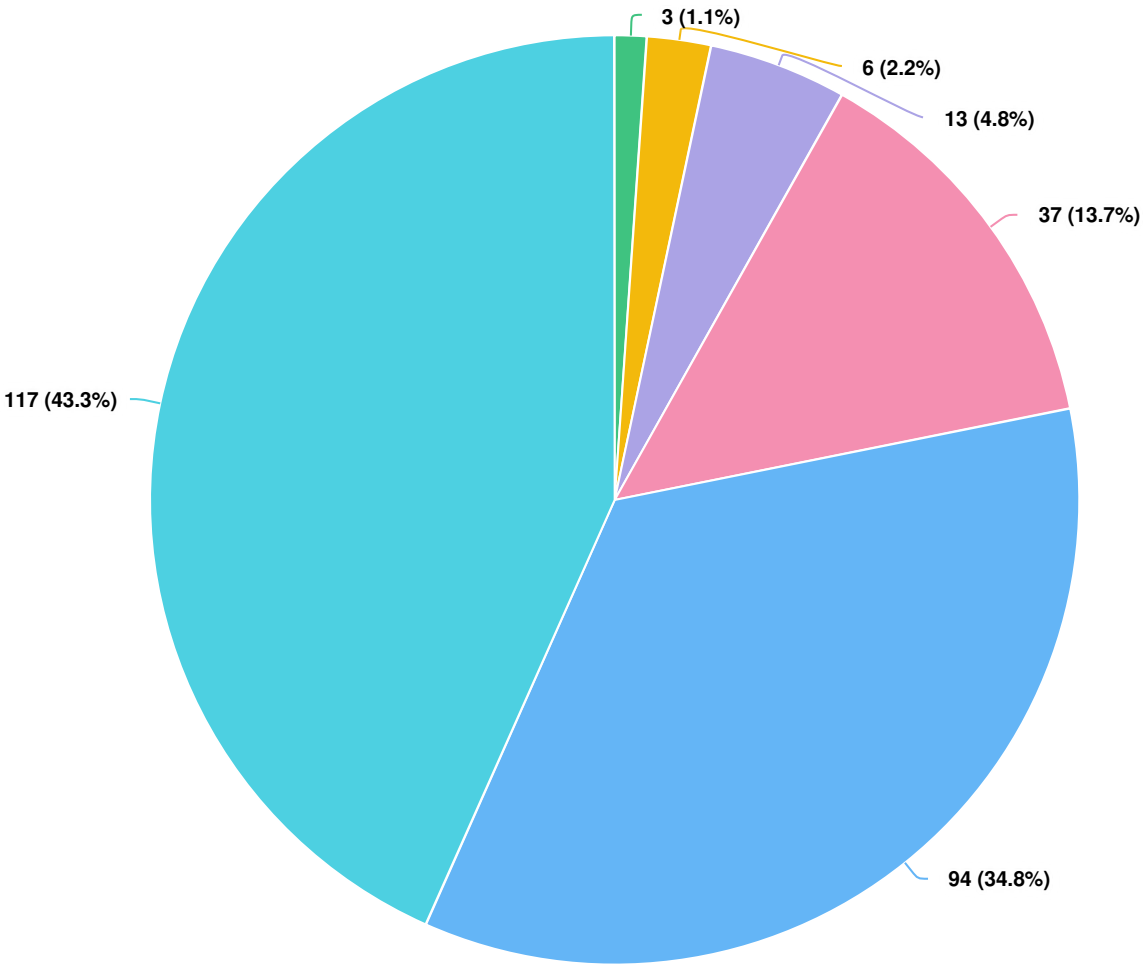
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Other (please specify)

Optional question (4 response(s), 275 skipped)

Question type: Checkbox Question

How often do you cycle through rural areas?



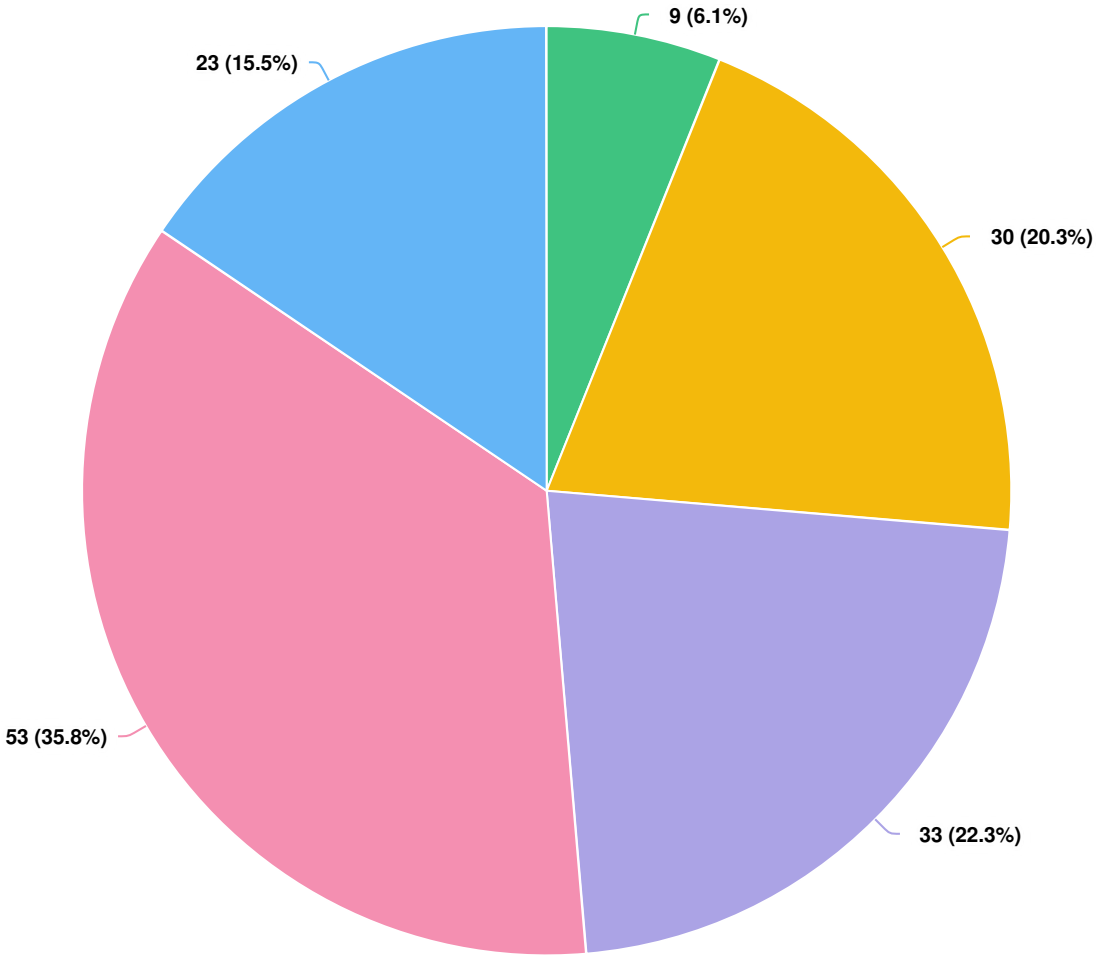
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely | Never

Optional question (270 response(s), 9 skipped)

Question type: Dropdown Question

How safe do you feel while cycling through a rural area?



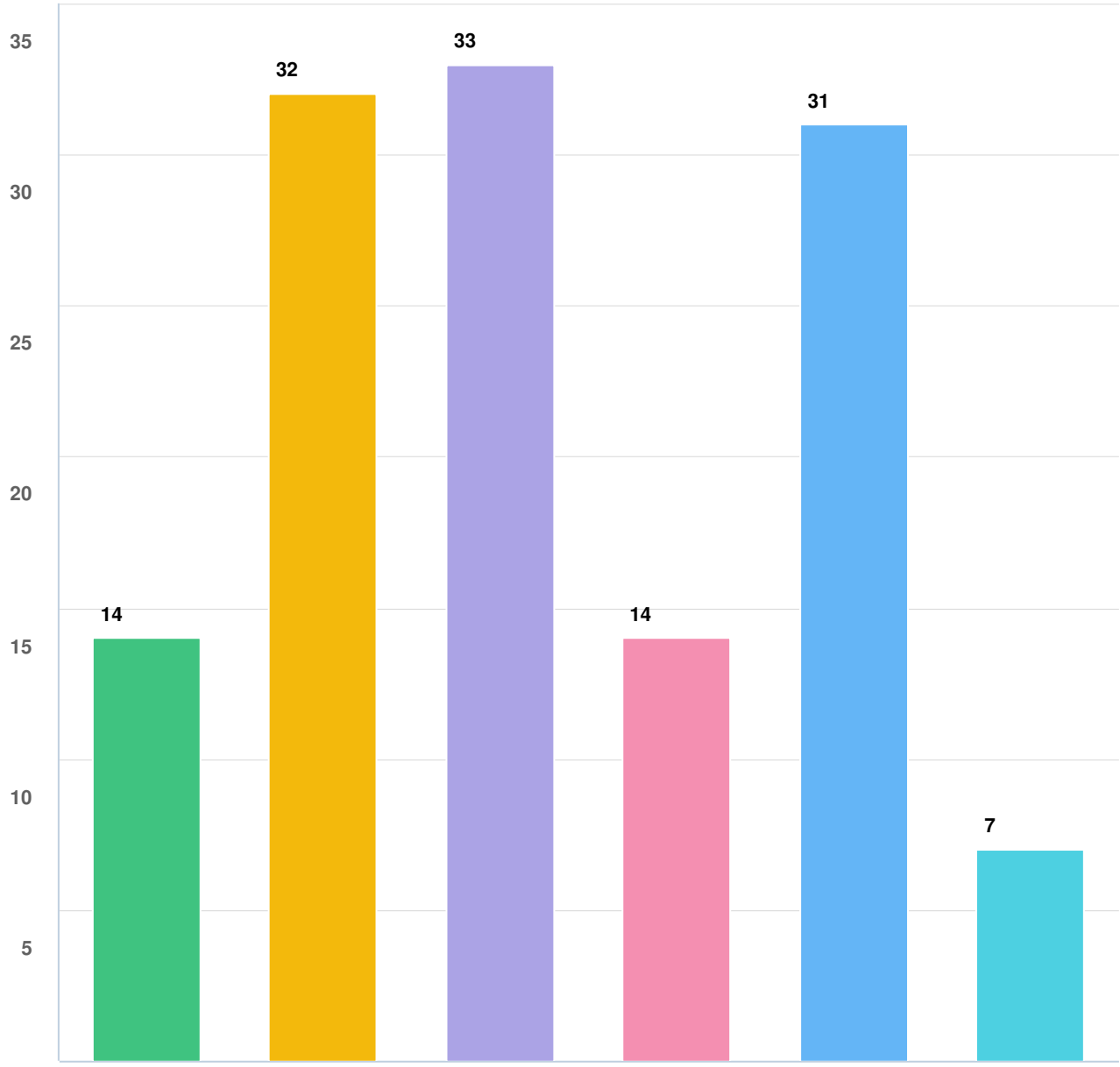
Question options

Very safe | Somewhat safe | Neutral | Somewhat unsafe | Very unsafe

Optional question (148 response(s), 131 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe cycling through a rural areas



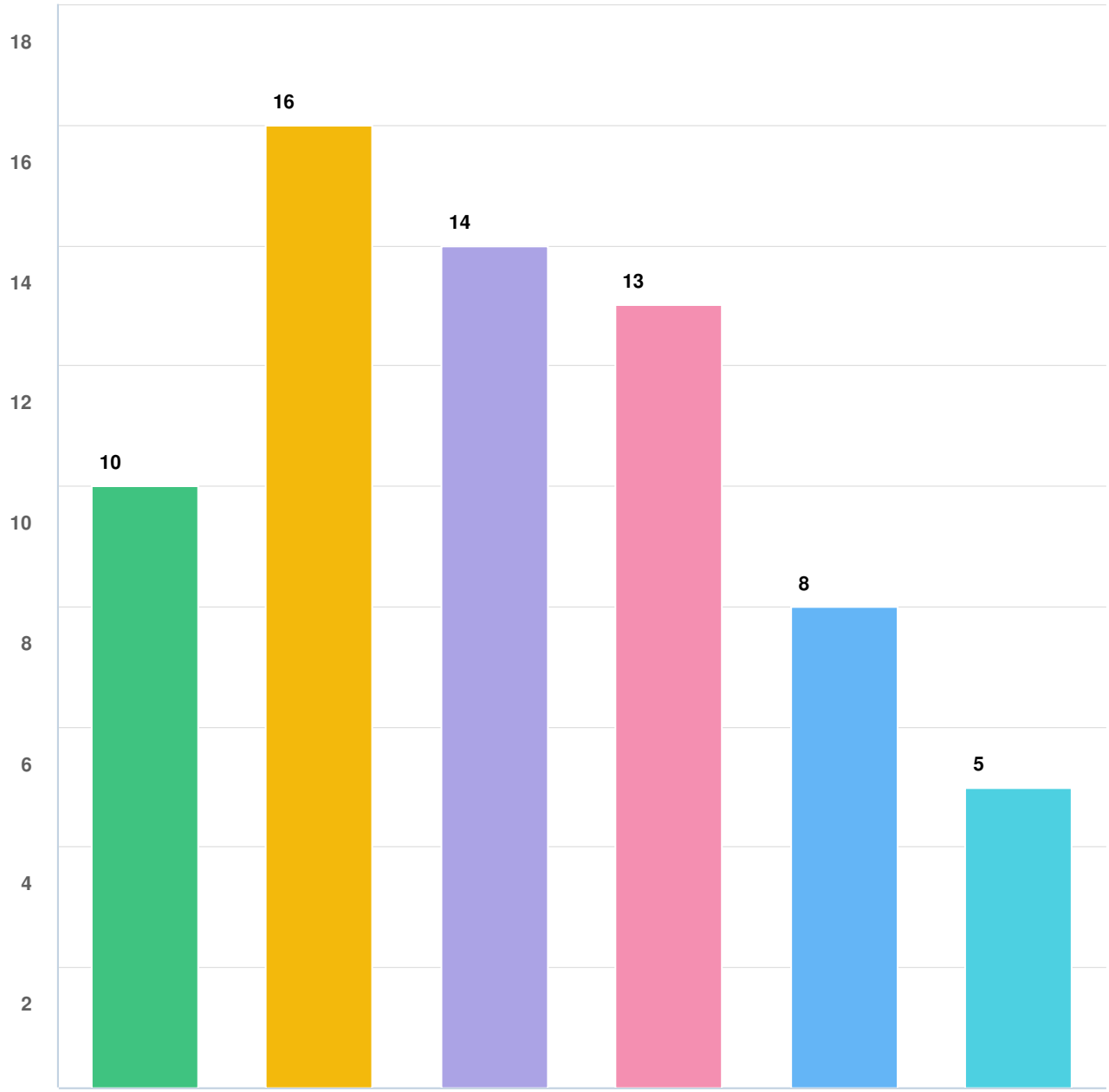
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (53 response(s), 226 skipped)

Question type: Checkbox Question

Select the top reasons you feel very unsafe cycling through a rural areas



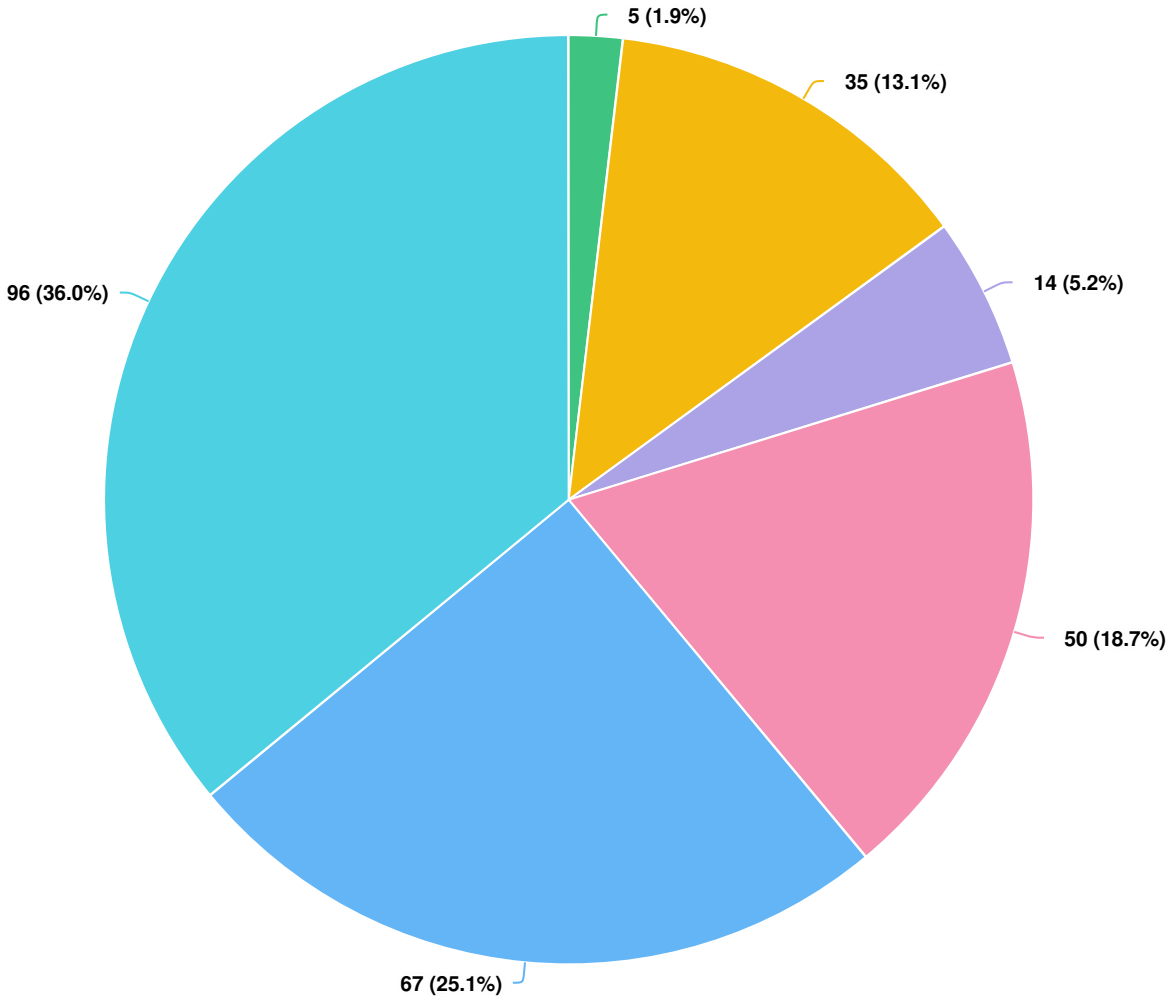
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Other (please specify)

Optional question (23 response(s), 256 skipped)

Question type: Checkbox Question

How often do you cycle through urban areas?



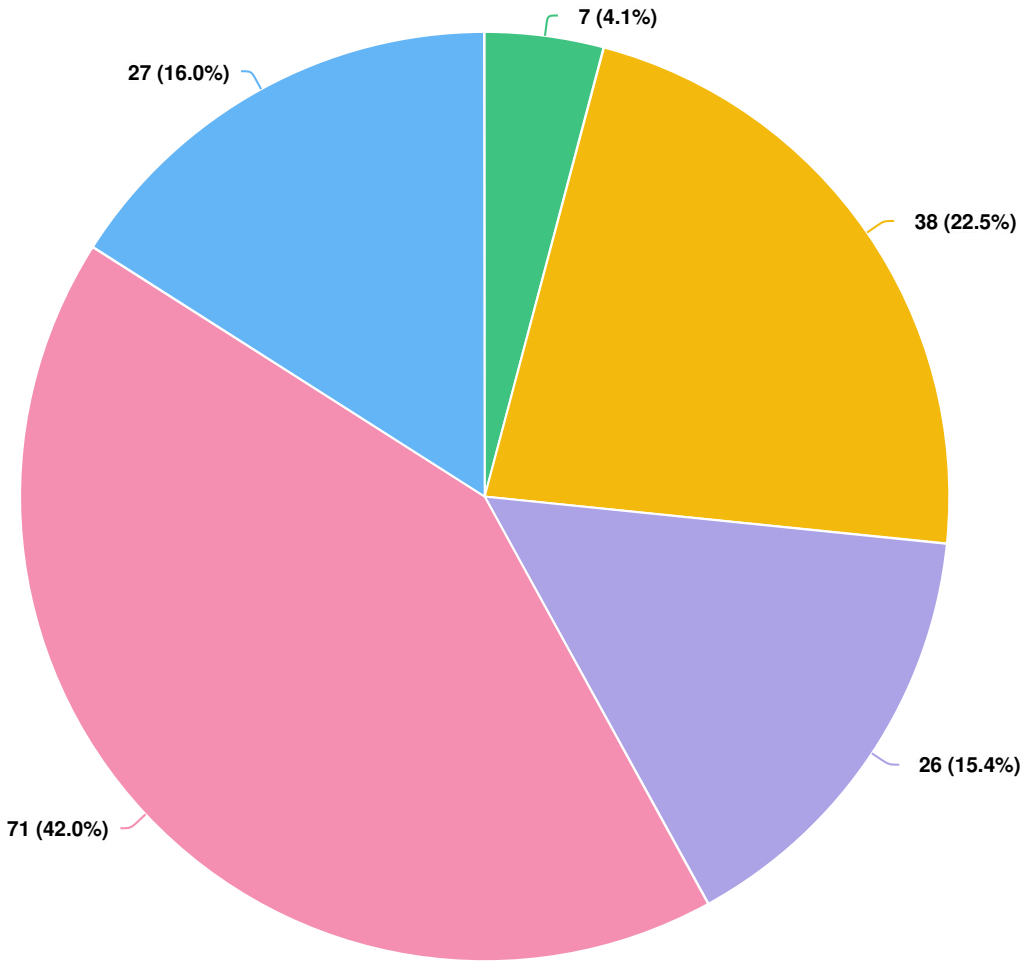
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely | Never

Optional question (267 response(s), 12 skipped)

Question type: Dropdown Question

How safe do you feel while cycling through a urban area?



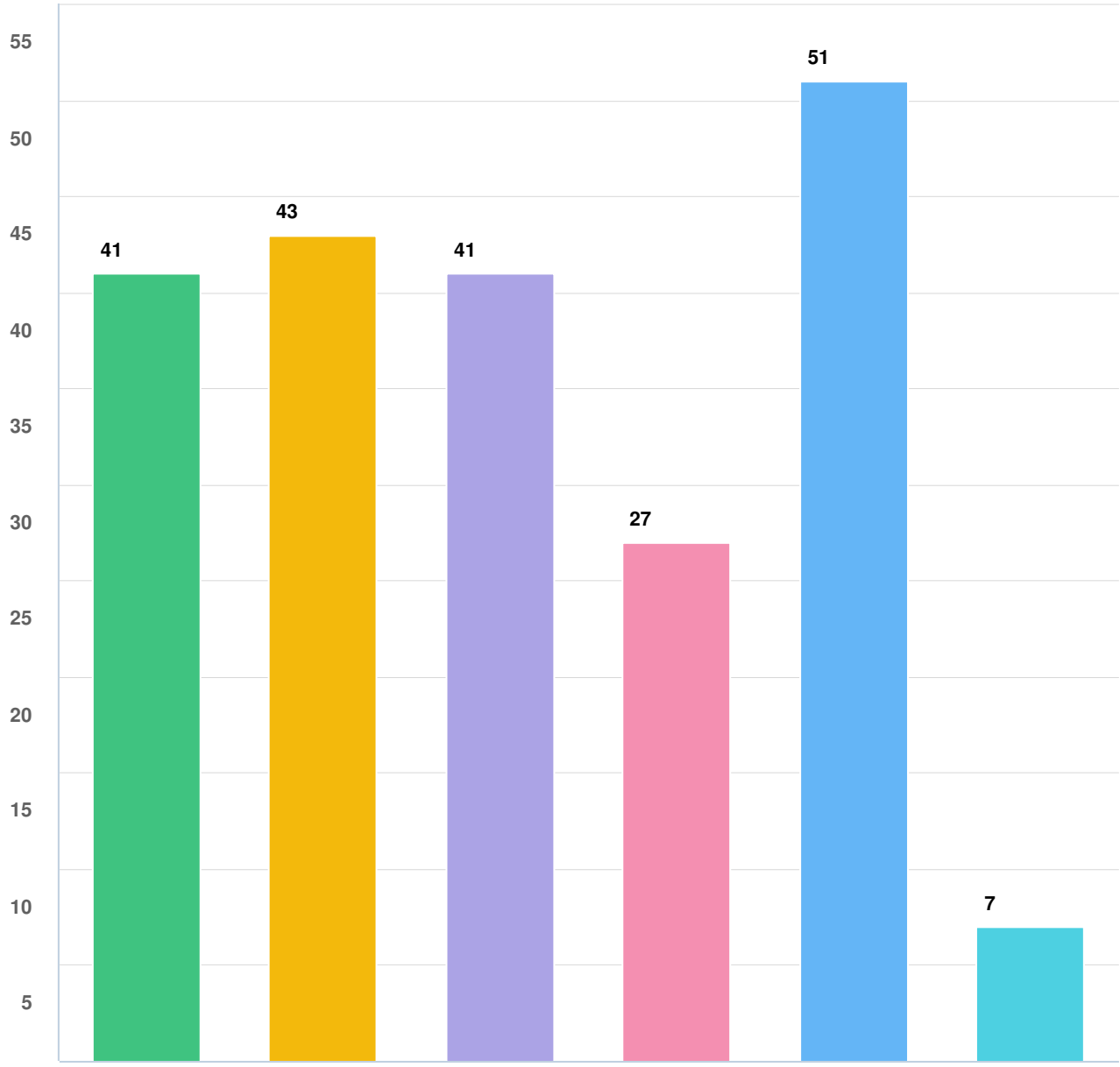
Question options

Very safe | Somewhat safe | Neutral | Somewhat unsafe | Very unsafe

Optional question (169 response(s), 110 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe cycling through a urban areas



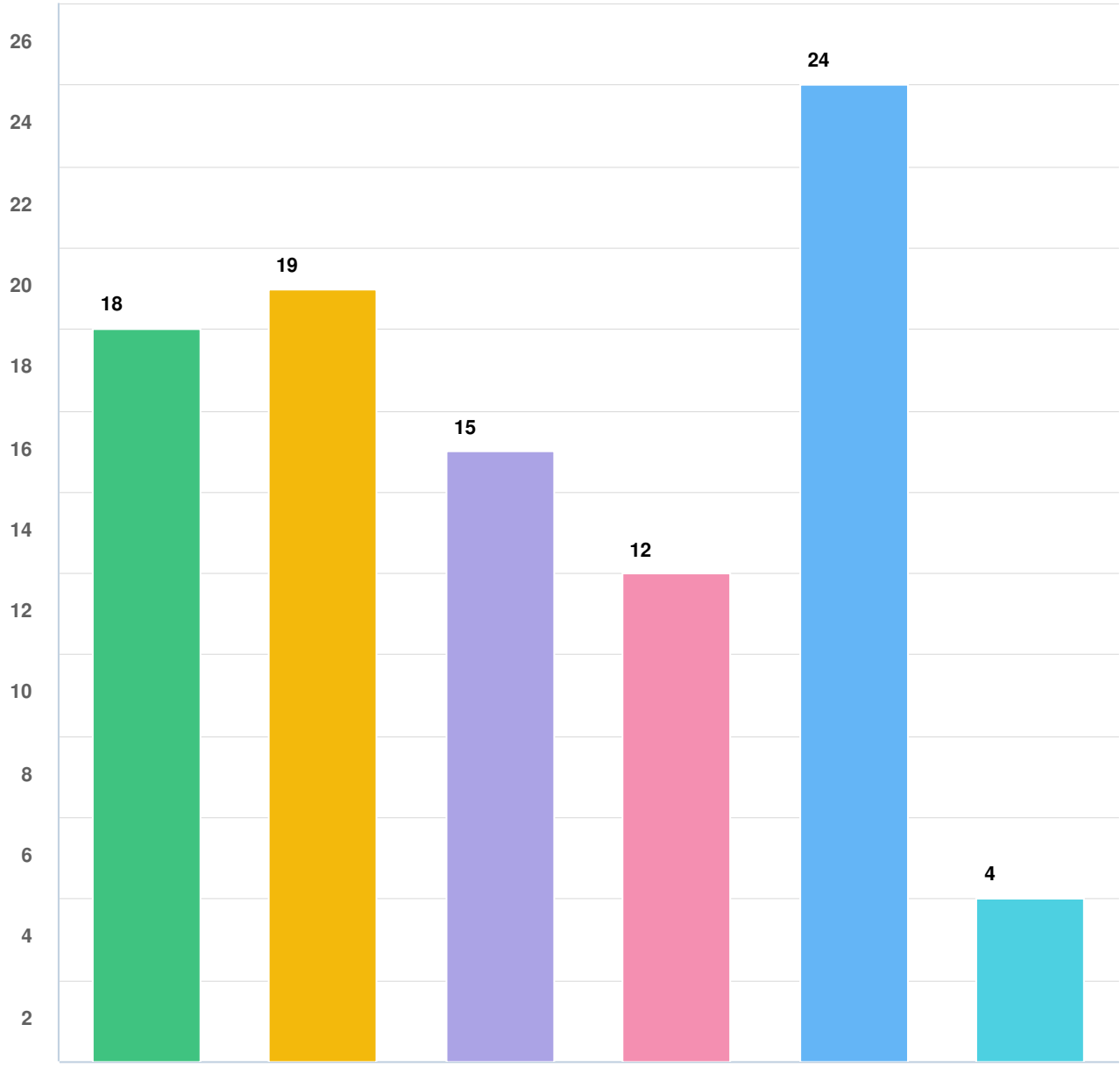
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (71 response(s), 208 skipped)

Question type: Checkbox Question

Select the top reasons you feel very unsafe cycling through a urban areas



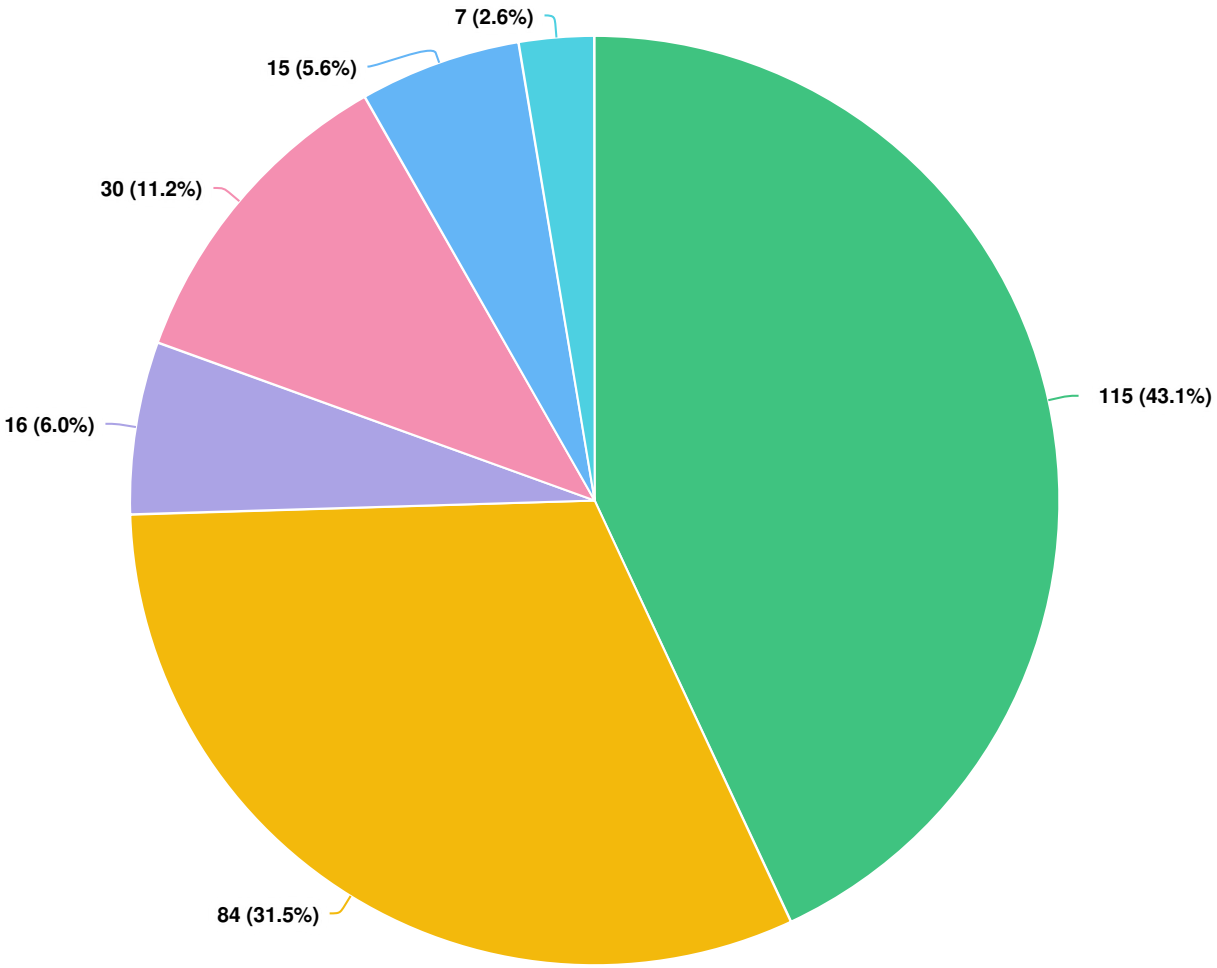
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (27 response(s), 252 skipped)

Question type: Checkbox Question

How often do you walk using sidewalks or multi-use trails?



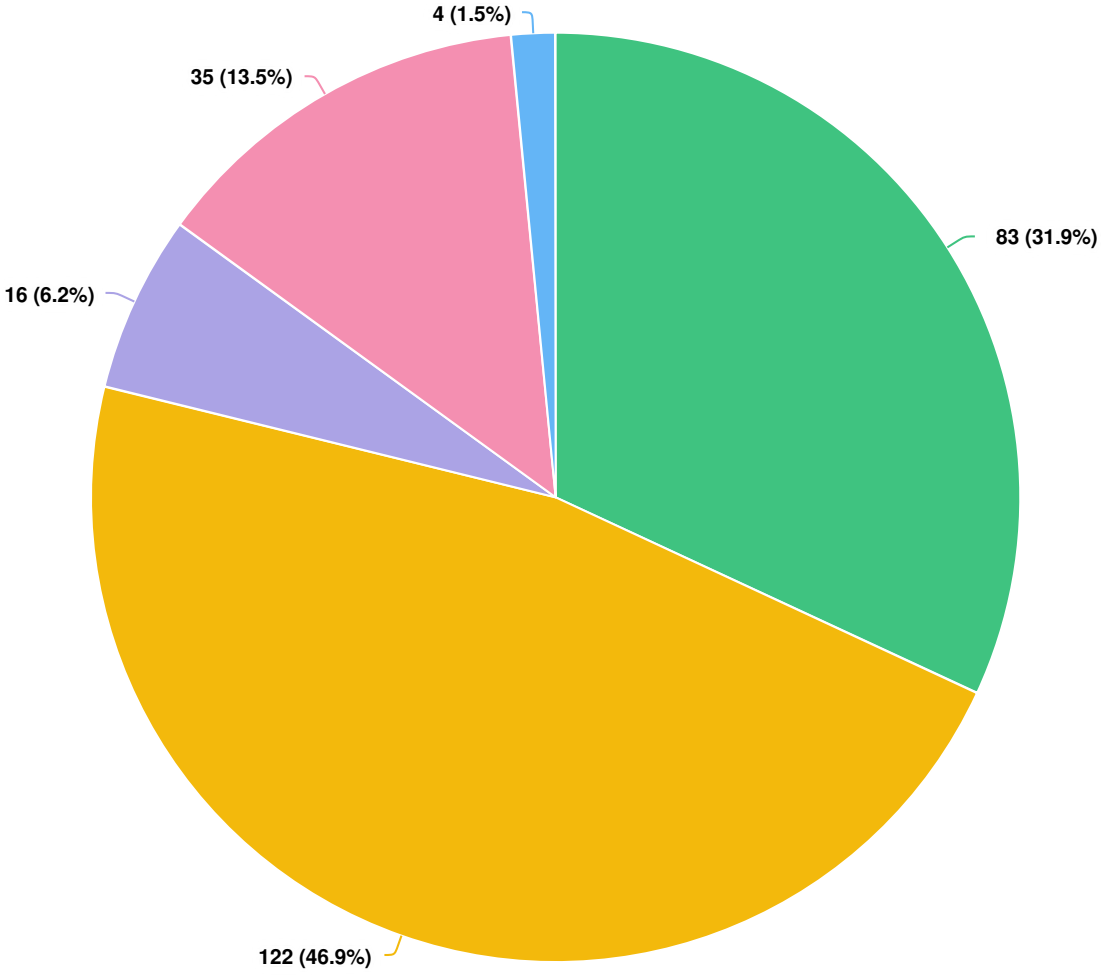
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely | Never

Optional question (267 response(s), 12 skipped)

Question type: Dropdown Question

How safe do you feel while walking on sidewalks or multi-use trails?



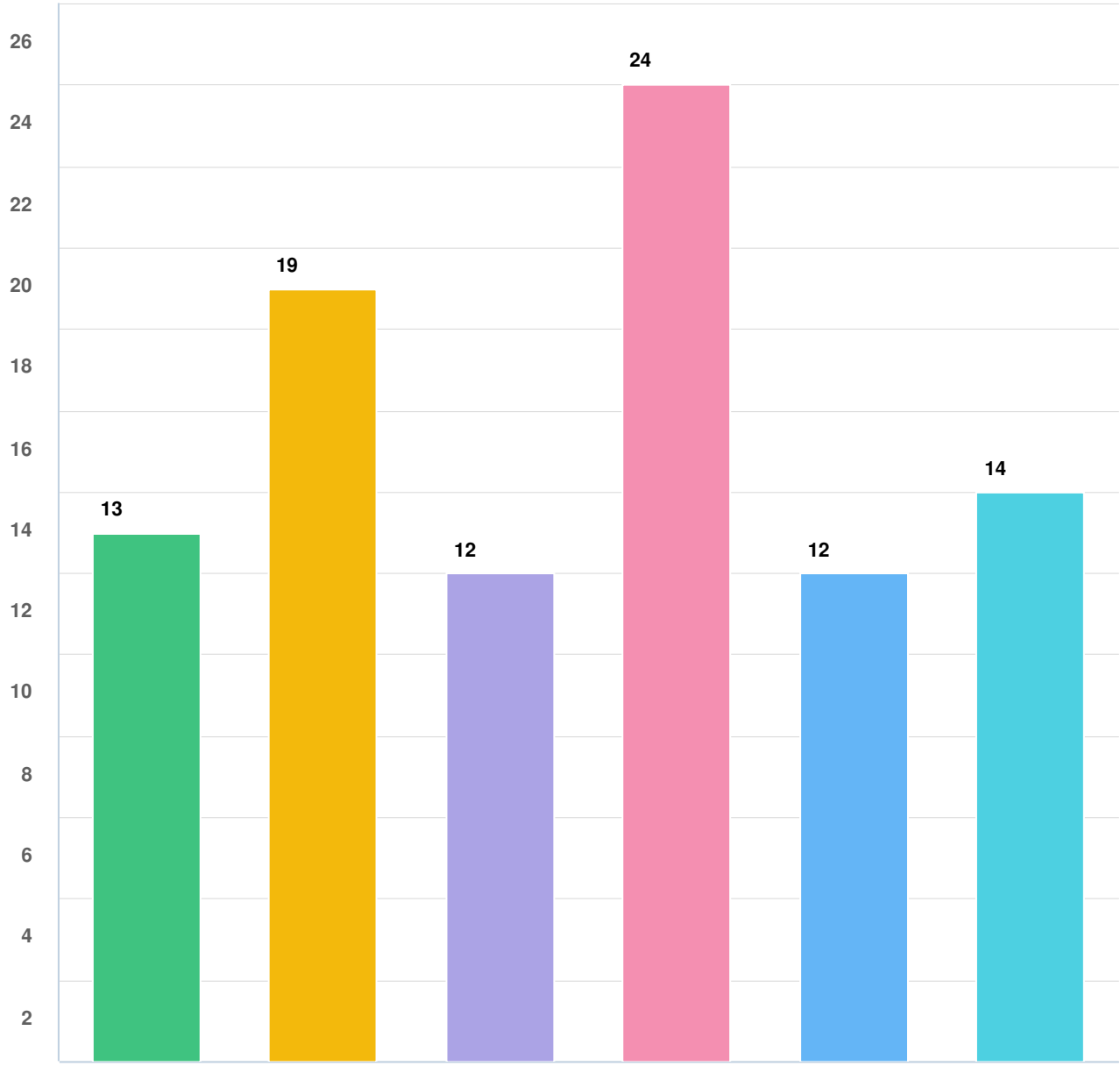
Question options

Very safe | Somewhat safe | Neutral | Somewhat unsafe | Very unsafe

Optional question (260 response(s), 19 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe walking on sidewalks or multi-use trails



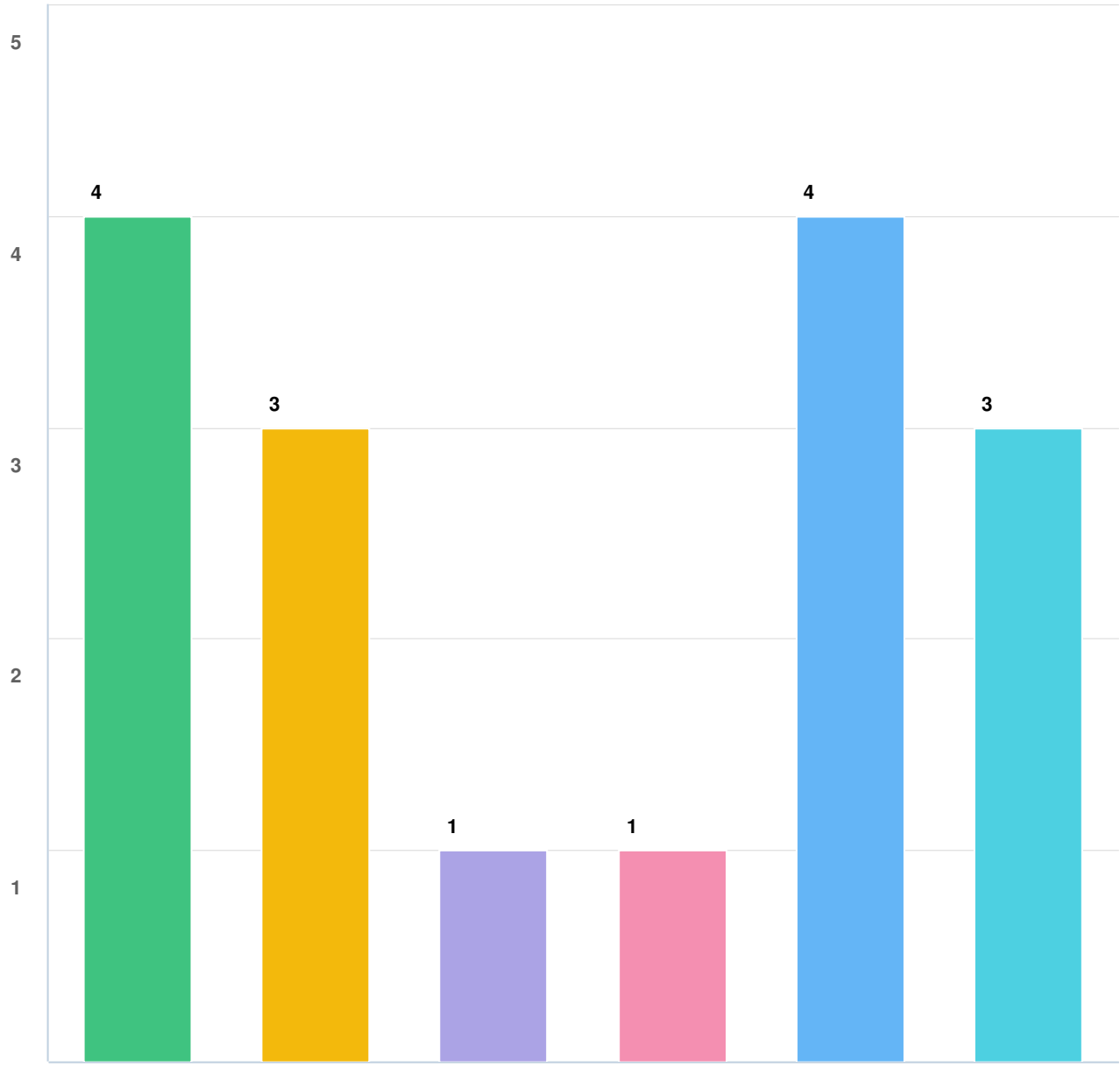
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (35 response(s), 244 skipped)

Question type: Checkbox Question

Select the top reasons you feel very unsafe walking on sidewalks or multi-use trails



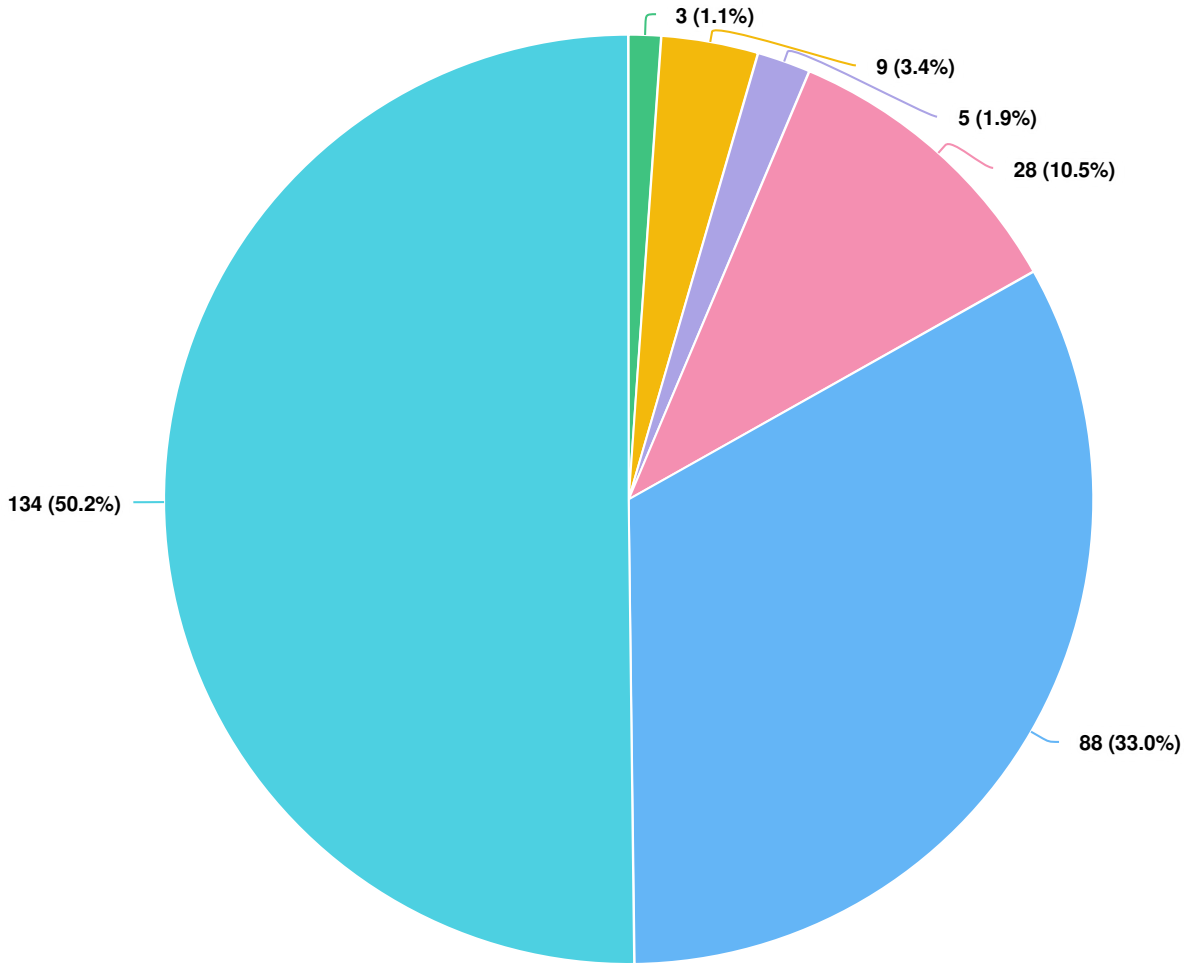
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Other (please specify)

Optional question (4 response(s), 275 skipped)

Question type: Checkbox Question

How often do you ride public transportation?



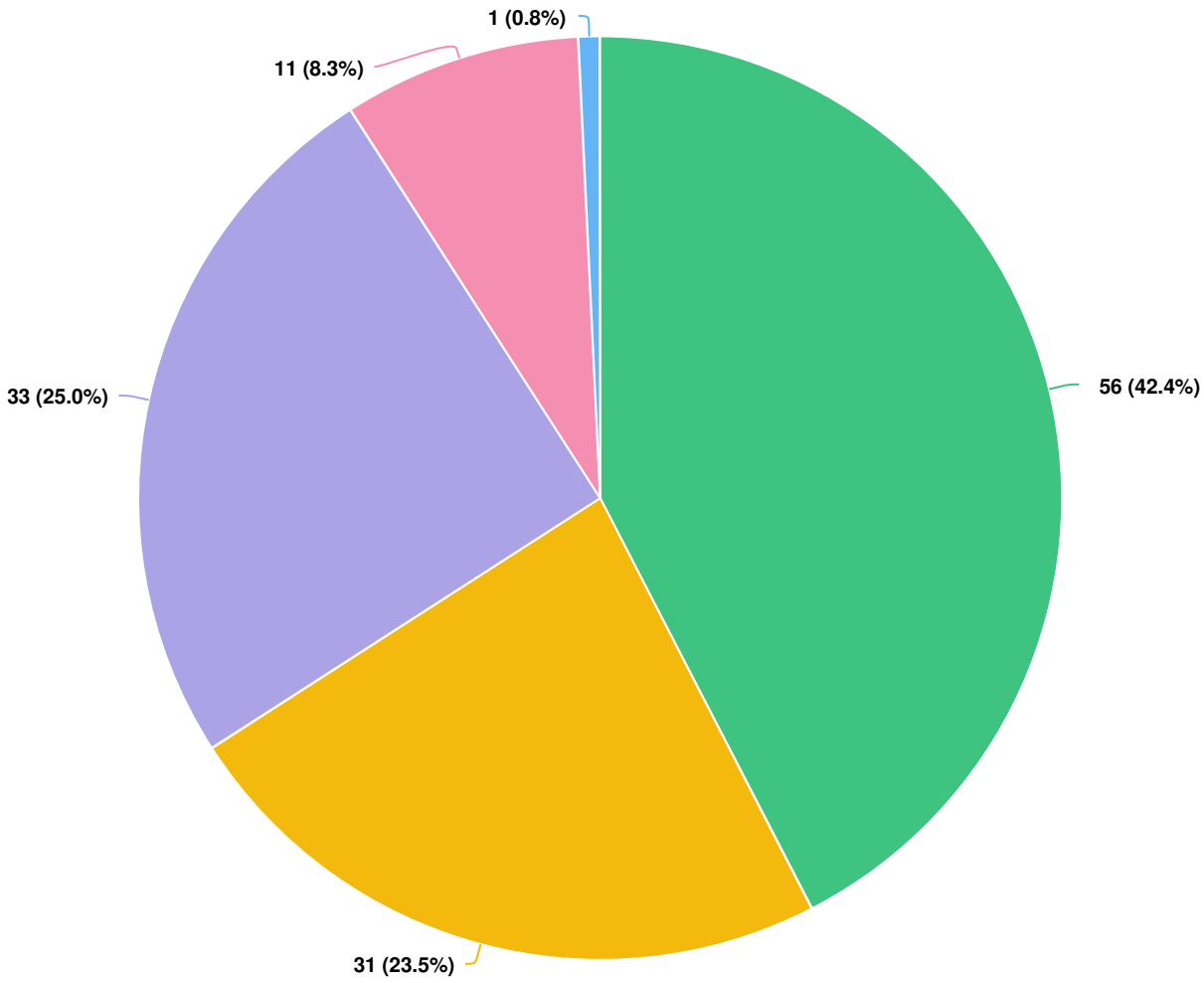
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely | Never

Optional question (267 response(s), 12 skipped)

Question type: Dropdown Question

How safe do you feel using the roads while riding public transportation?



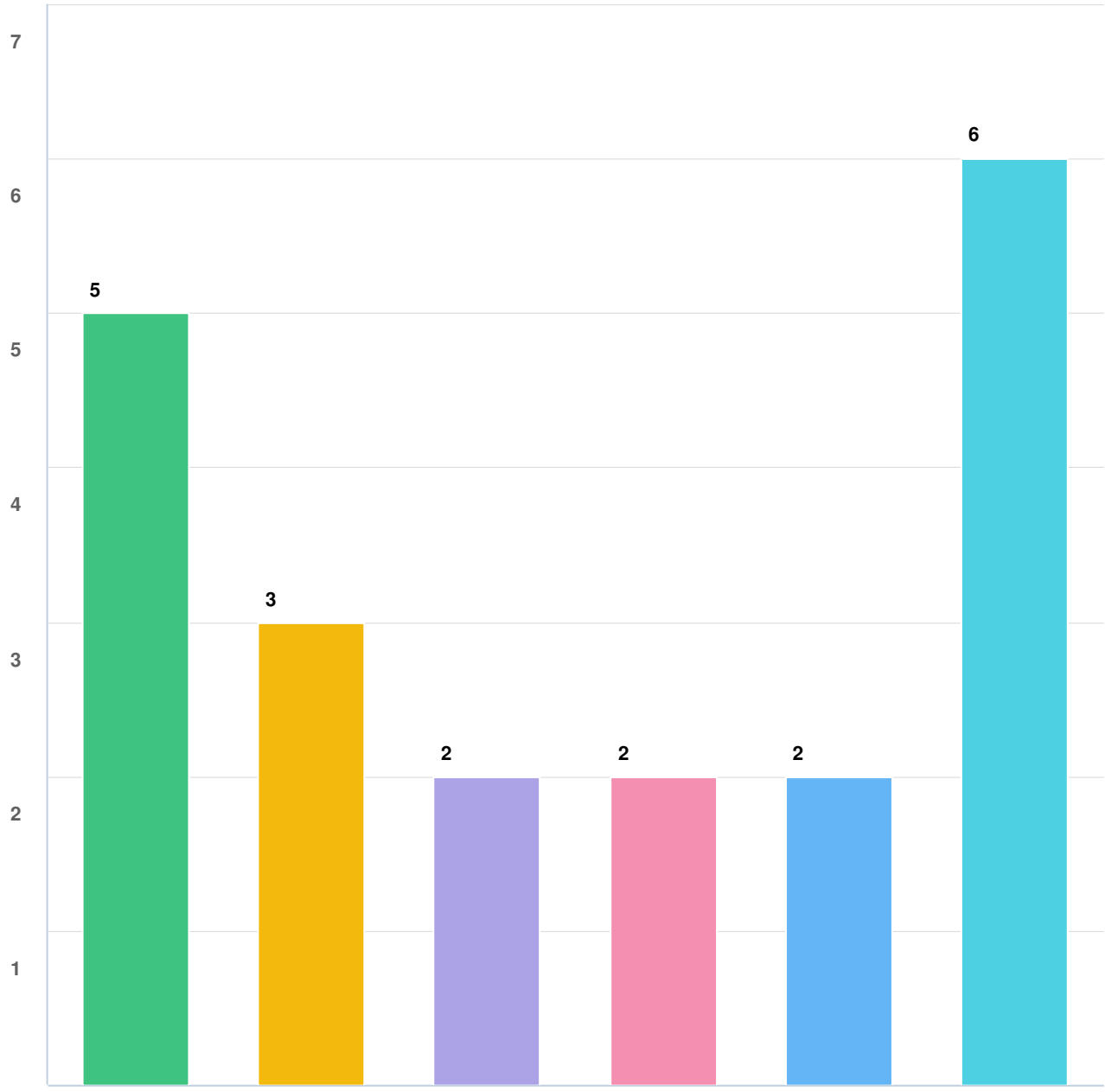
Question options

Very safe | Somewhat safe | Neutral | Somewhat unsafe | Very unsafe

Optional question (132 response(s), 147 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe riding public transportation



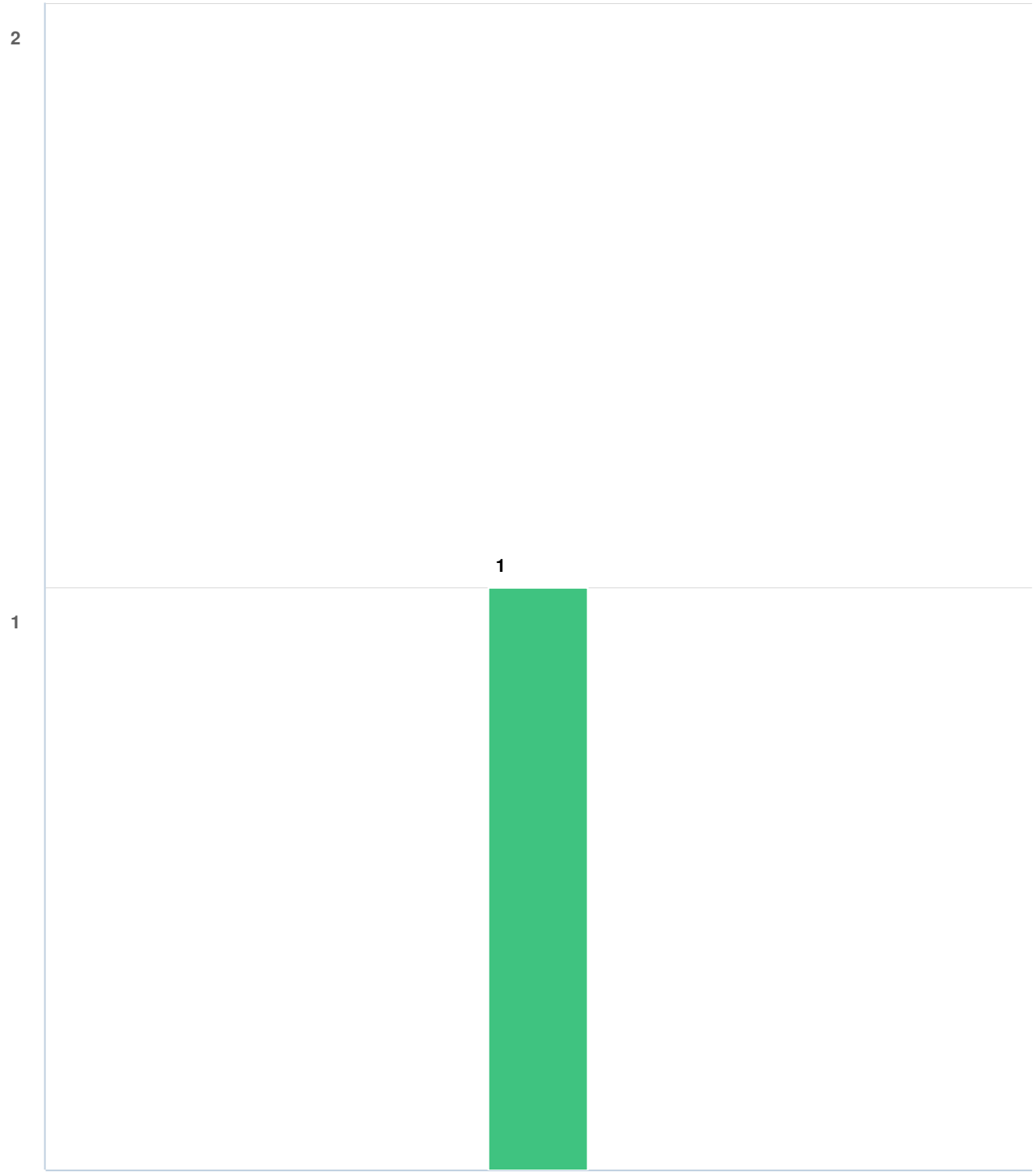
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Other (please specify)

Optional question (10 response(s), 269 skipped)

Question type: Checkbox Question

Select the top reasons you feel very unsafe riding public transportation



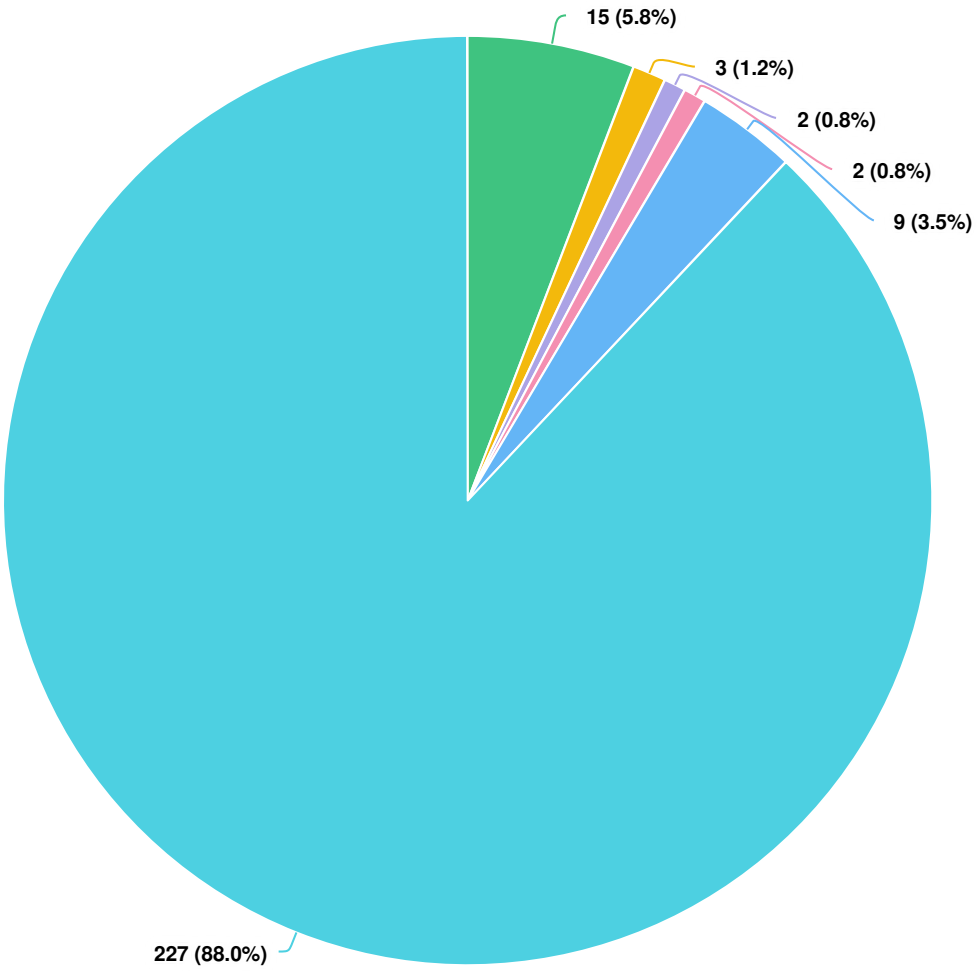
Question options

- Surface condition (e.g. significant cracking, potholes)

Optional question (1 response(s), 278 skipped)

Question type: Checkbox Question

How often do you use a mobility device?



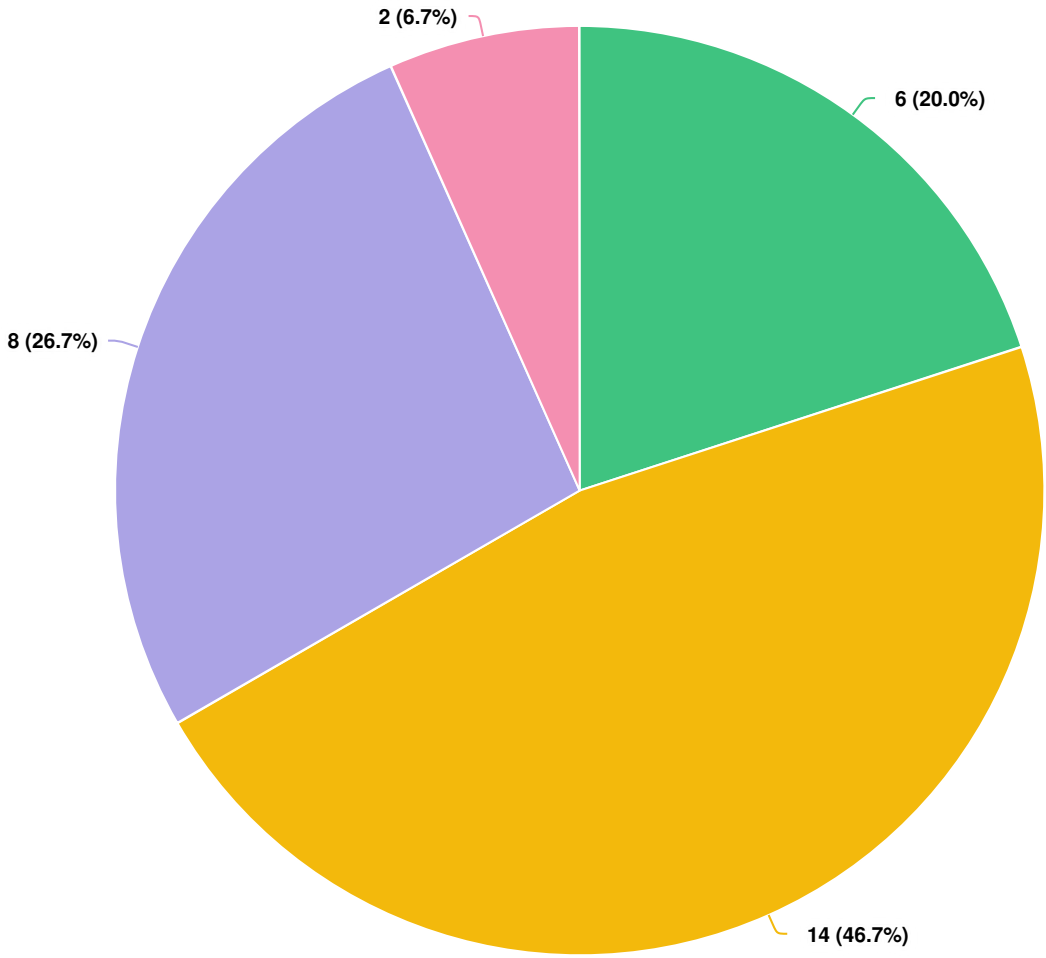
Question options

Every day | A few times a week | About once a week | A few times a month | Rarely | Never

Optional question (258 response(s), 21 skipped)

Question type: Dropdown Question

How safe do you feel using a mobility device on the City's transportation network? (including sidewalks, public transportation etc.)



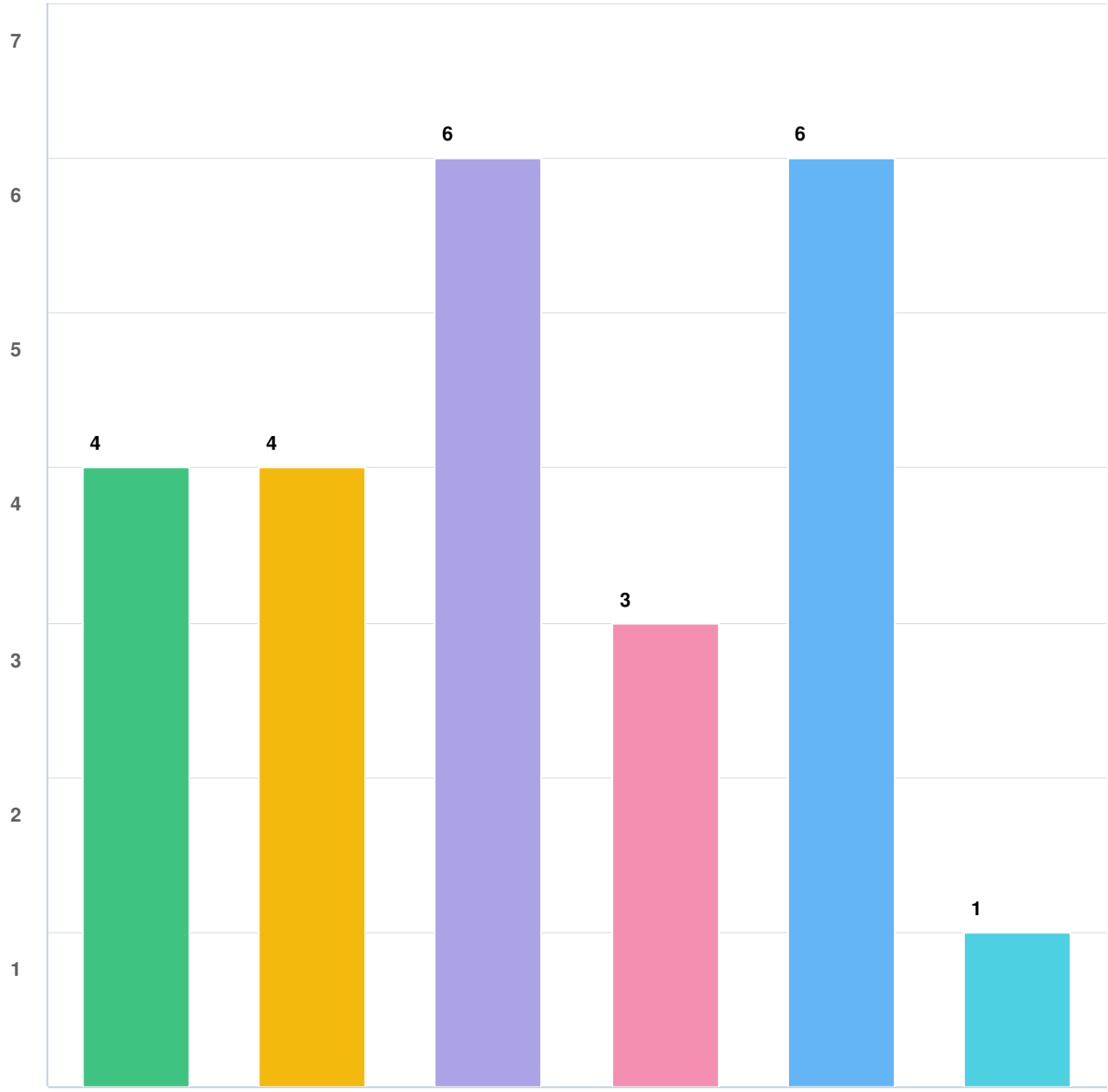
Question options

Somewhat safe Neutral Somewhat unsafe Very unsafe

Optional question (30 response(s), 249 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe using a mobility device



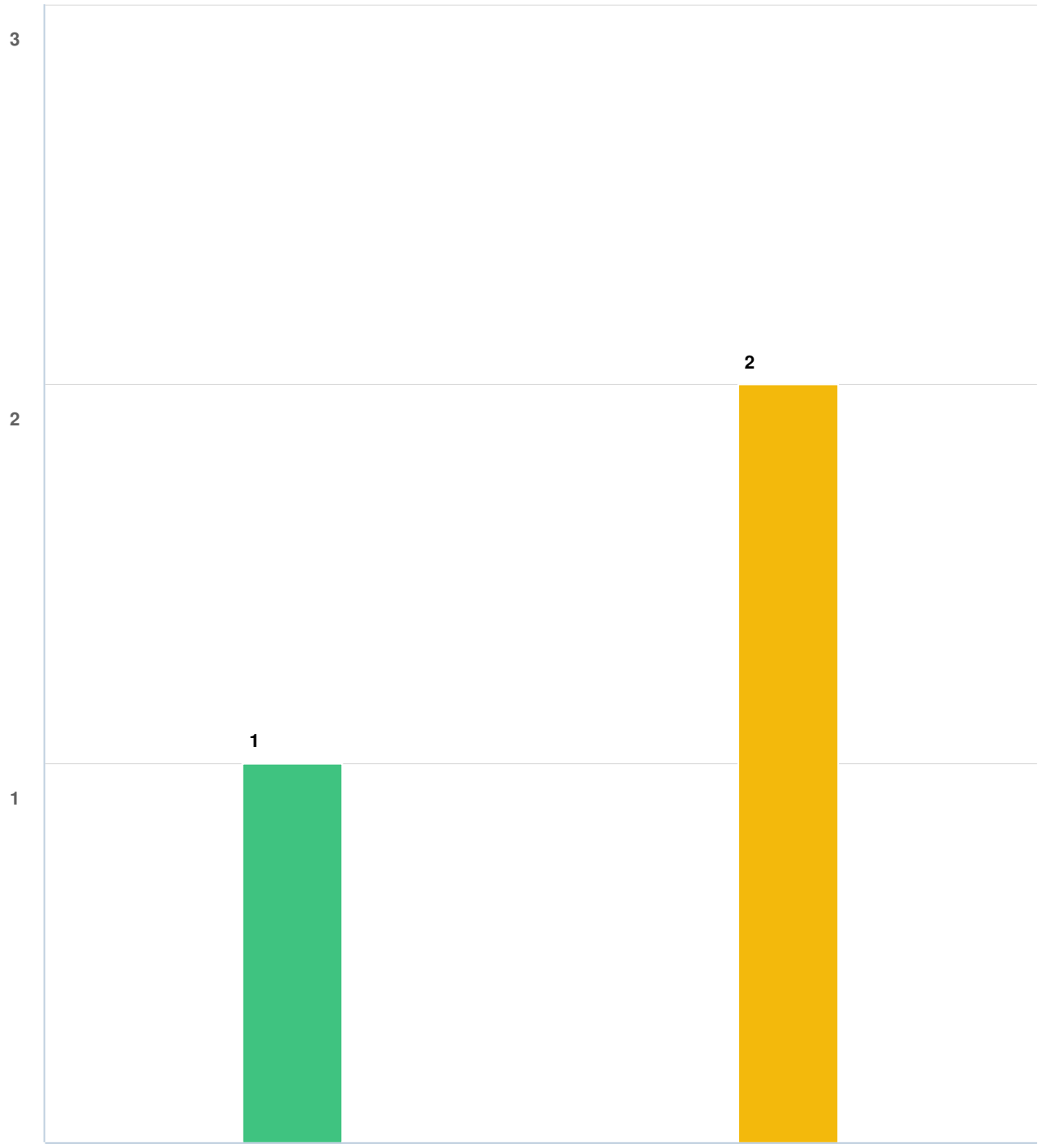
Question options

- Traffic/congestion (e.g. Too many cars, people, or bicycles in regular route etc.)
- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)
- Poor connectivity (e.g. Bike lanes ending abruptly, sidewalks missing, curb cuts not available for mobility devices, roads frequently closed etc.)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)
- Other (please specify)

Optional question (8 response(s), 271 skipped)

Question type: Checkbox Question

Select the top reasons you feel very unsafe using a mobility device



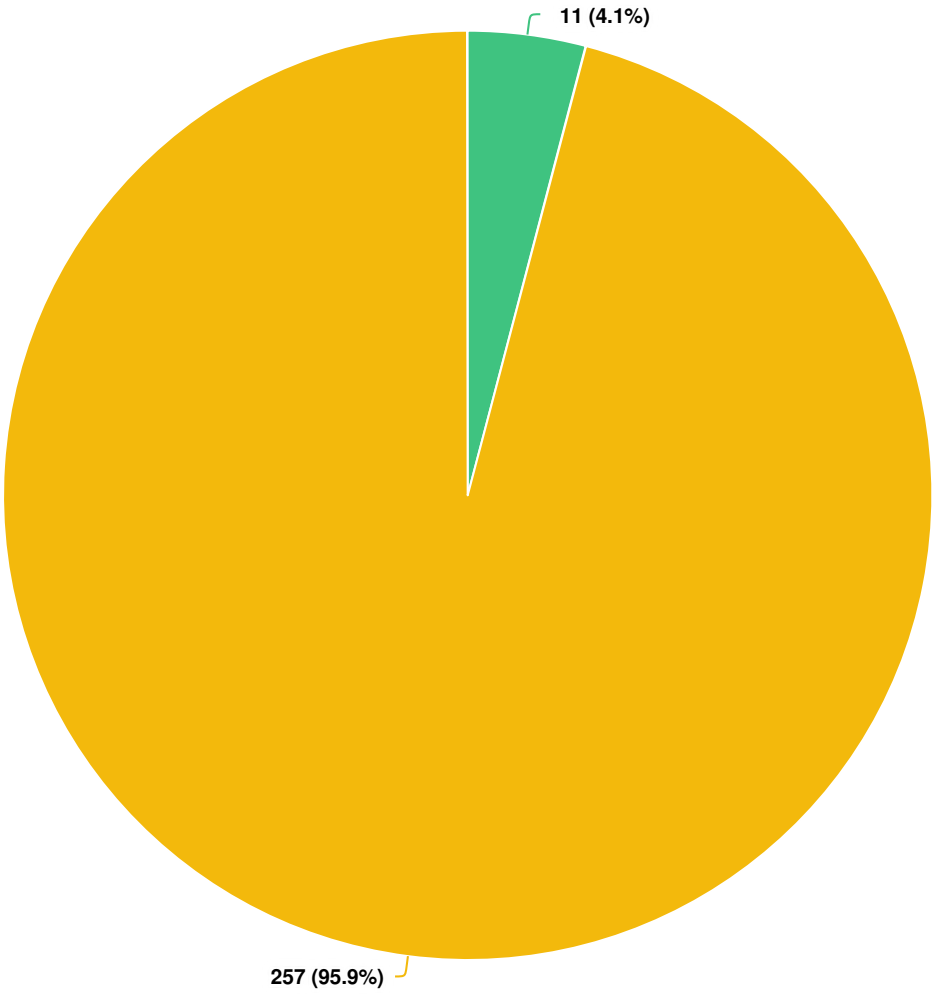
Question options

- Surface condition (e.g. significant cracking, potholes)
- Operational Issue (e.g. snow or ice not cleared, debris frequently not cleared)

Optional question (2 response(s), 277 skipped)

Question type: Checkbox Question

Do you use another mode of transportation?



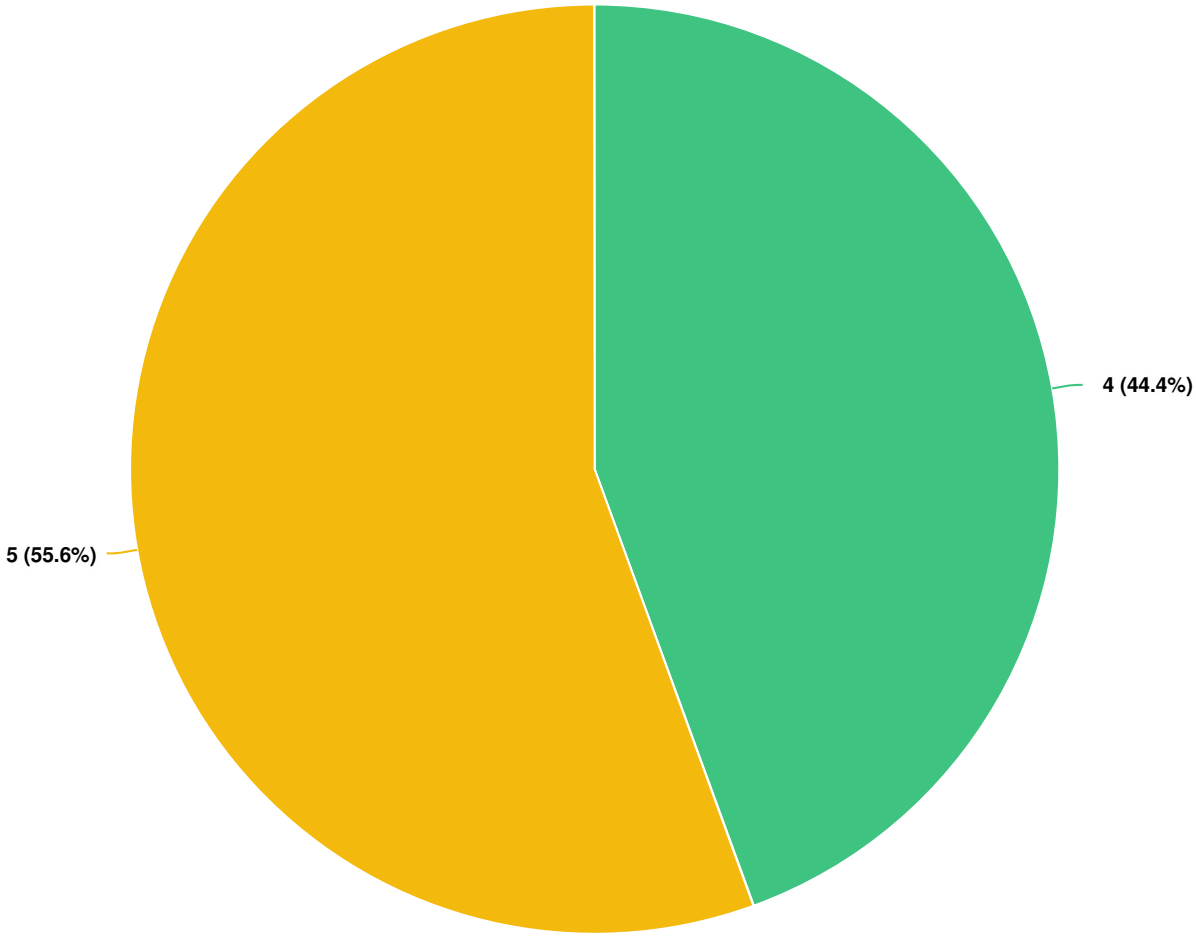
Question options

Yes No

Optional question (268 response(s), 11 skipped)

Question type: Dropdown Question

How often do you use that mode of transportation?



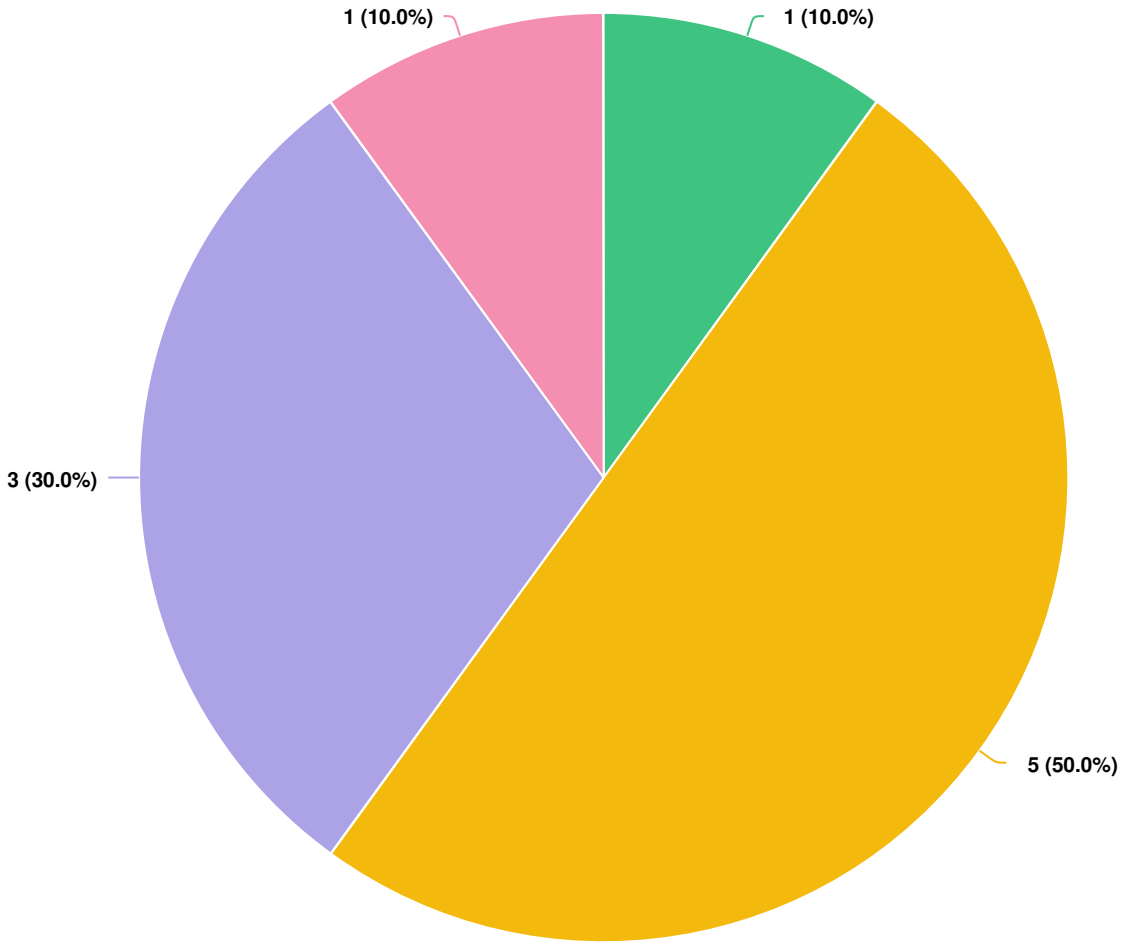
Question options

Every day A few times a week

Optional question (9 response(s), 270 skipped)

Question type: Dropdown Question

How safe do you feel using that mode of transportation on the road network?



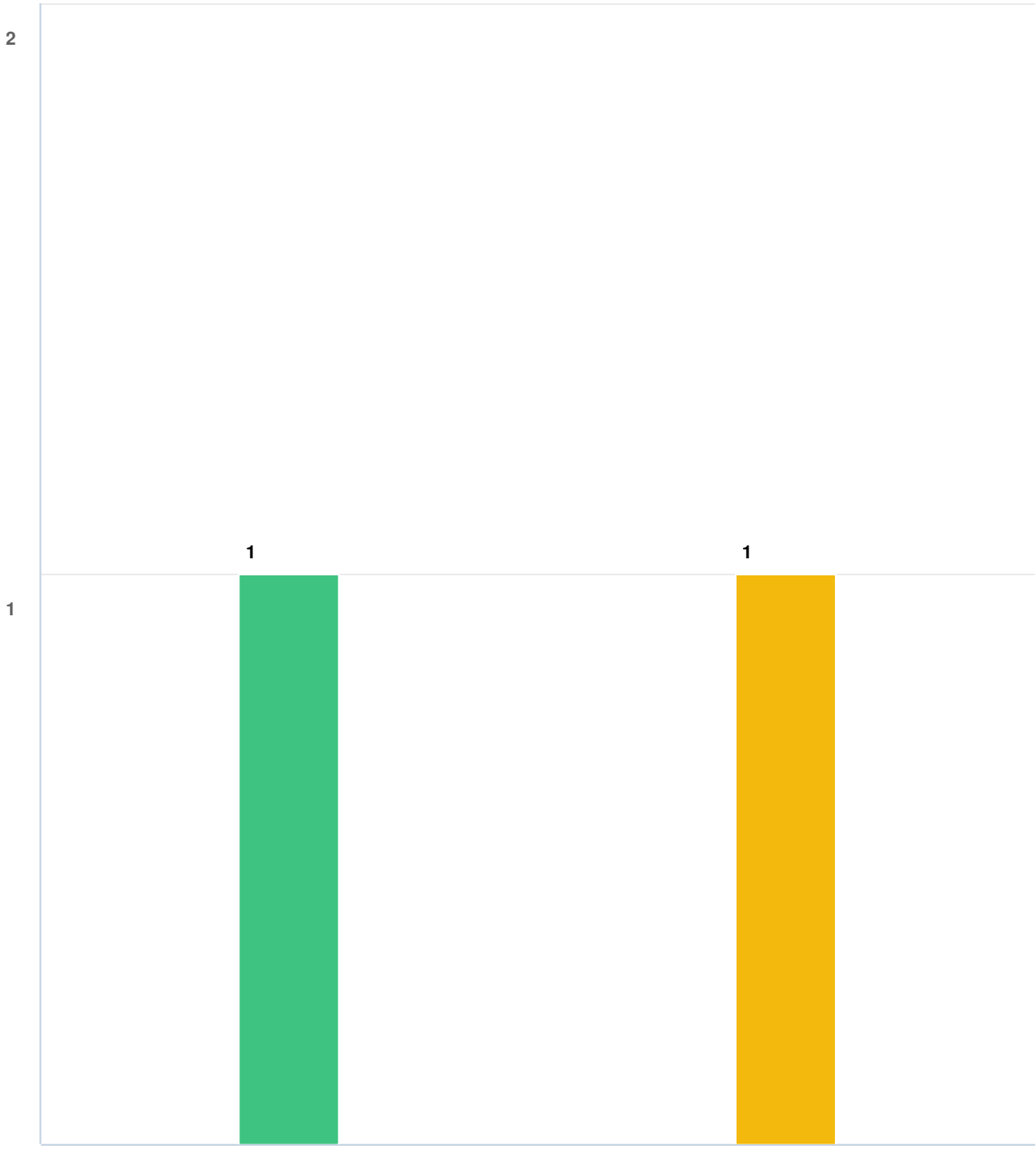
Question options

Very safe Somewhat safe Neutral Somewhat unsafe

Optional question (10 response(s), 269 skipped)

Question type: Dropdown Question

Select the top reasons you feel somewhat unsafe using that mode of transportation



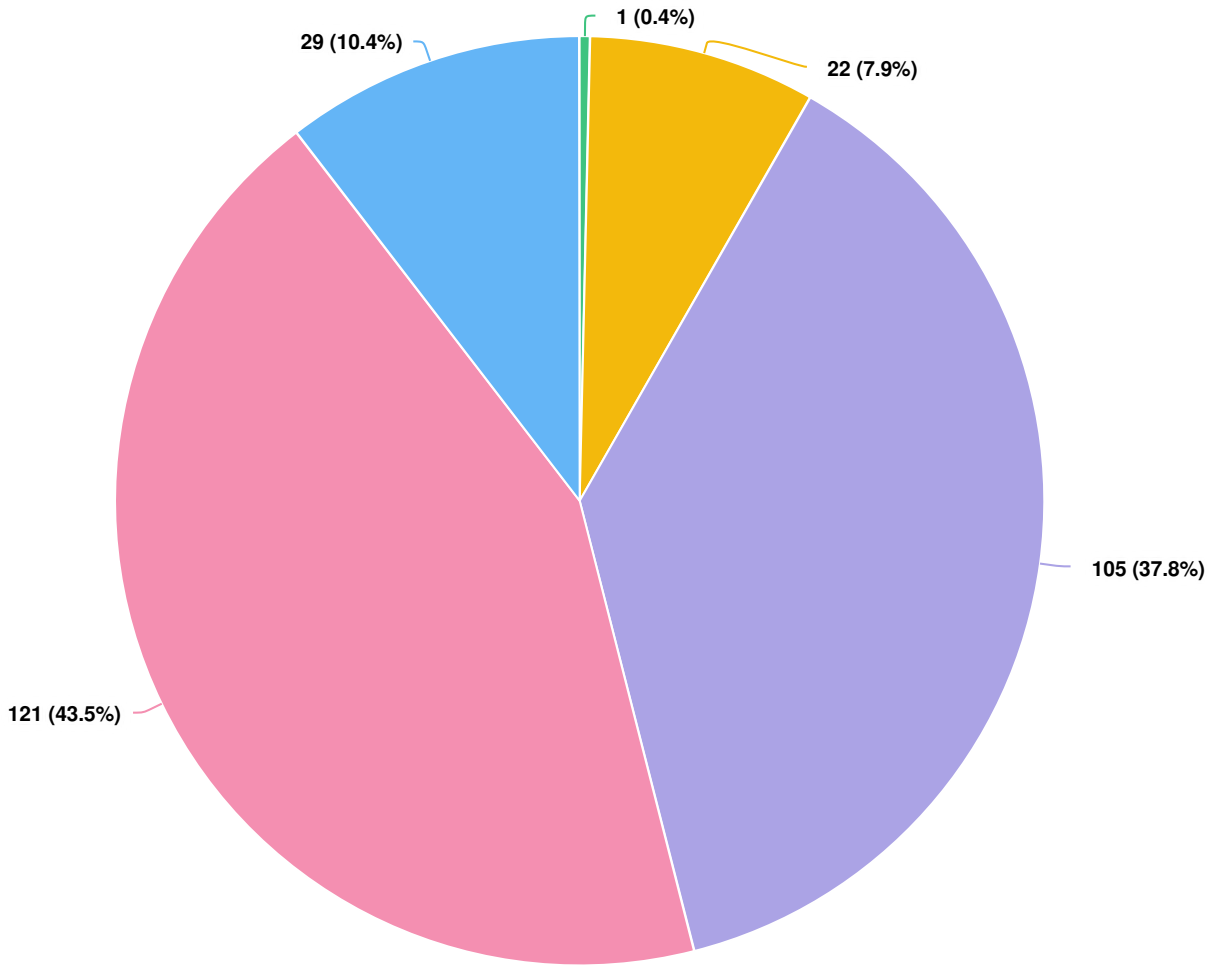
Question options

- Infrastructure Design (e.g. not enough safety features or separation, poor drainage, steep slope, slippery when wet etc.)
- Surface condition (e.g. significant cracking, potholes)

Optional question (1 response(s), 278 skipped)

Question type: Checkbox Question

Based on the images above, how would you rate the surface condition (quality) of the roads in Hamilton?



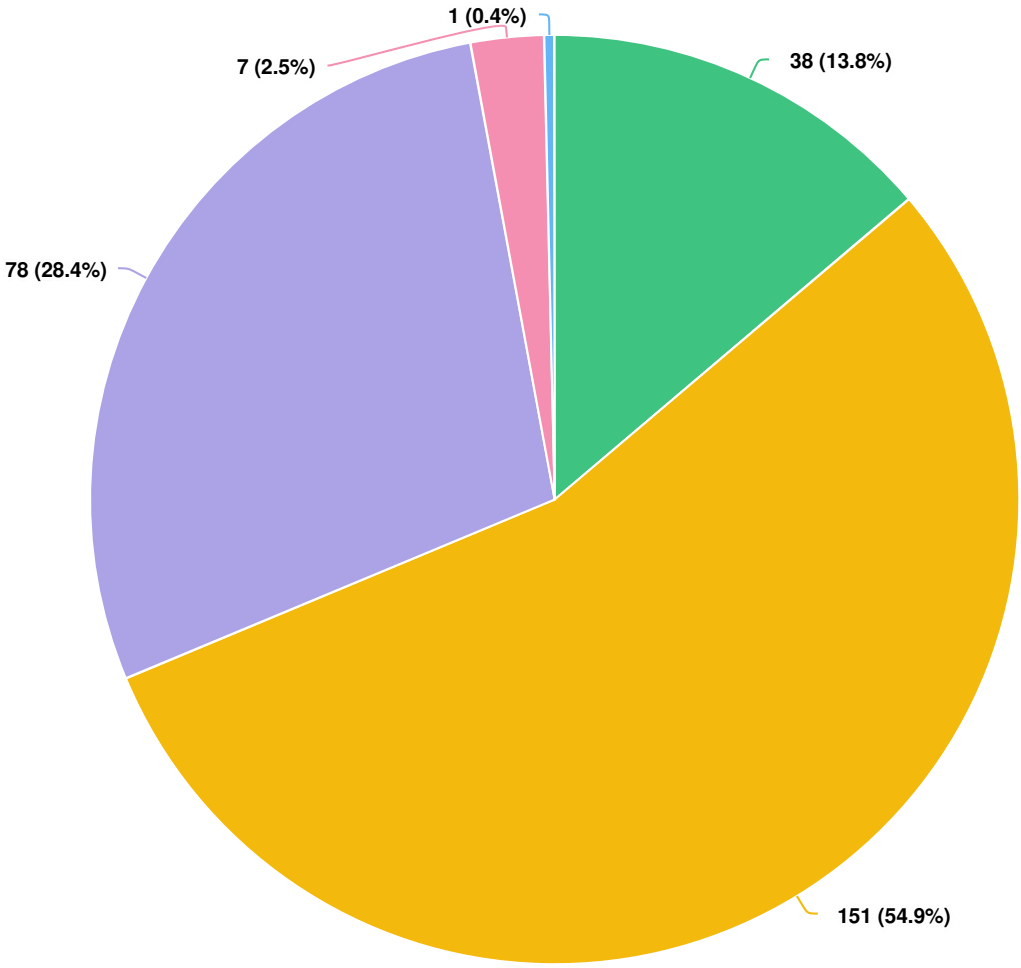
Question options

Very Good Good Fair Poor Very poor

Optional question (278 response(s), 1 skipped)

Question type: Dropdown Question

Based on the images above, what minimum surface condition (quality) of the roads would you like to see?



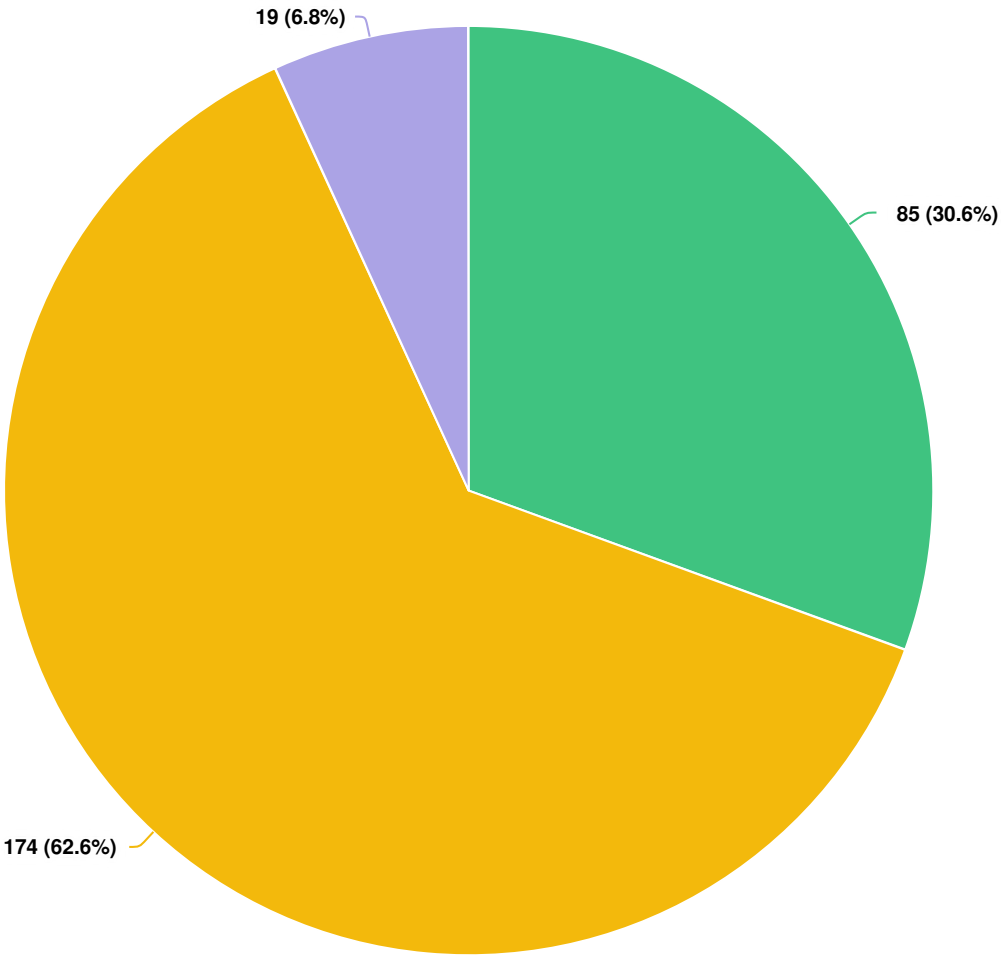
Question options

Very Good Good Fair Poor Very Poor

Optional question (275 response(s), 4 skipped)

Question type: Dropdown Question

Based on the images above, how would you rate the surface condition (quality) of the sidewalks in Hamilton?



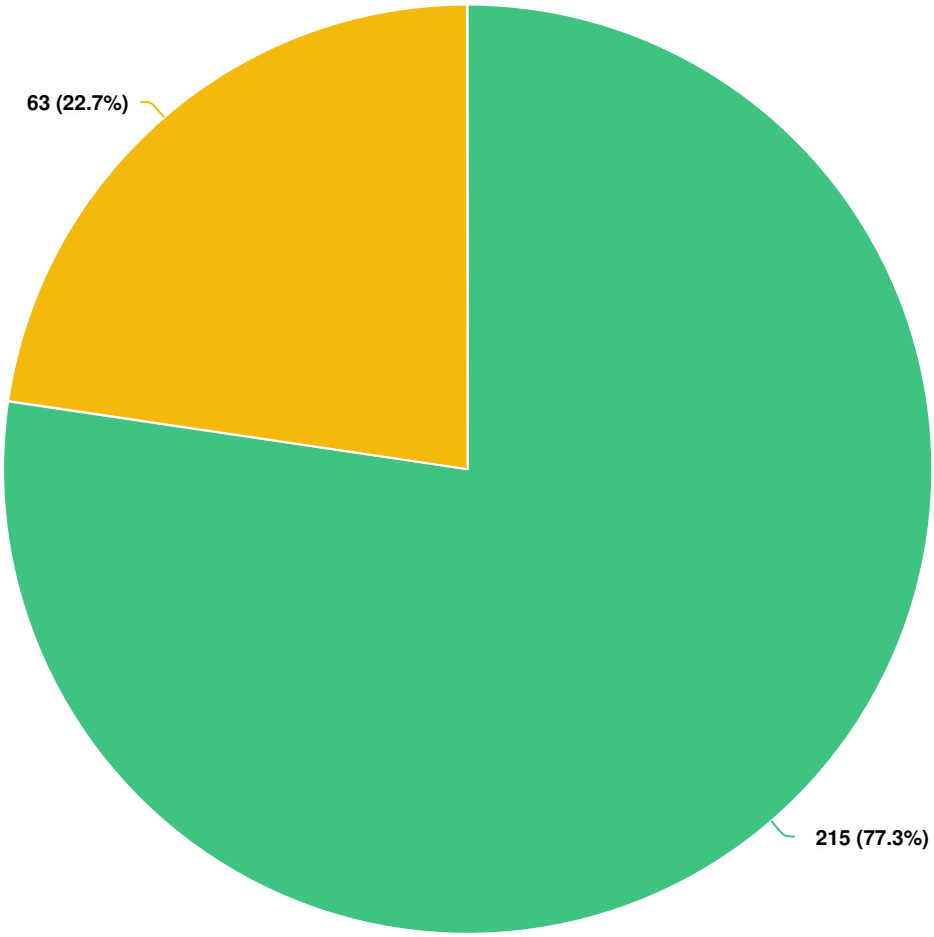
Question options

Good Fair Poor

Optional question (278 response(s), 1 skipped)

Question type: Dropdown Question

Based on the images above, what minimum surface condition (quality) of the sidewalks would you like to see?



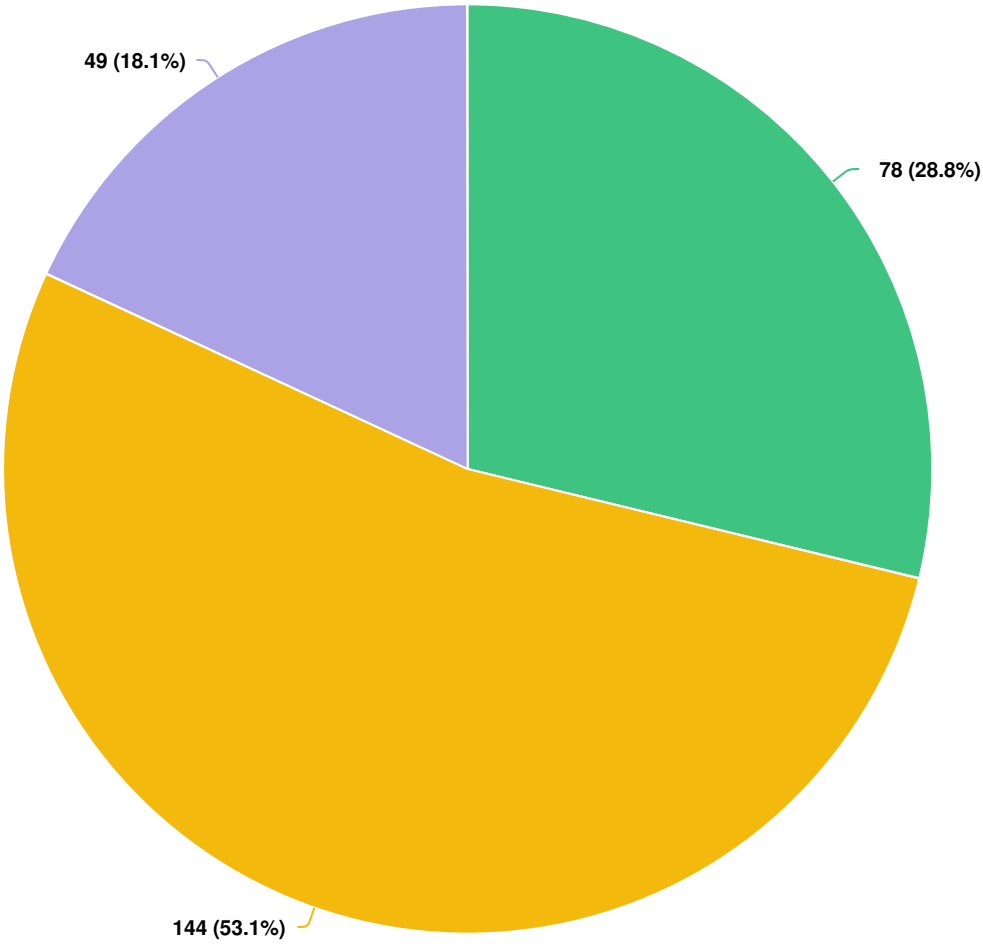
Question options

Good Fair

Optional question (278 response(s), 1 skipped)

Question type: Dropdown Question

Based on the images above, how would you rate the surface condition (quality) of the bike lanes in Hamilton?



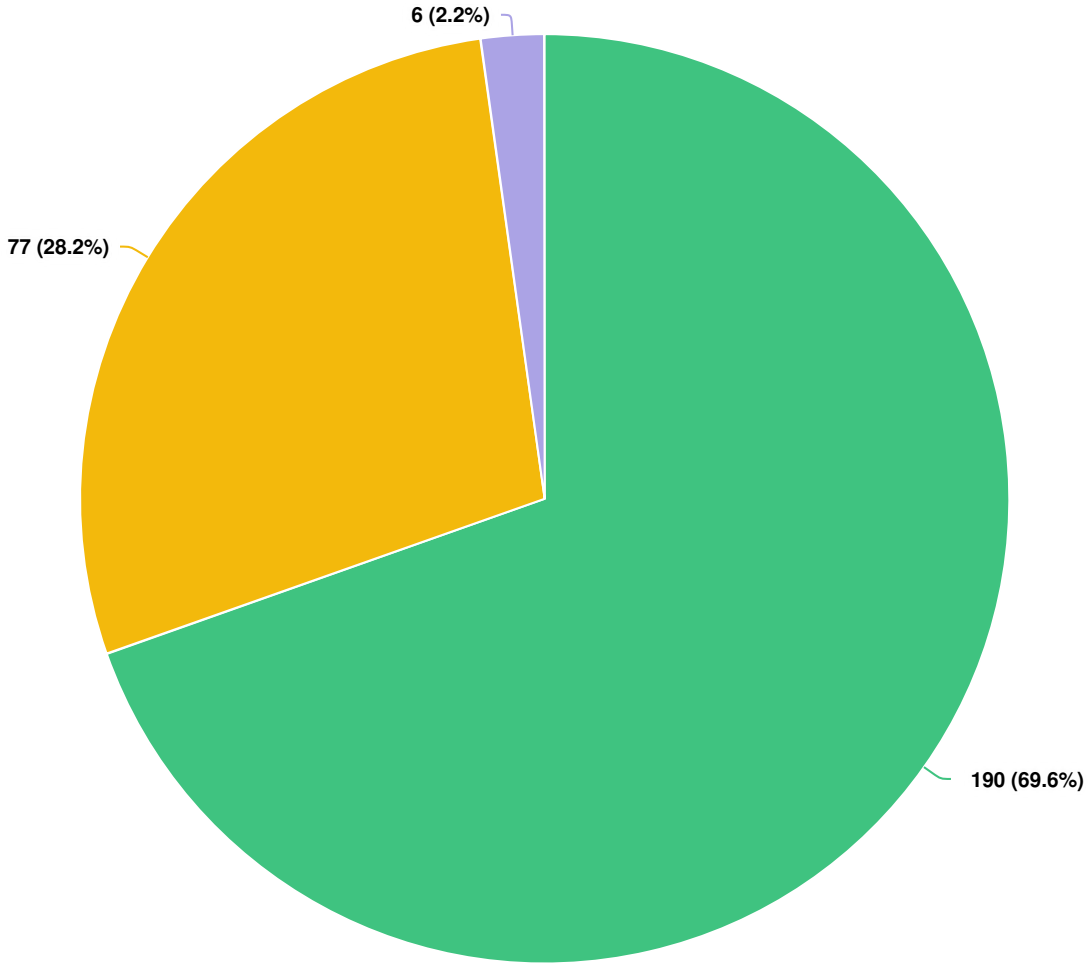
Question options

Good Fair Poor

Optional question (271 response(s), 8 skipped)

Question type: Dropdown Question

Based on the images above, what minimum surface condition (quality) of the bike lanes would you like to see?



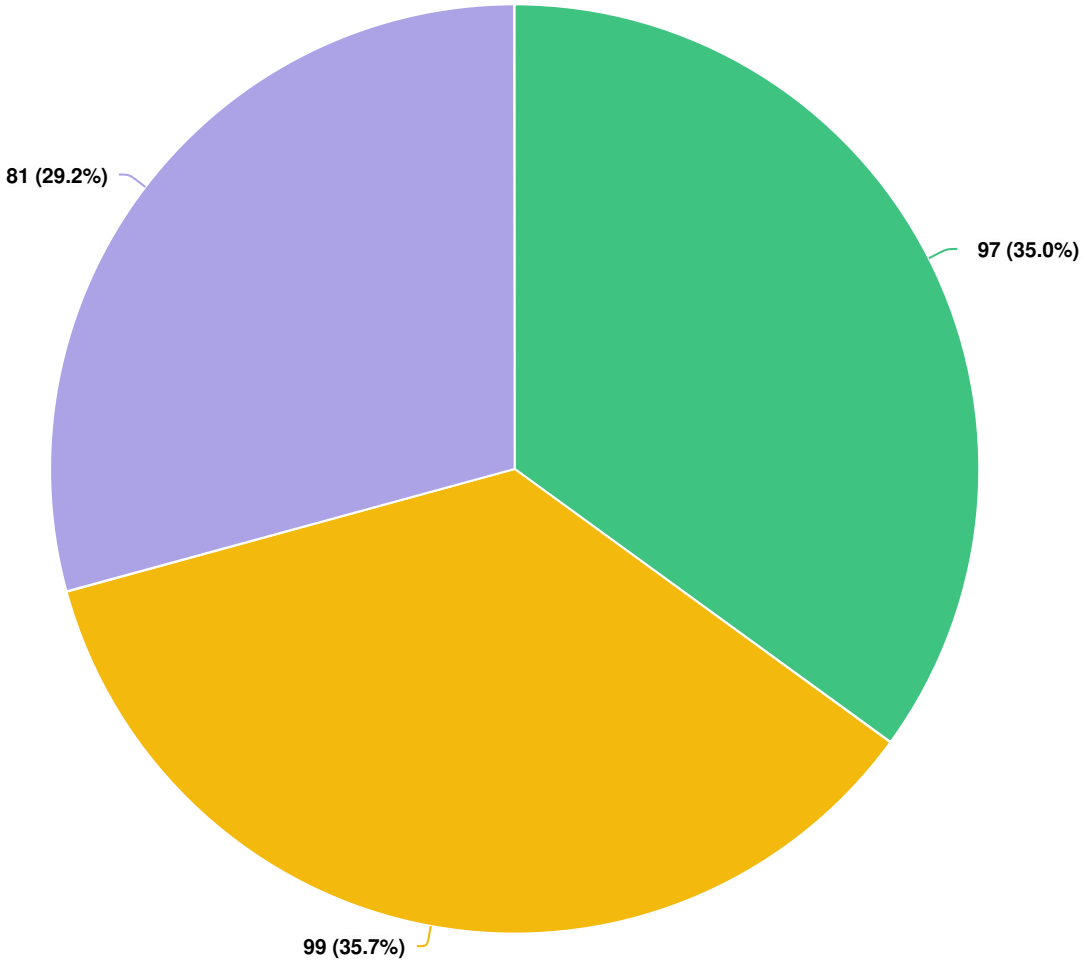
Question options

Good Fair Poor

Optional question (273 response(s), 6 skipped)

Question type: Dropdown Question

How do you feel about traffic or congestion in Hamilton?



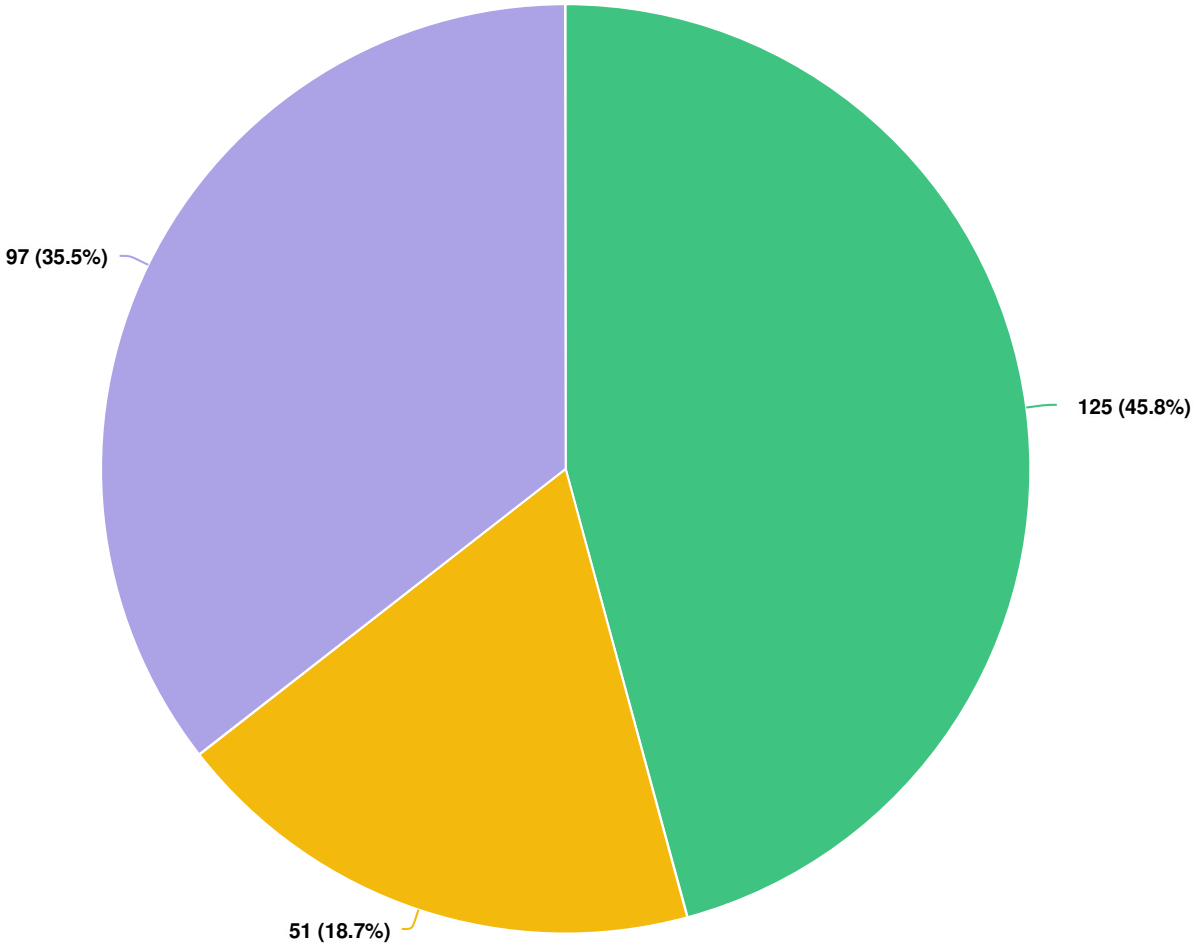
Question options

Traffic levels are acceptable | Neutral | Traffic levels are unacceptable

Optional question (277 response(s), 2 skipped)

Question type: Dropdown Question

How is your commute affected if one of the escarpment access routes is closed due to construction or a collision?



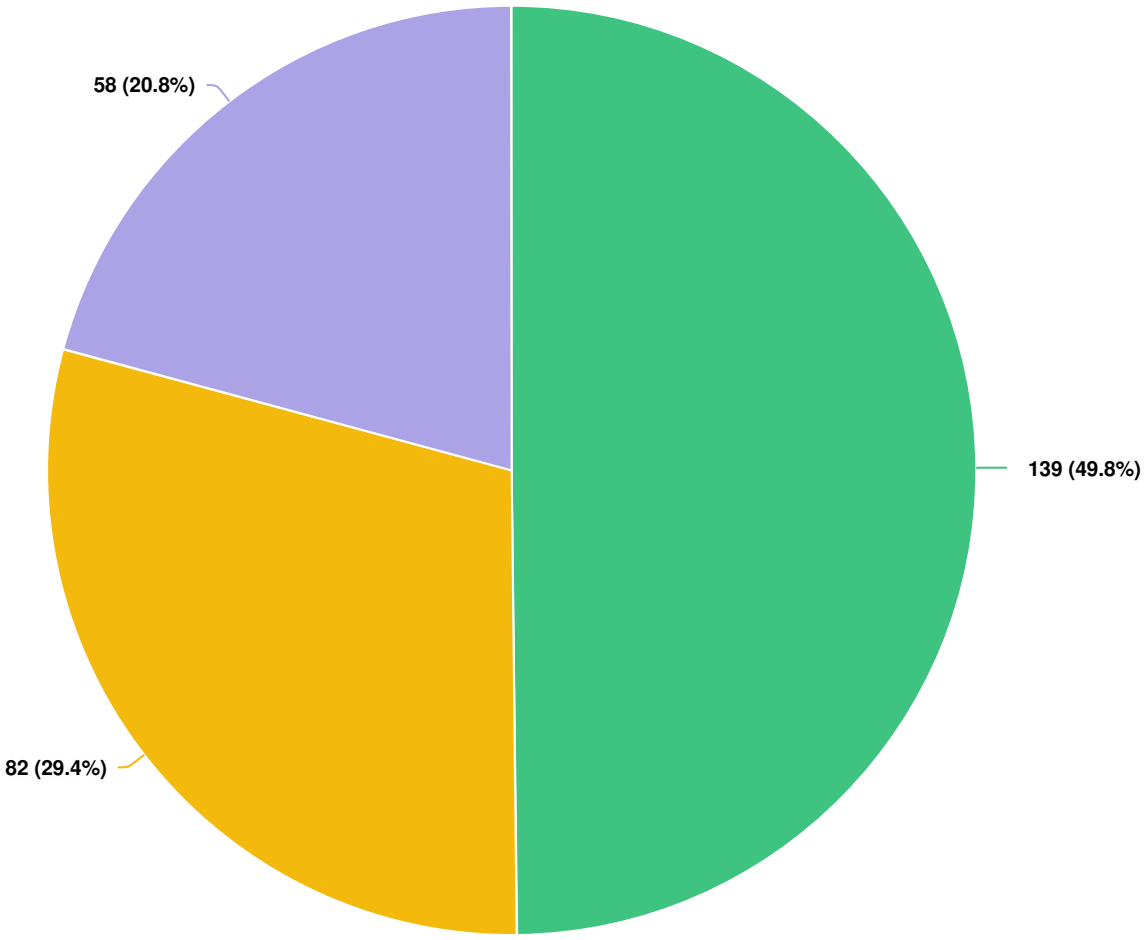
Question options

- My commute is not affected by escarpment access closures.
- Neutral
- My commute is affected by escarpment access closures.

Optional question (273 response(s), 6 skipped)

Question type: Dropdown Question

When road closures occur for maintenance or construction work, do you think the City provides ample notification (e.g. signage, updates through local media) to allow you to find alternate routes?



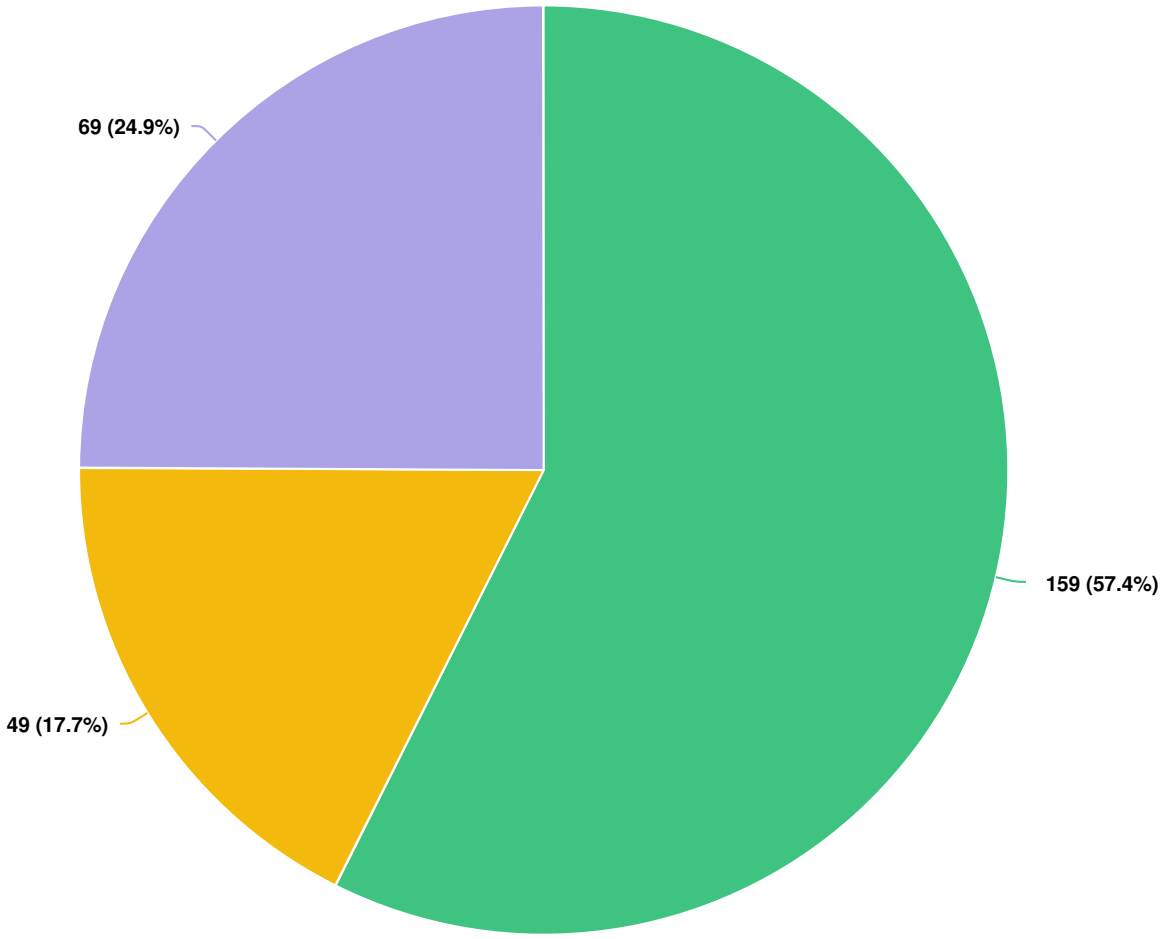
Question options

Yes, I think there is ample notice of road work. Neutral No, I do not think there is ample notice of road work.

Optional question (279 response(s), 0 skipped)

Question type: Dropdown Question

During a winter storm with at least 5cm of snow, do you think roads are plowed in a reasonable amount of time?



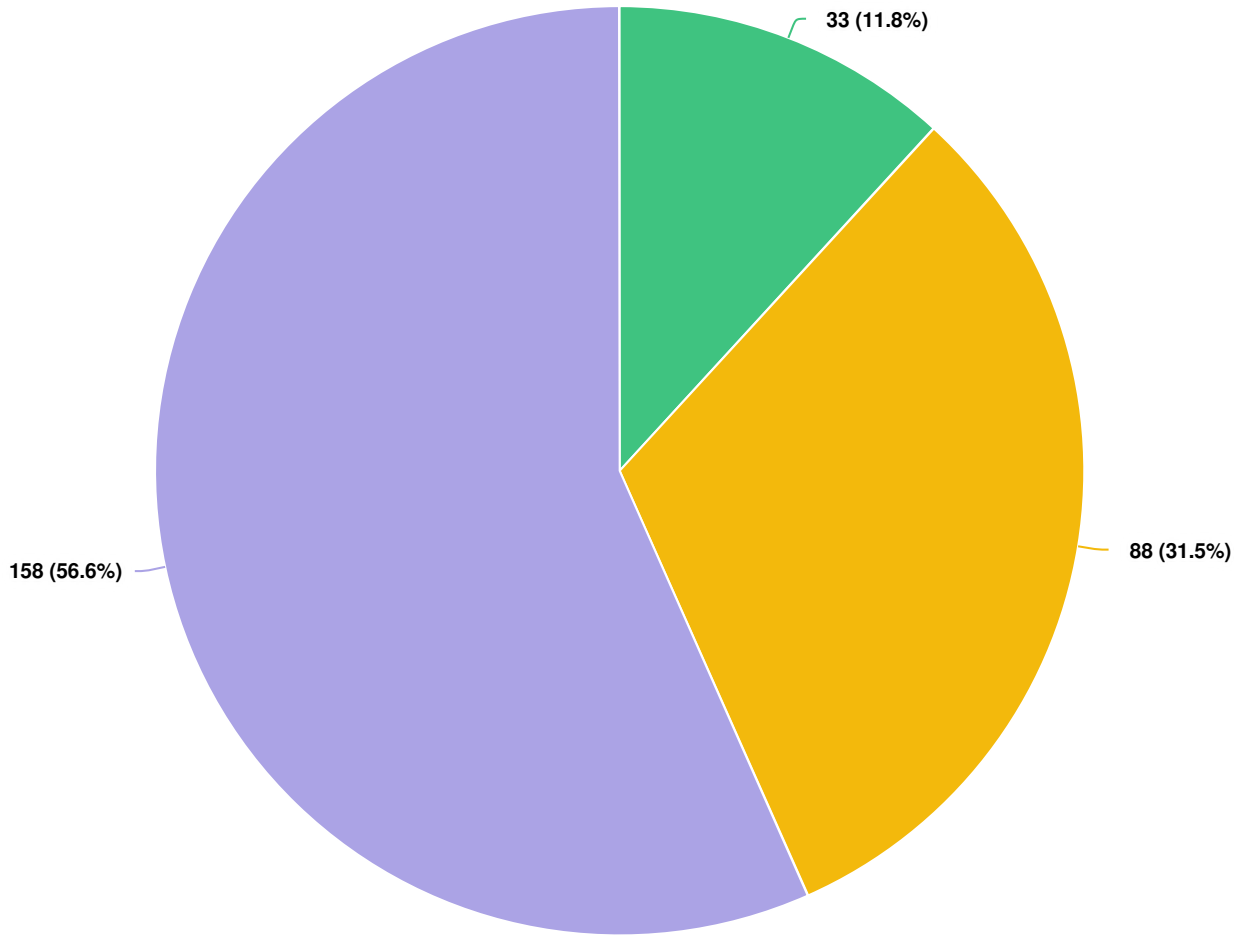
Question options

- Yes, I think the roads are plowed in a reasonable amount of time.
- Neutral
- No, I do not think the roads are plowed in a reasonable amount of time.

Optional question (277 response(s), 2 skipped)

Question type: Dropdown Question

Do you think potholes are fixed in a timely manner?



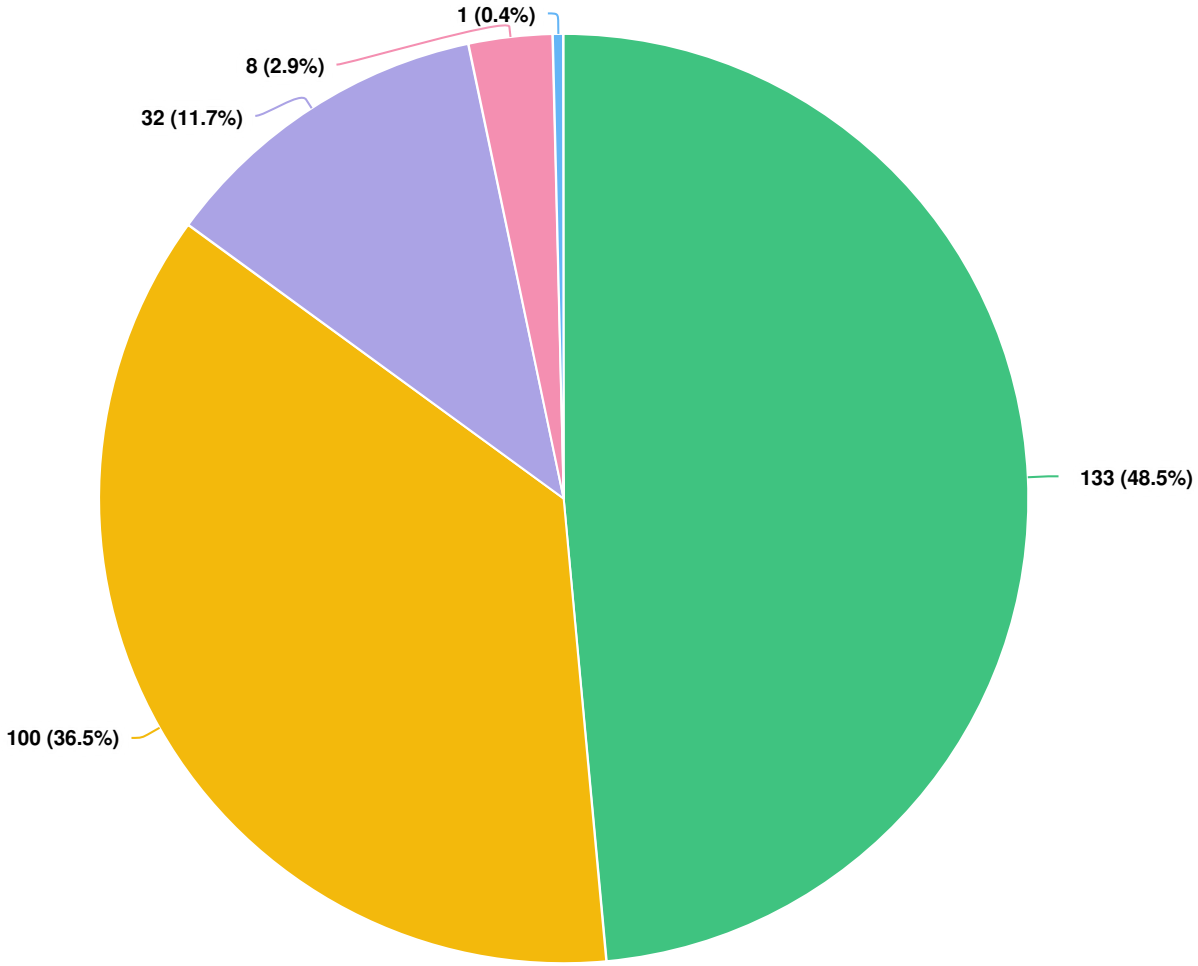
Question options

Yes, I think potholes are fixed in a timely manner. Neutral No, I do not think potholes are fixed in a timely manner

Optional question (279 response(s), 0 skipped)

Question type: Dropdown Question

Do you believe Hamilton's bridges and culverts are generally safe to travel over?



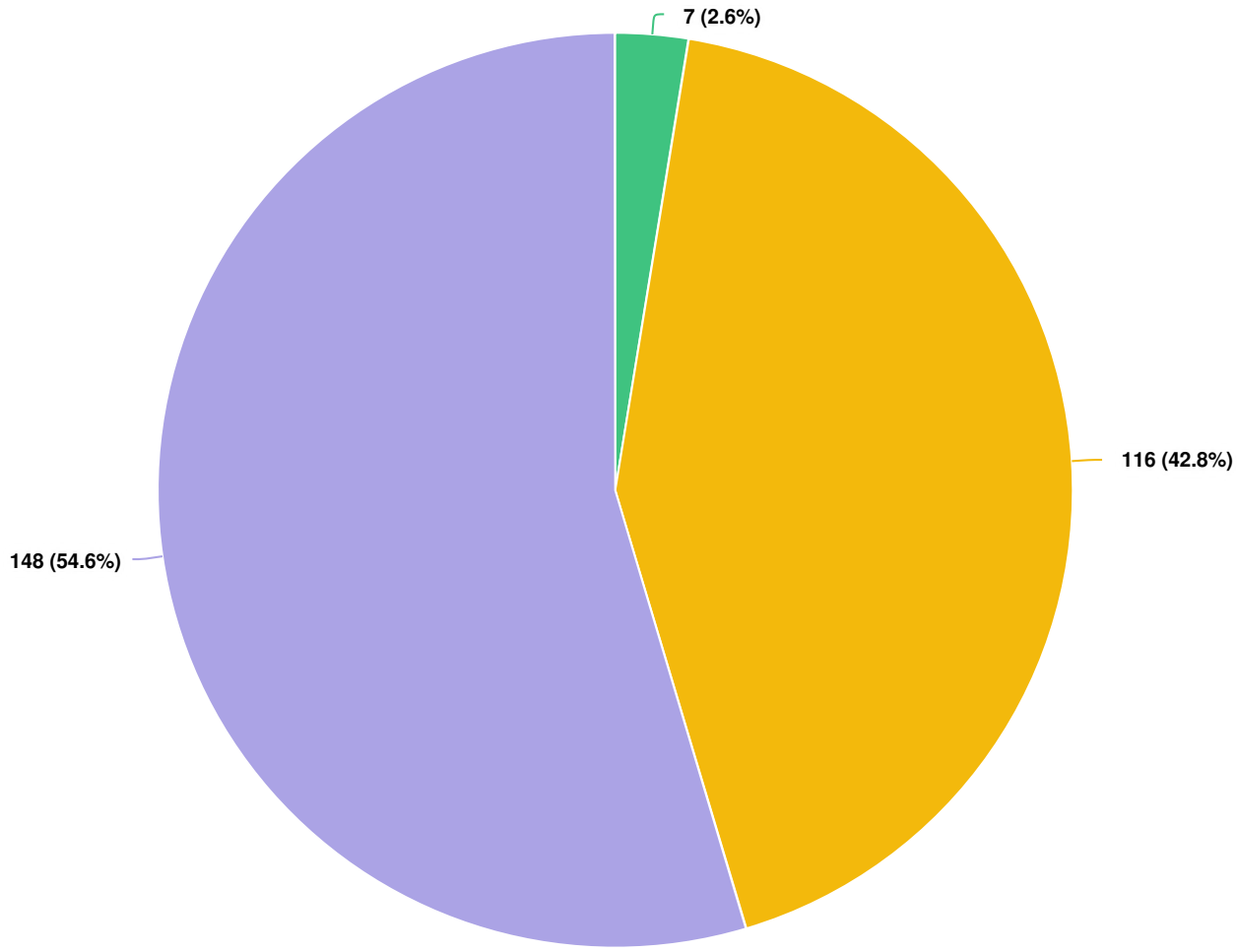
Question options

Very safe | Somewhat safe | Neutral | Somewhat Unsafe | Very Unsafe

Optional question (274 response(s), 5 skipped)

Question type: Dropdown Question

When traveling over the bridges and culverts in Hamilton do you feel they are generally in good condition?



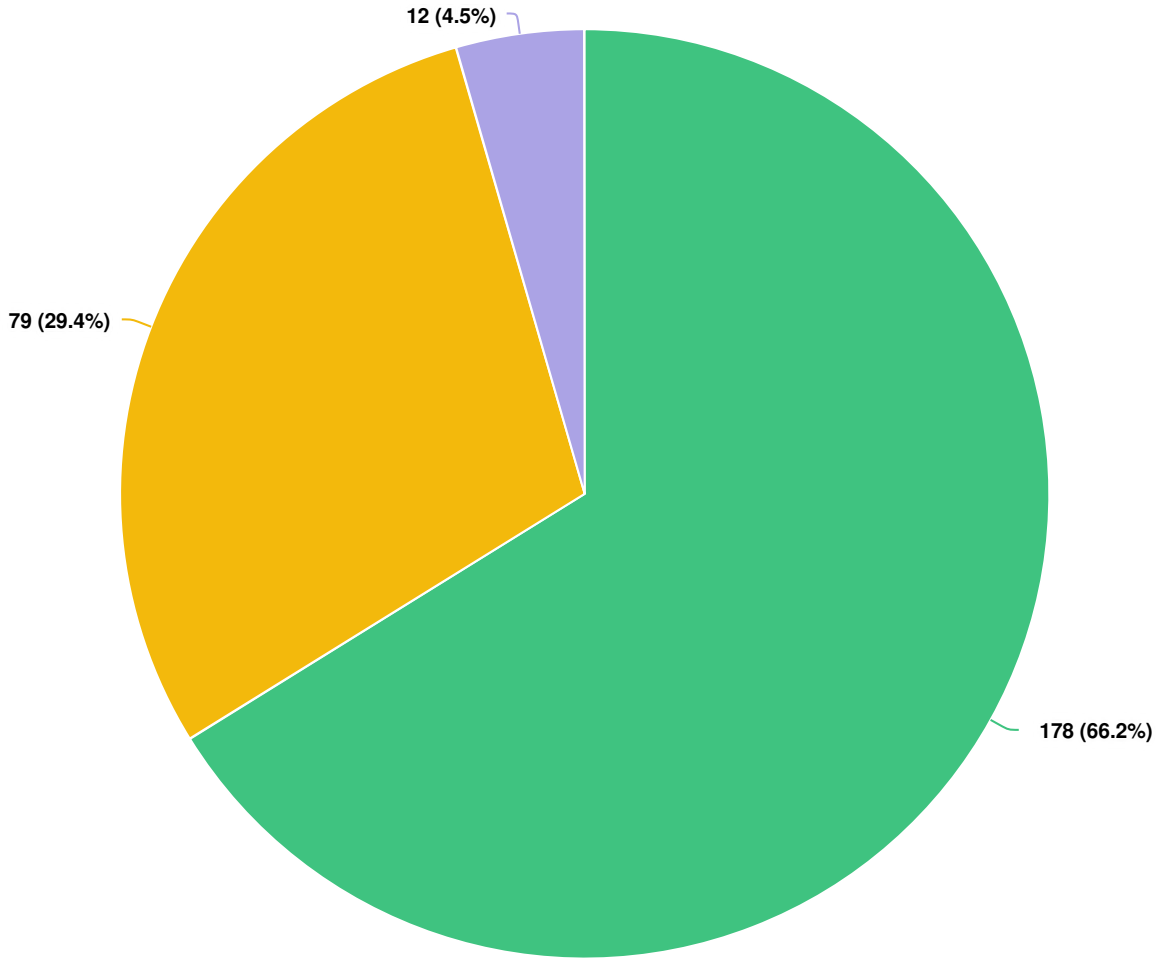
Question options

Poor Fair Good

Optional question (271 response(s), 8 skipped)

Question type: Dropdown Question

When traveling over the bridges and culverts in Hamilton do you feel there are traffic impacts leading up to the bridge?



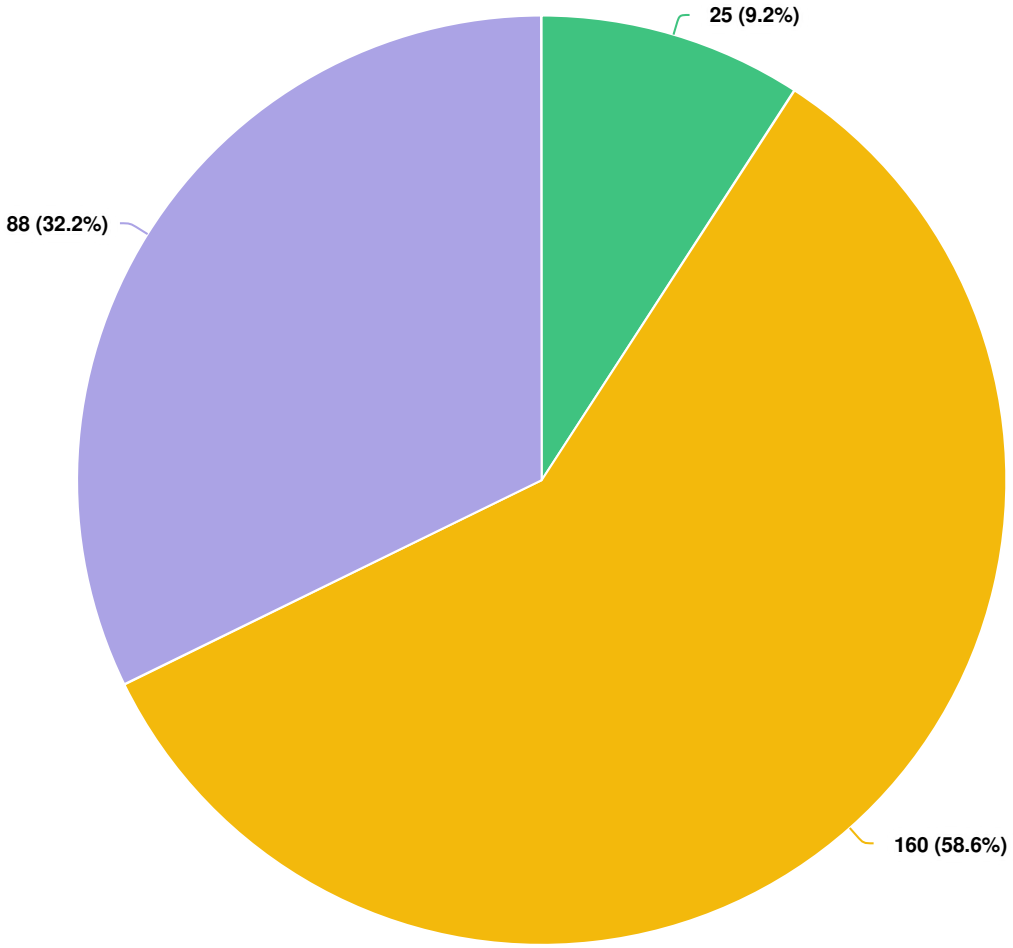
Question options

- Traffic levels are acceptable
- Traffic does affect my travel some of the time
- There are significant traffic issues around bridges/culverts

Optional question (269 response(s), 10 skipped)

Question type: Dropdown Question

Are there bridges (pedestrian and/or vehicular) that are currently closed that you would typically use if they were not closed?



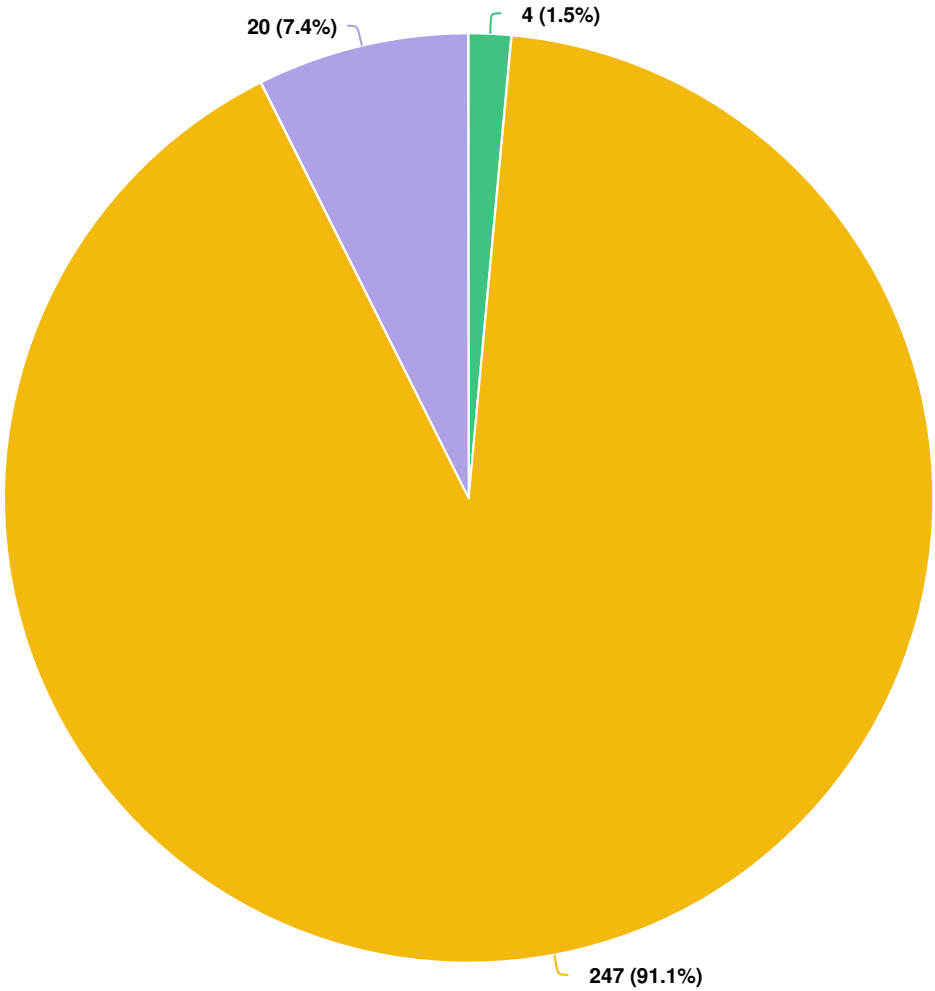
Question options

Yes No Not sure

Optional question (273 response(s), 6 skipped)

Question type: Dropdown Question

Are there any bridges or culverts that you do not use due to either height or weight restrictions?



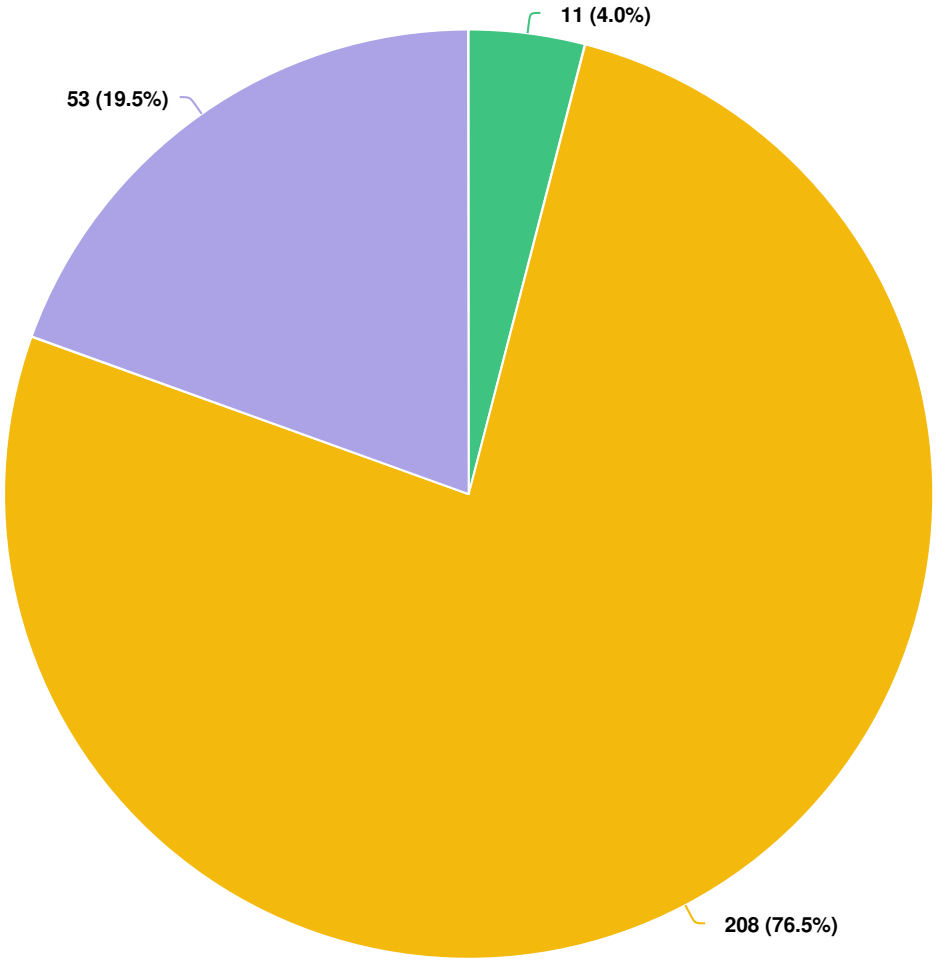
Question options

Yes No Not sure

Optional question (271 response(s), 8 skipped)

Question type: Dropdown Question

Do you know of any culverts that are either partially or completely blocked?



Question options

Yes No Not sure

Optional question (272 response(s), 7 skipped)

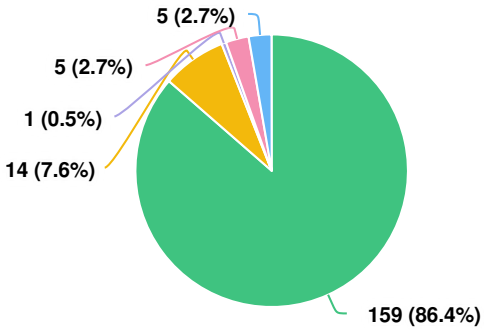
Question type: Dropdown Question

ENGAGEMENT TOOL: SURVEY TOOL

Asset Management - Drinking water, Stormwater and Wastewater

Visitors 227	Contributors 183	CONTRIBUTIONS 184

How would you best describe yourself?



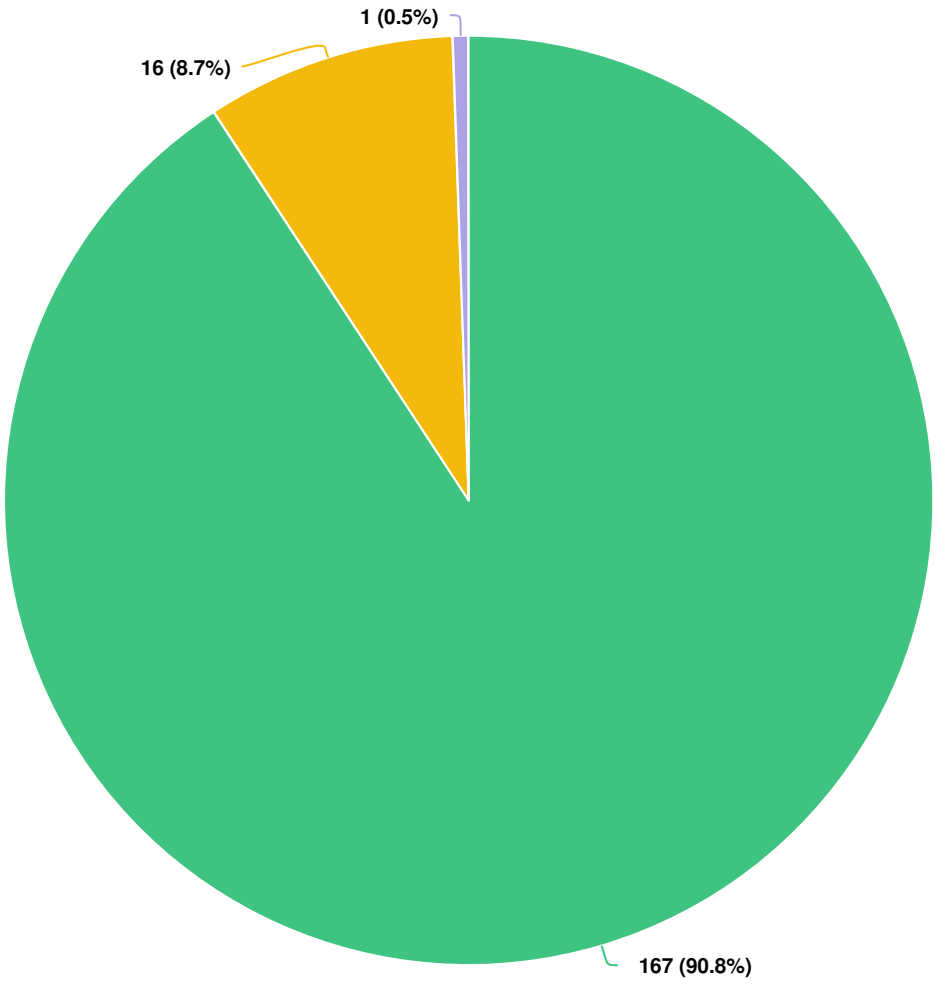
Question options

- I live in Hamilton
- I live in Hamilton and I also run a Hamilton-based business
- I don't live in Hamilton, but I run a Hamilton-based business
- I work in Hamilton (but I live somewhere else)
- Other (please specify)

Mandatory Question (184 response(s))

Question type: Dropdown Question

Are you connected to Hamilton's municipal water network?



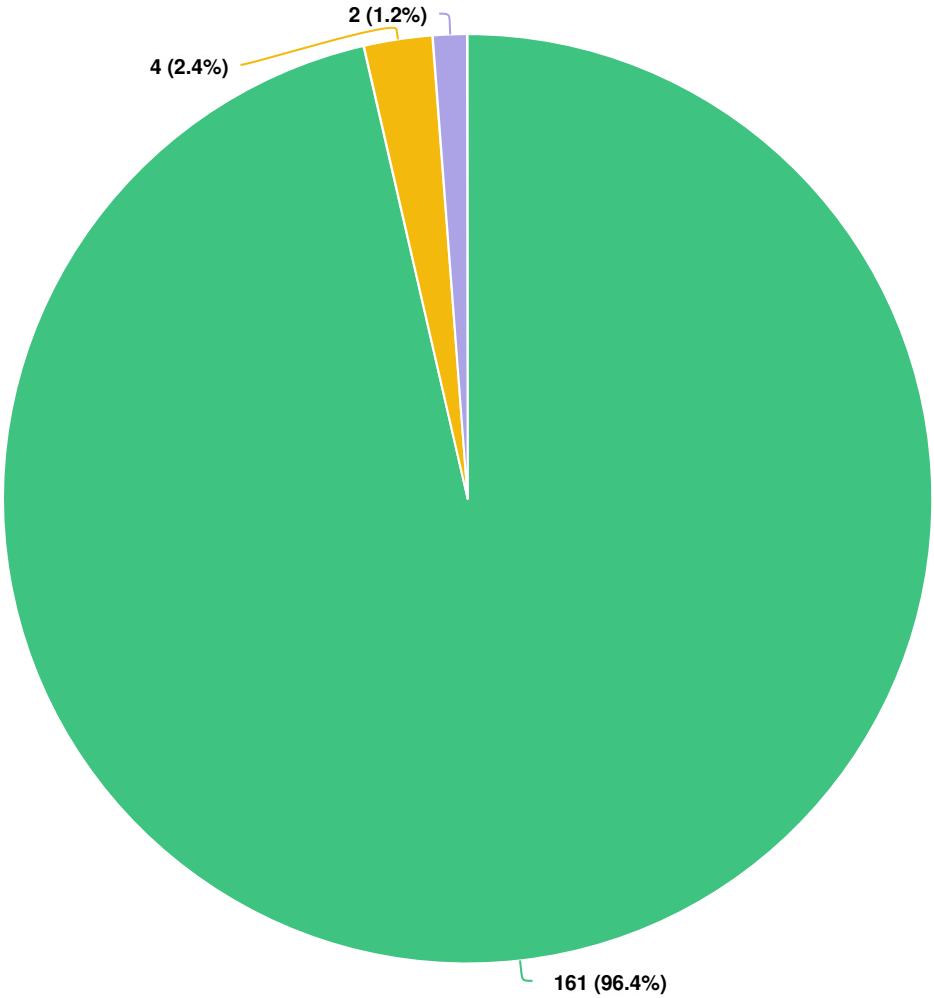
Question options

Yes No Not sure

Mandatory Question (184 response(s))

Question type: Dropdown Question

Do you feel that drinking water is readily available with minimal to no service interruptions?



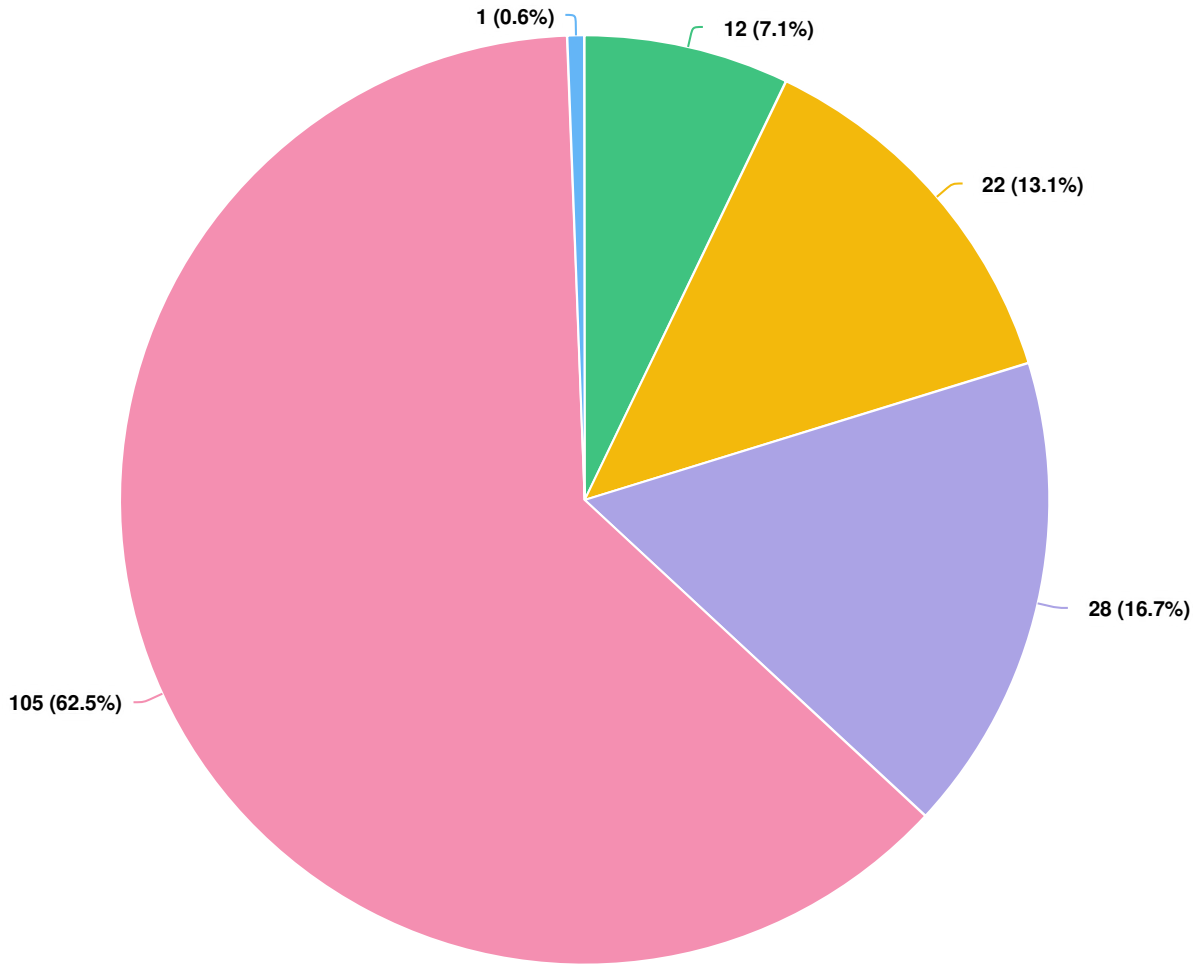
Question options

Yes No Not sure

Optional question (167 response(s), 17 skipped)

Question type: Dropdown Question

Does your drinking water from the tap ever have an unusual taste or odor?



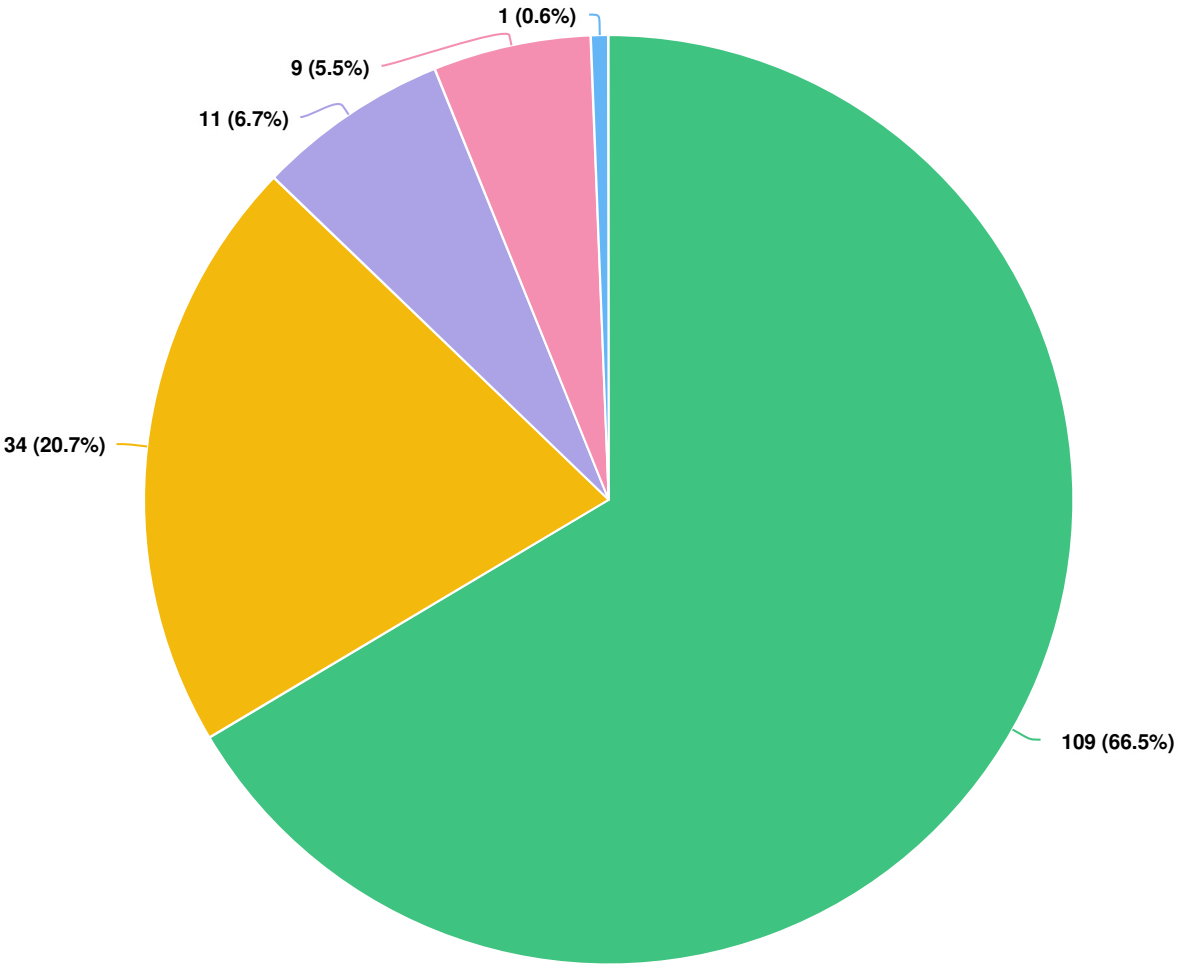
Question options

Unusual taste | Unusual odour | Both | Neither | Other (please specify)

Optional question (168 response(s), 16 skipped)

Question type: Dropdown Question

How safe do you feel the water from your tap is?



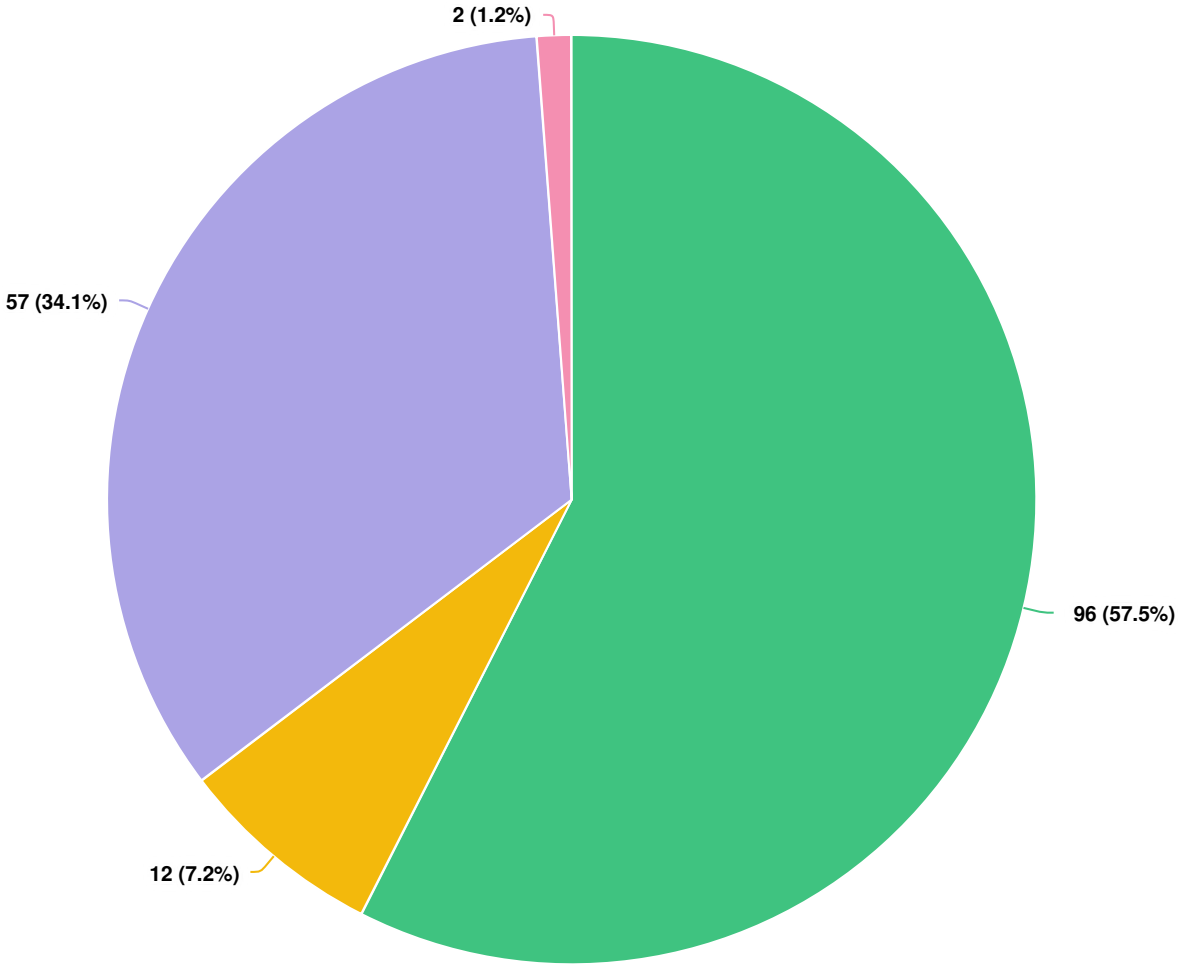
Question options

Very safe | Somewhat safe | Neutral | Not very safe | Not safe at all

Optional question (164 response(s), 20 skipped)

Question type: Dropdown Question

What is your preferred type of drinking water?



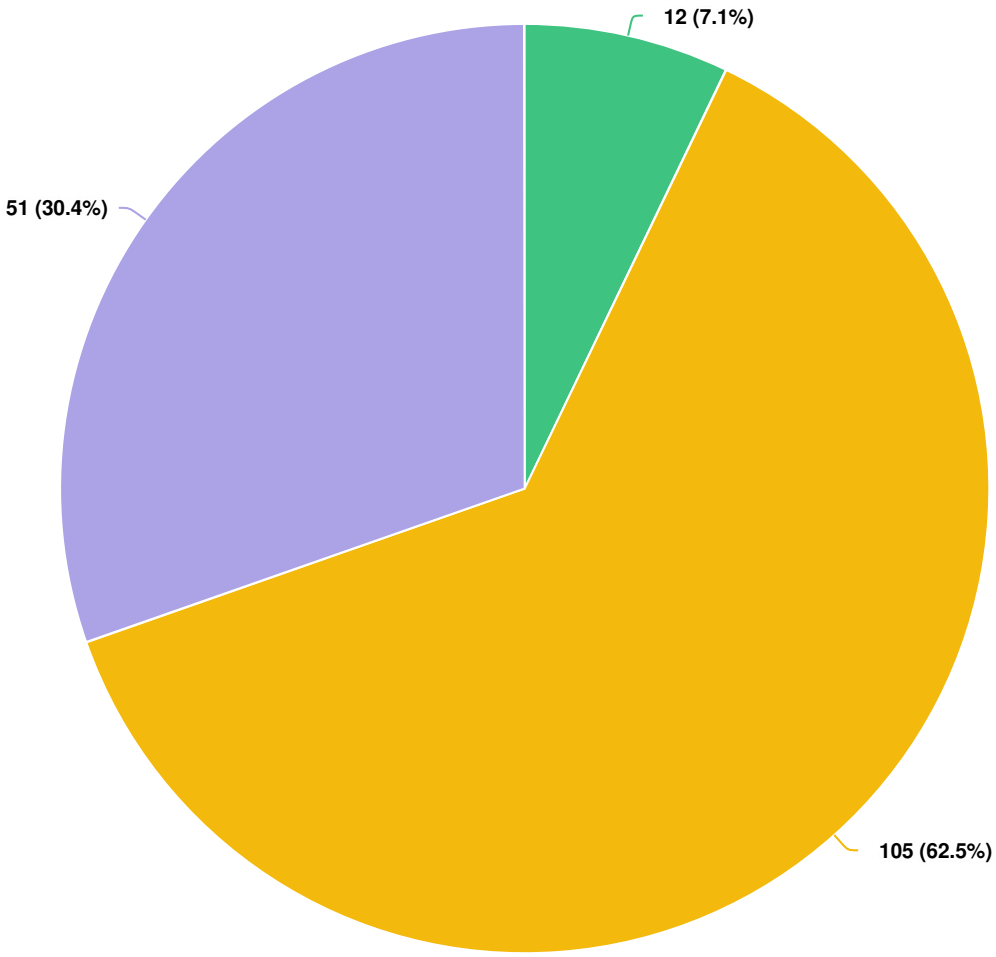
Question options

- Tap water
- Bottled water
- Filtered water (through fridge filtration, brita, reverse osmosis, etc.)
- Other (please specify)

Optional question (167 response(s), 17 skipped)

Question type: Dropdown Question

Do you know if your water is currently supplied to your residence by a lead service pipe?



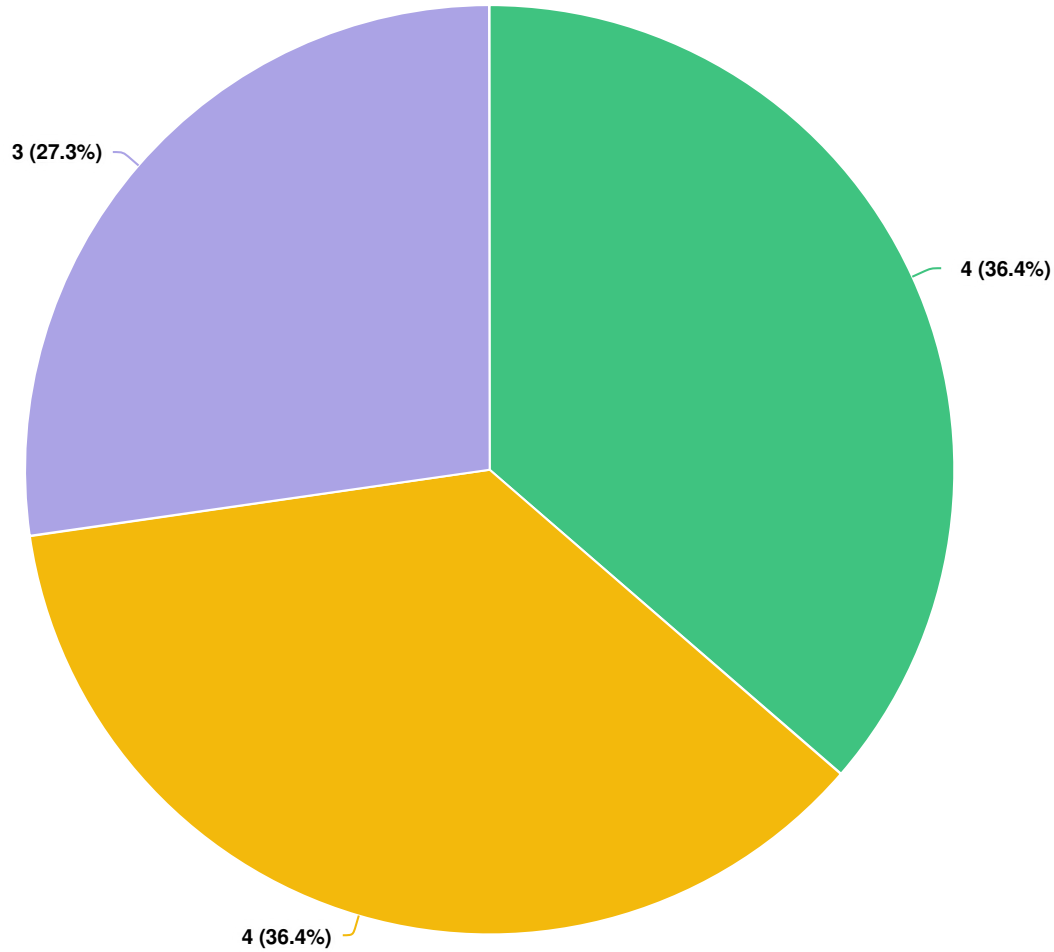
Question options

Yes No Not sure

Optional question (168 response(s), 16 skipped)

Question type: Dropdown Question

Do you anticipate switching it over?



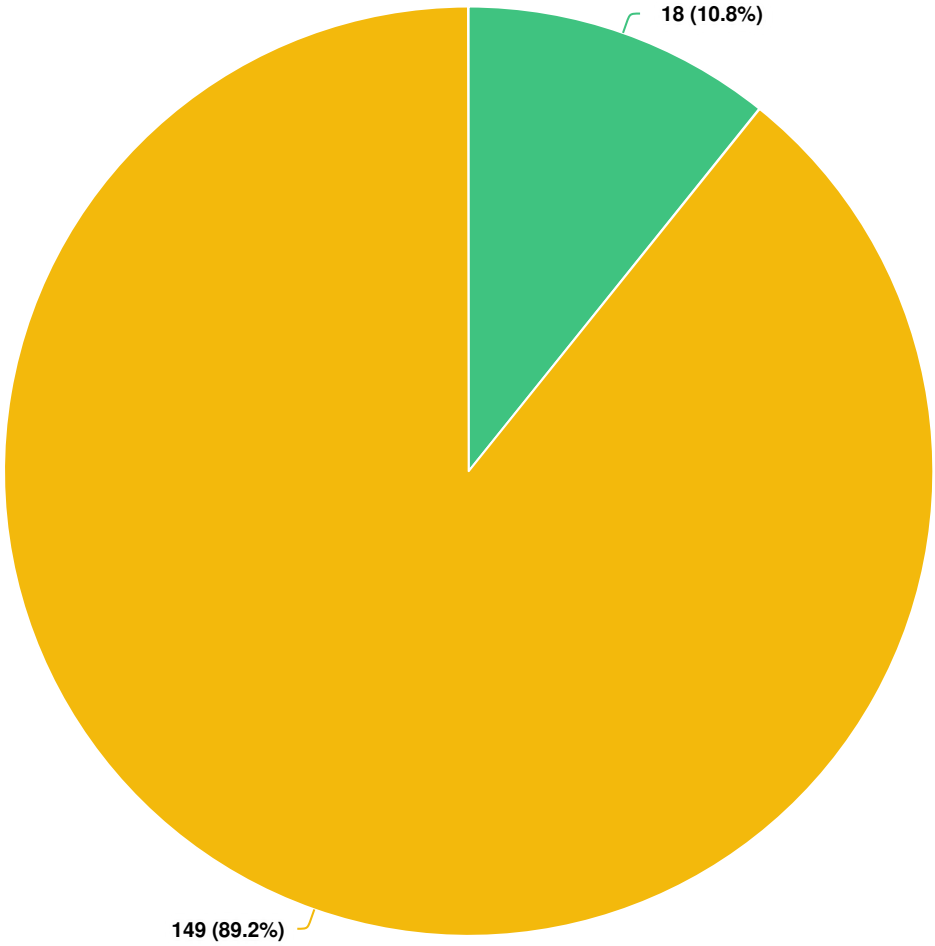
Question options

Yes, in 2022 Yes, within the next 3 years No plans to change it

Optional question (11 response(s), 173 skipped)

Question type: Dropdown Question

In the last 12 months has your household or business had an unplanned water service interruption (e.g. caused by a water main break)?



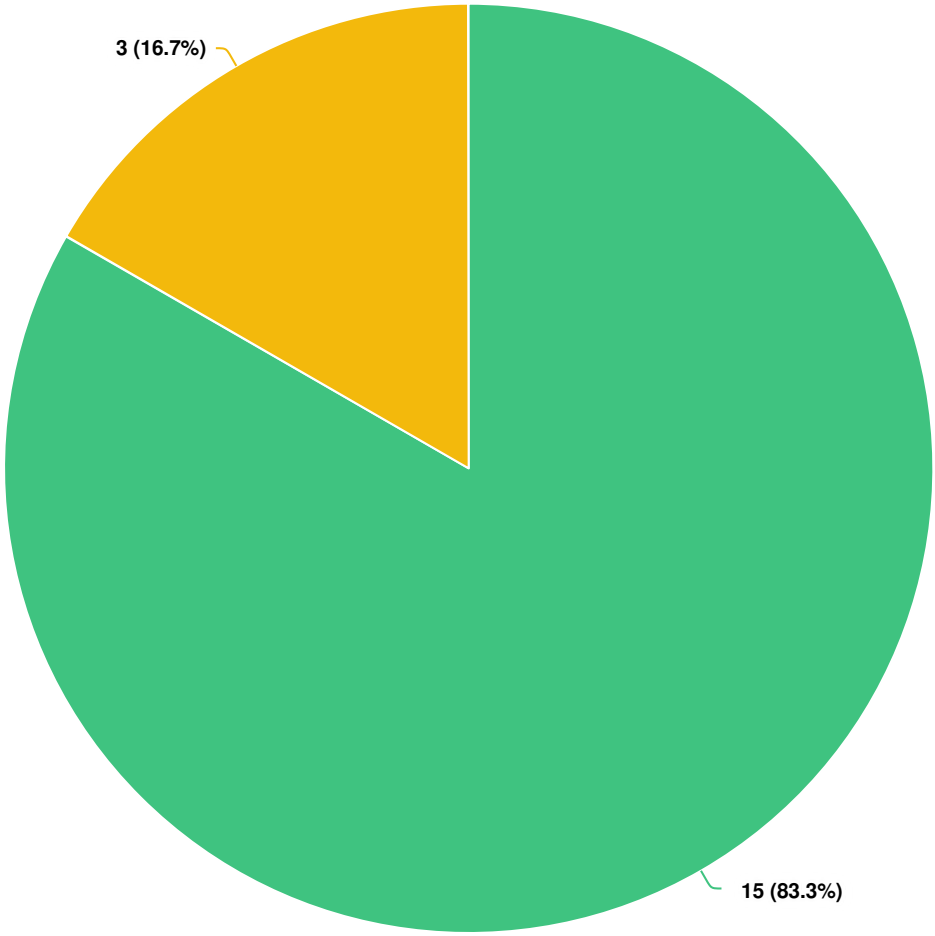
Question options

Yes No

Optional question (167 response(s), 17 skipped)

Question type: Dropdown Question

Do you feel the City responded quickly to resolve the issue in a timely manner?



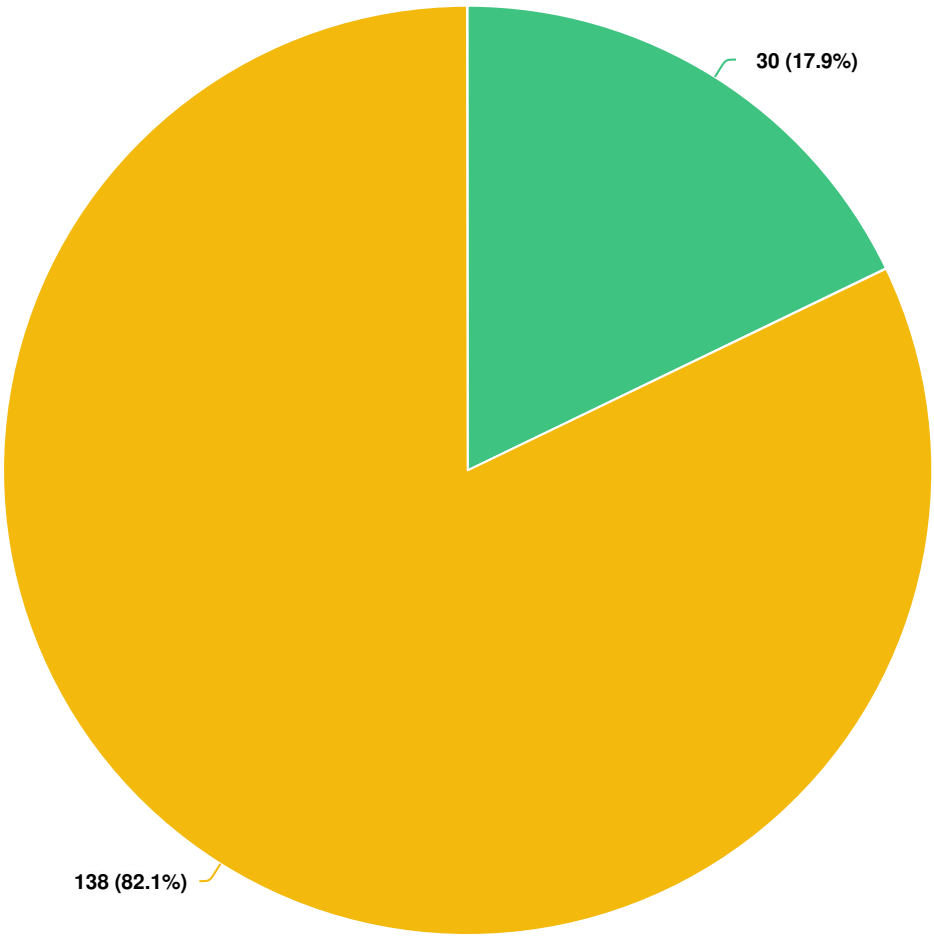
Question options

Yes No

Optional question (18 response(s), 166 skipped)

Question type: Dropdown Question

In the last 12 months has your household or business had a planned water service interruption (e.g. planned maintenance or servicing)?



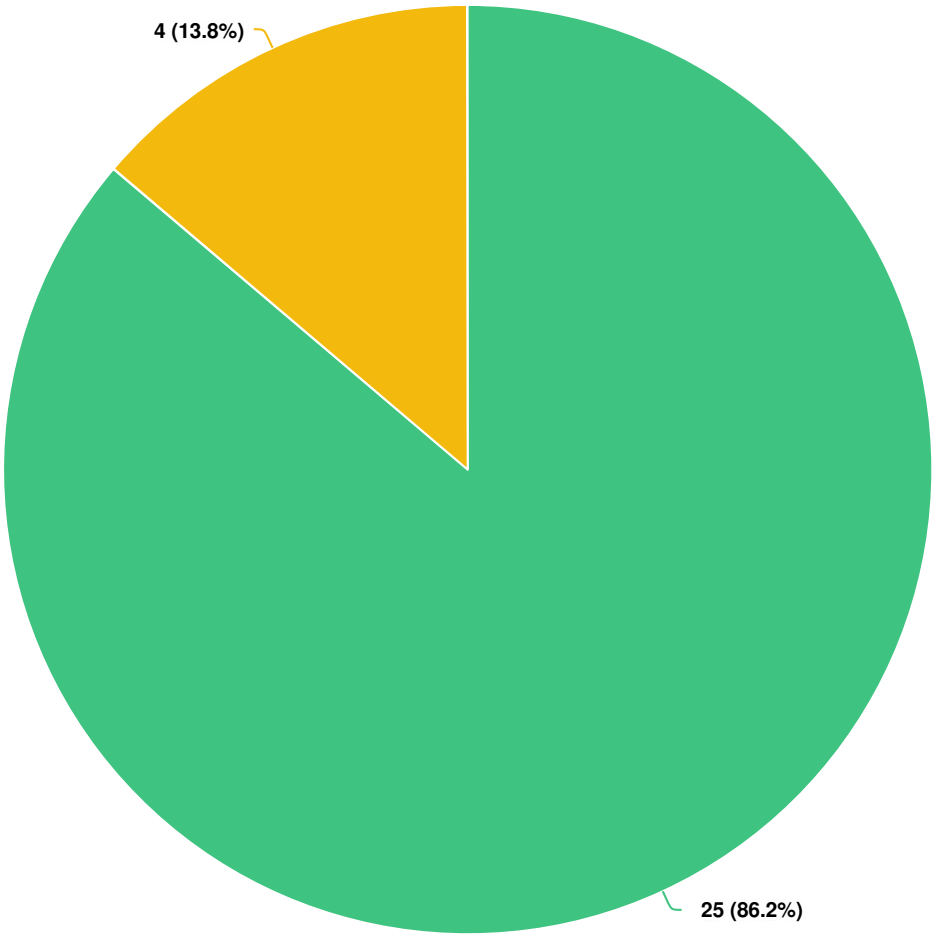
Question options

Yes No

Optional question (168 response(s), 16 skipped)

Question type: Dropdown Question

Did the City provide you with enough notice?



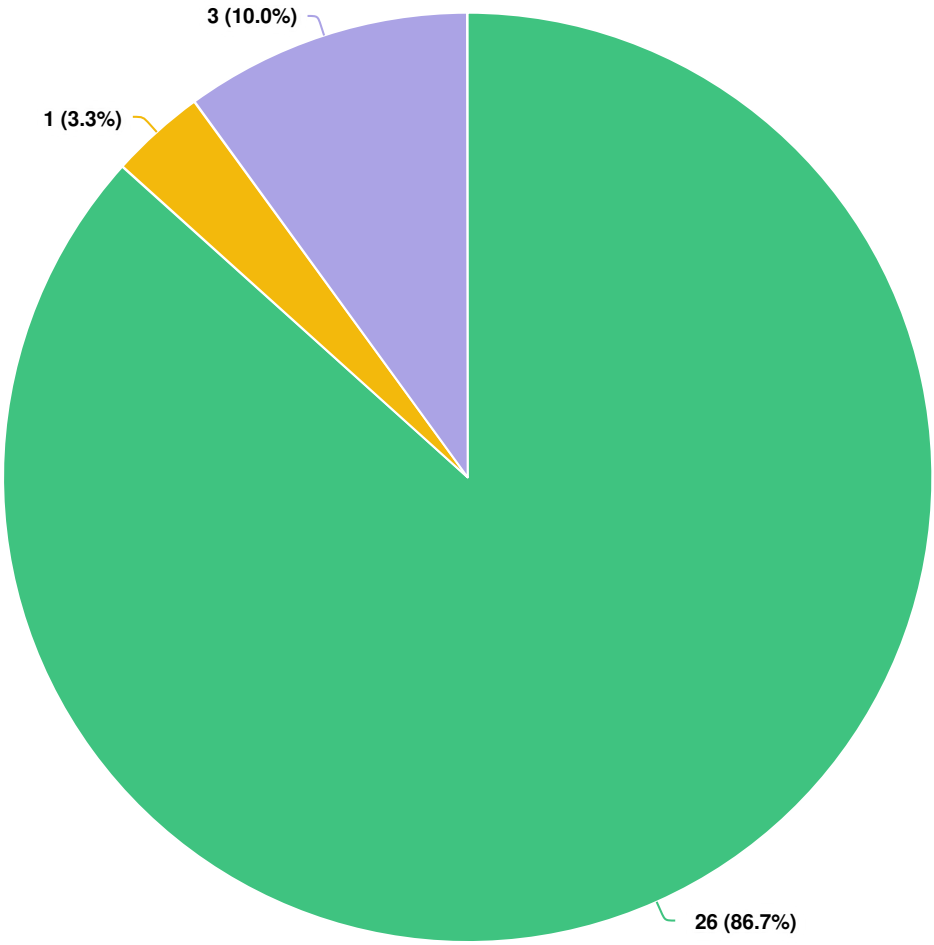
Question options

Yes No

Optional question (29 response(s), 155 skipped)

Question type: Dropdown Question

Did the City complete the work in the timeline outlined in the notice?



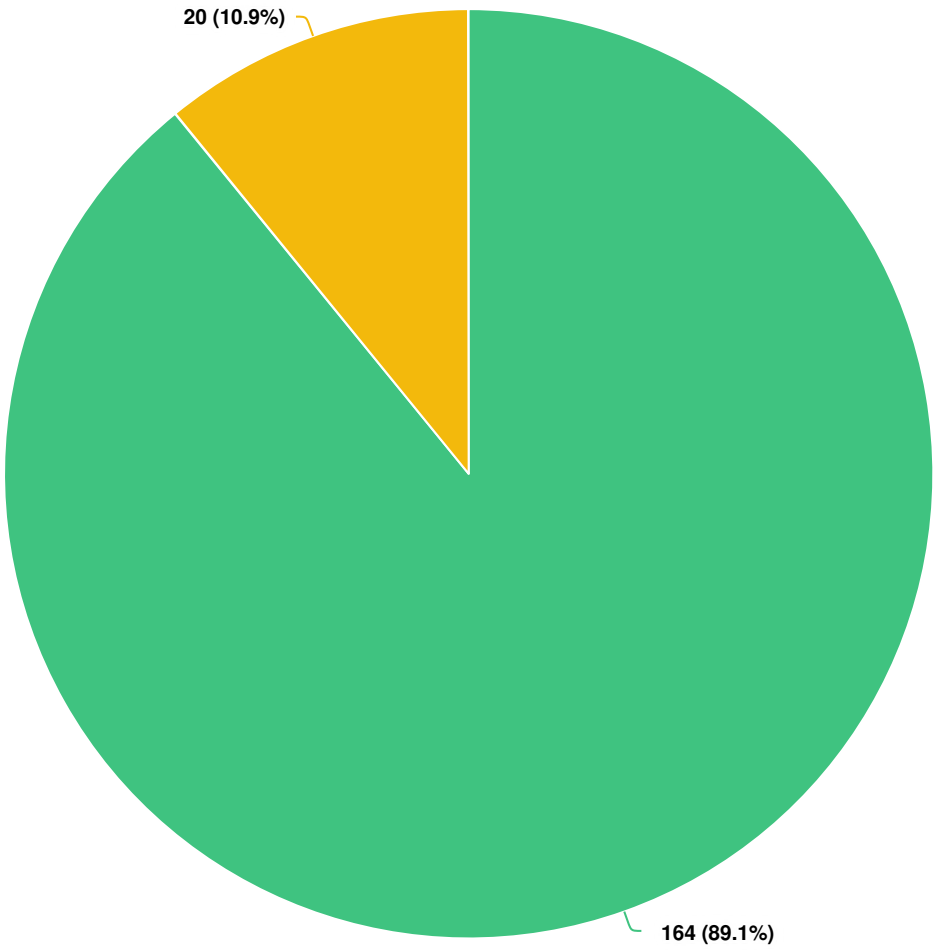
Question options

Yes No Not sure

Optional question (30 response(s), 154 skipped)

Question type: Dropdown Question

Are you connected to Hamilton’s sanitary wastewater service or do you have a private septic system?



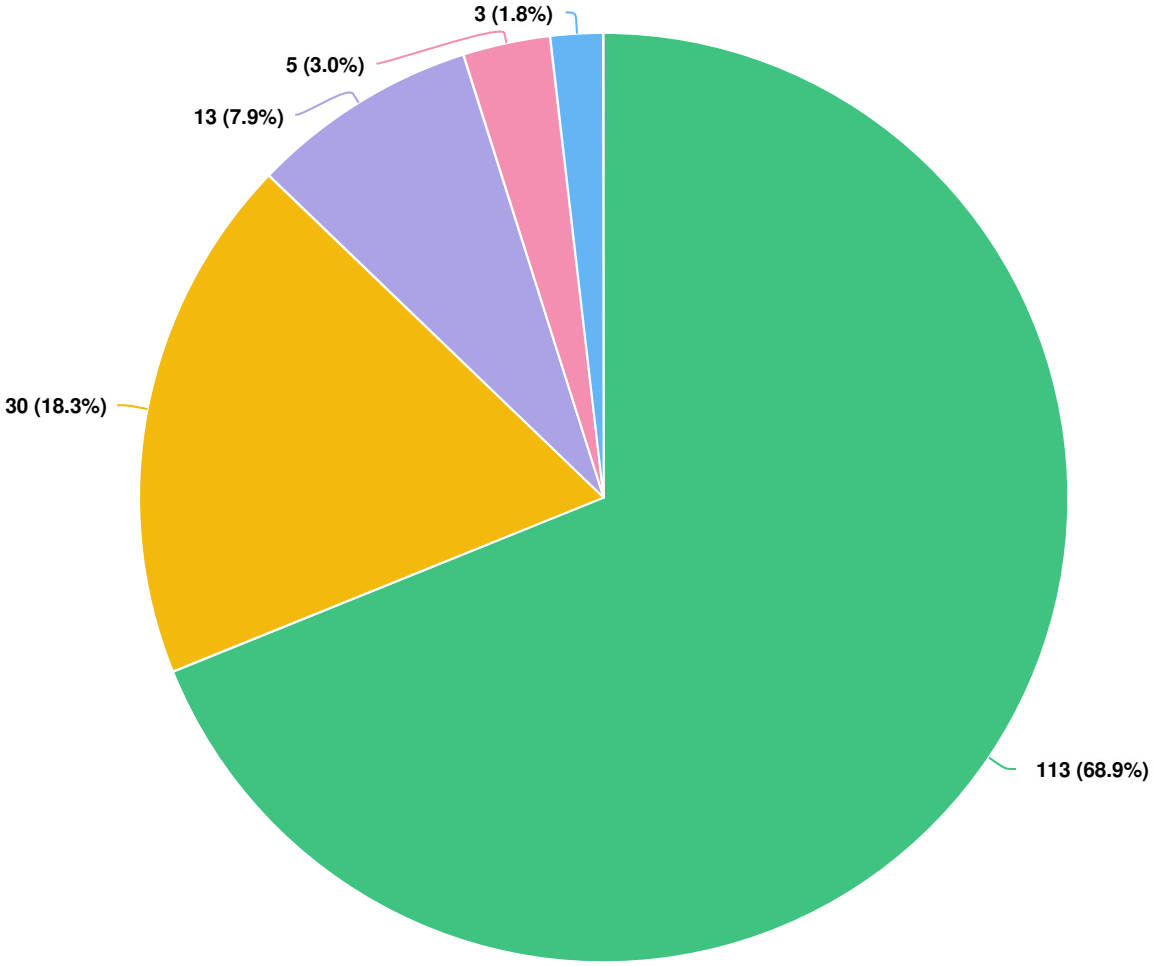
Question options

- I am connected to Hamilton’s sanitary wastewater service
- I have a private system like a septic tank

Mandatory Question (184 response(s))

Question type: Dropdown Question

How satisfied are you with the sanitary wastewater services you receive from Hamilton?



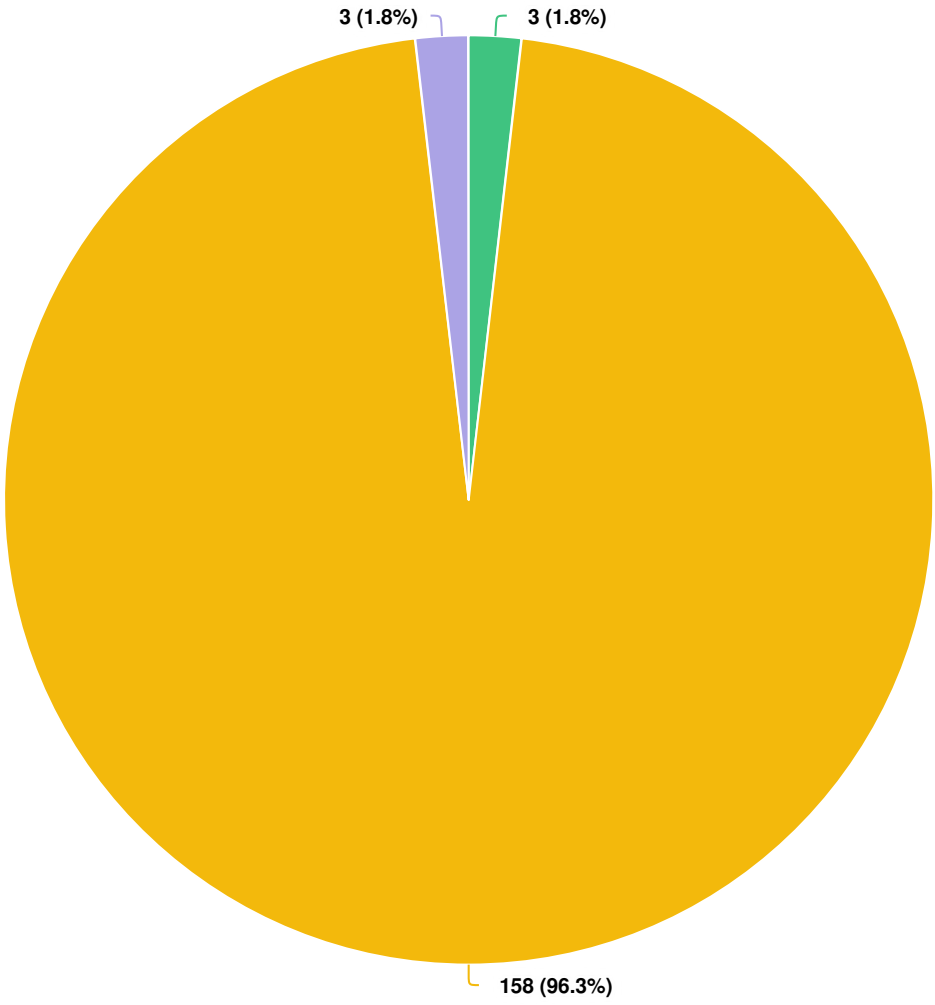
Question options

Very satisfied Somewhat satisfied Neutral Somewhat unsatisfied Very unsatisfied

Optional question (164 response(s), 20 skipped)

Question type: Dropdown Question

In the last 12 months have you had a sewer back up on your property due to city owned infrastructure?



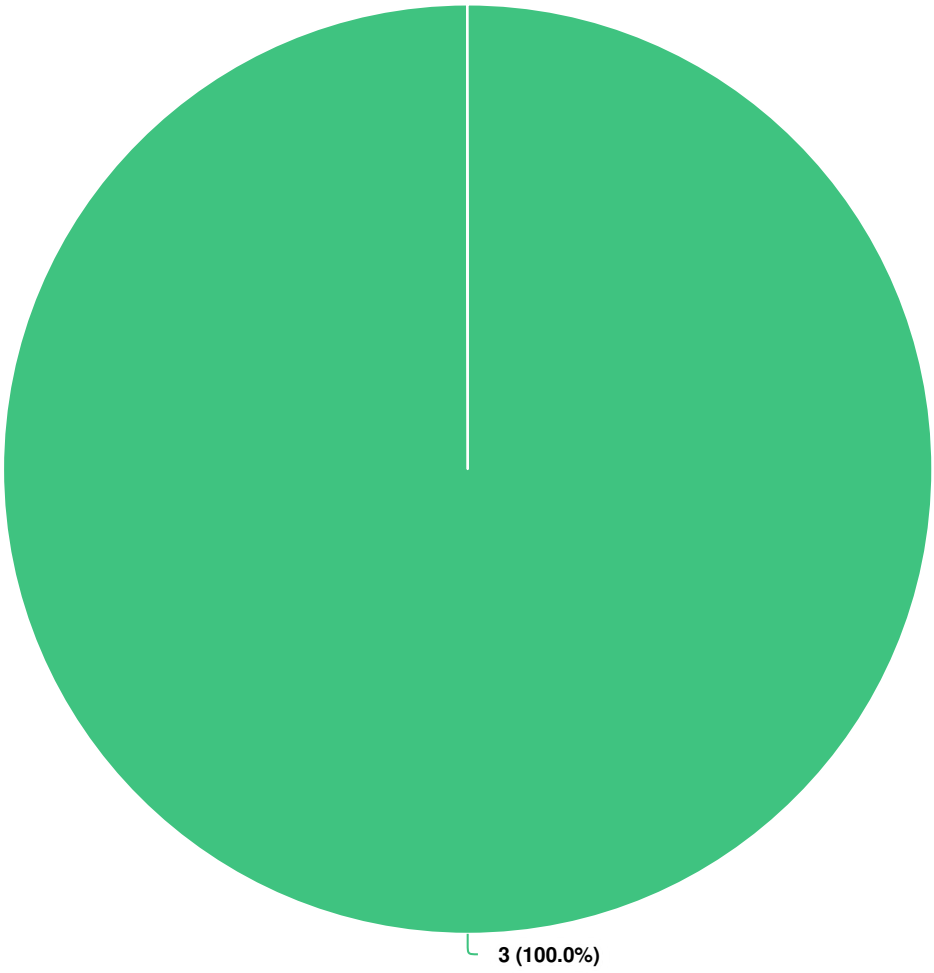
Question options

Yes No Not sure

Optional question (164 response(s), 20 skipped)

Question type: Dropdown Question

Do you feel the City responded quickly to resolve the issue in a timely manner?



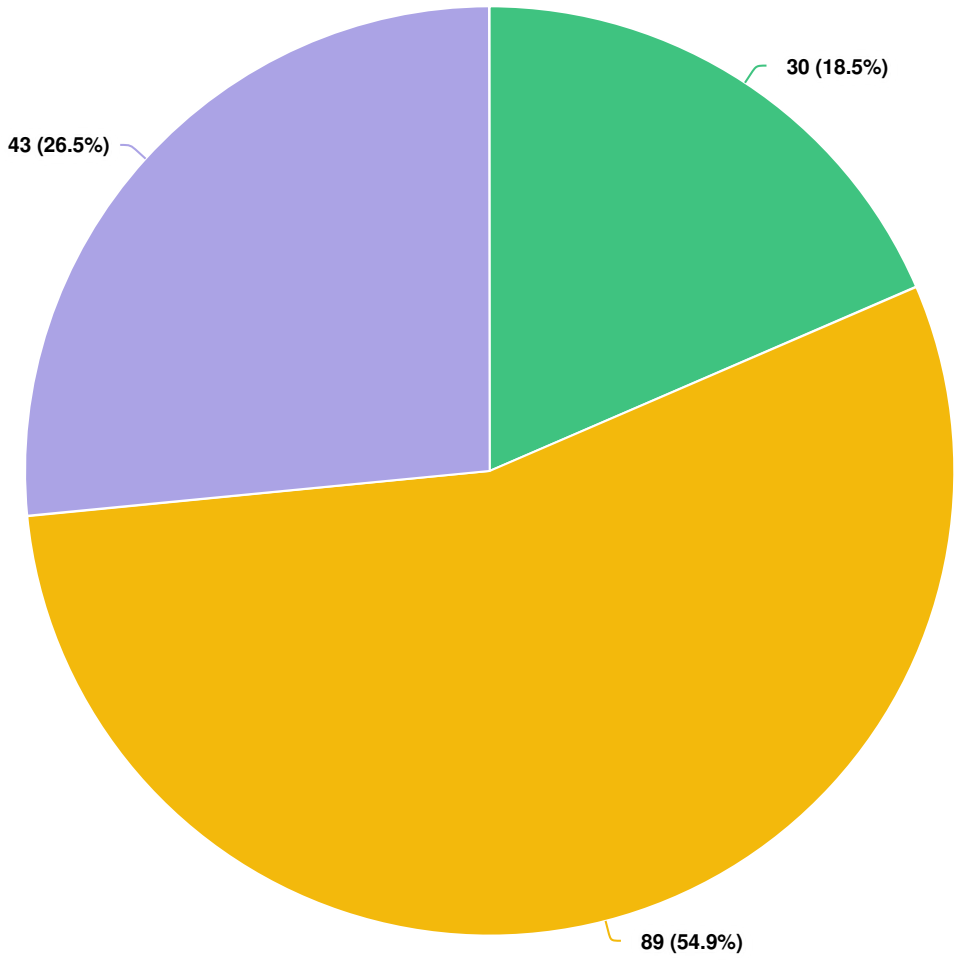
Question options

No

Optional question (3 response(s), 181 skipped)

Question type: Dropdown Question

Do you have a backwater valve?



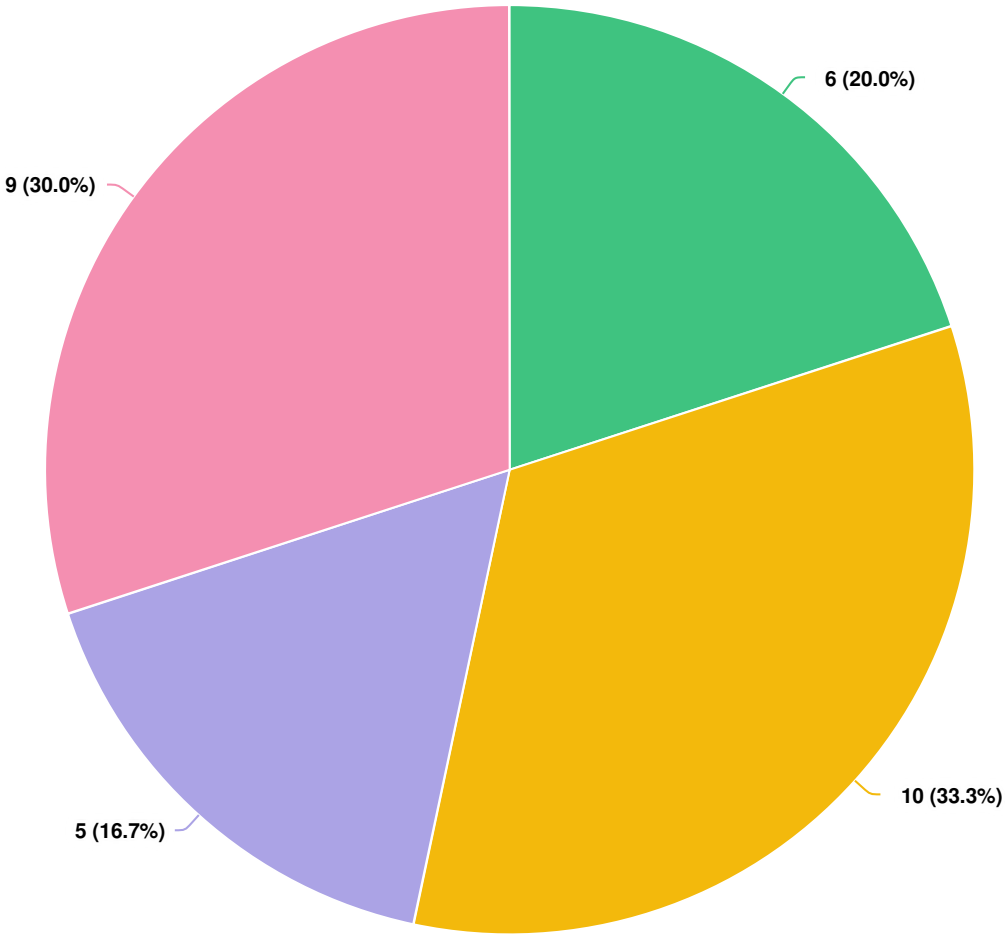
Question options

Yes No Not sure

Optional question (162 response(s), 22 skipped)

Question type: Dropdown Question

How often do you maintain/clean your backwater valve?



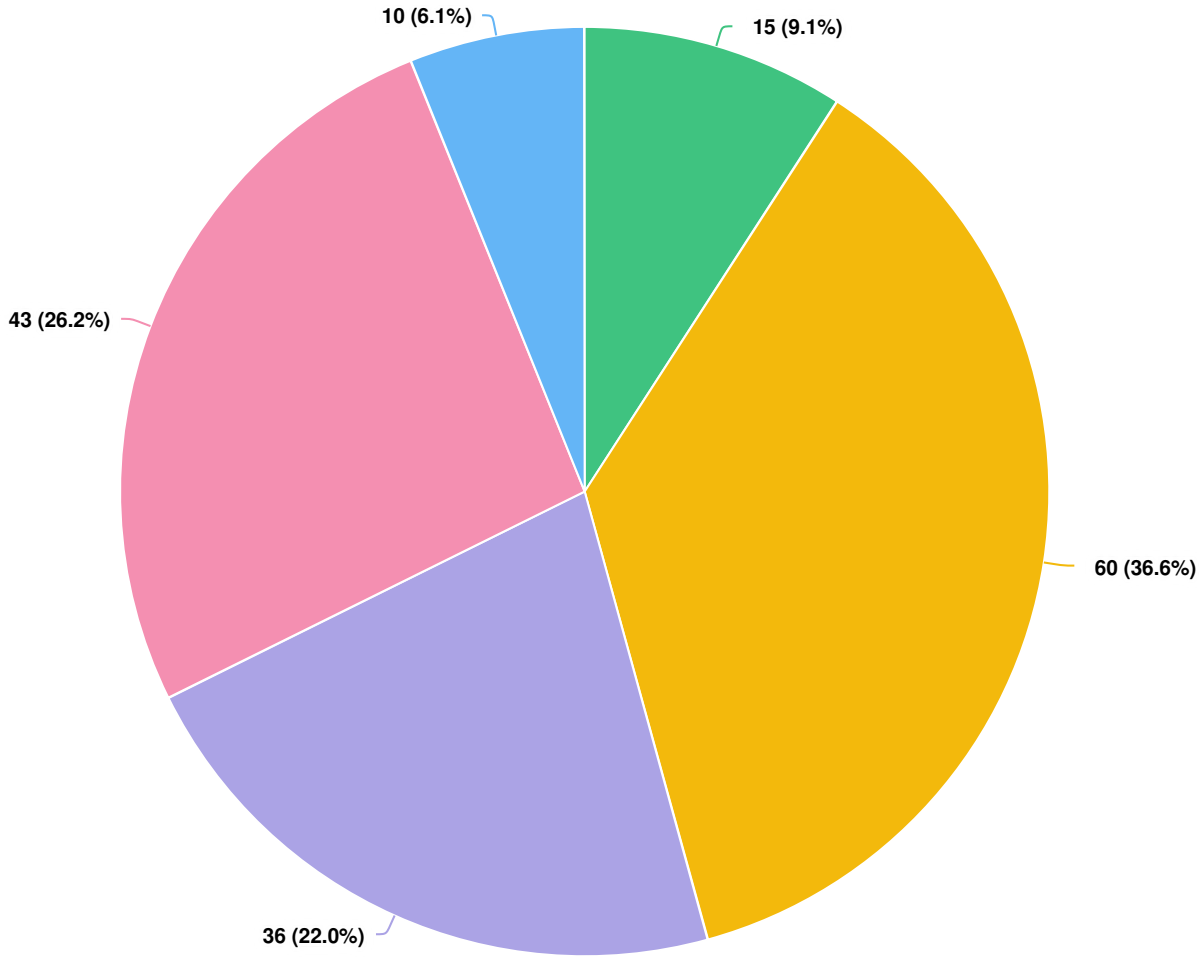
Question options

- Two or more time per year
- Once per year
- Once every few years
- Never

Optional question (30 response(s), 154 skipped)

Question type: Dropdown Question

Are you concerned about having a sewer back up on your property?



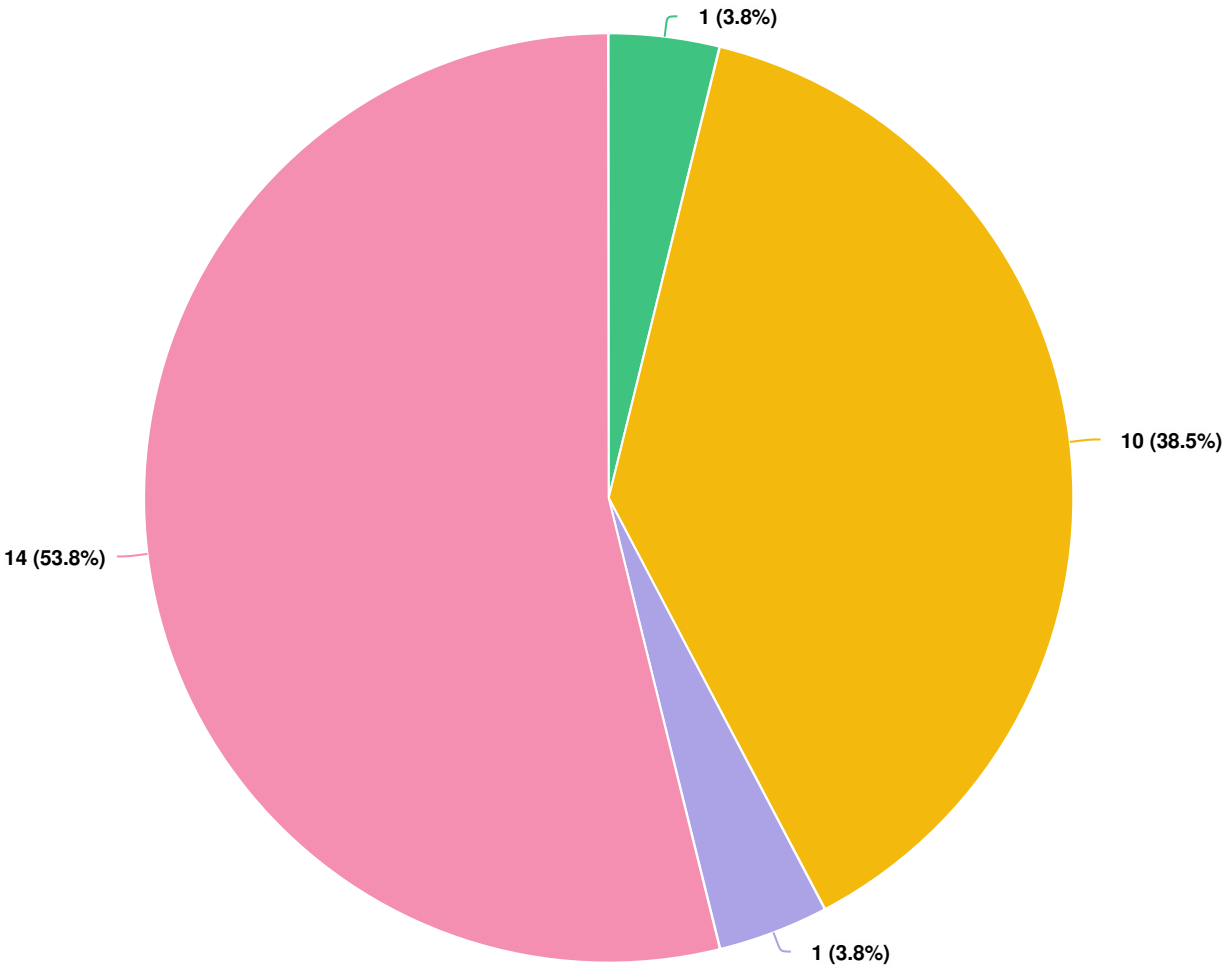
Question options

Very concerned | Somewhat concerned | Neutral | Not very concerned | Not concerned at all

Optional question (164 response(s), 20 skipped)

Question type: Dropdown Question

Why are you somewhat concerned?



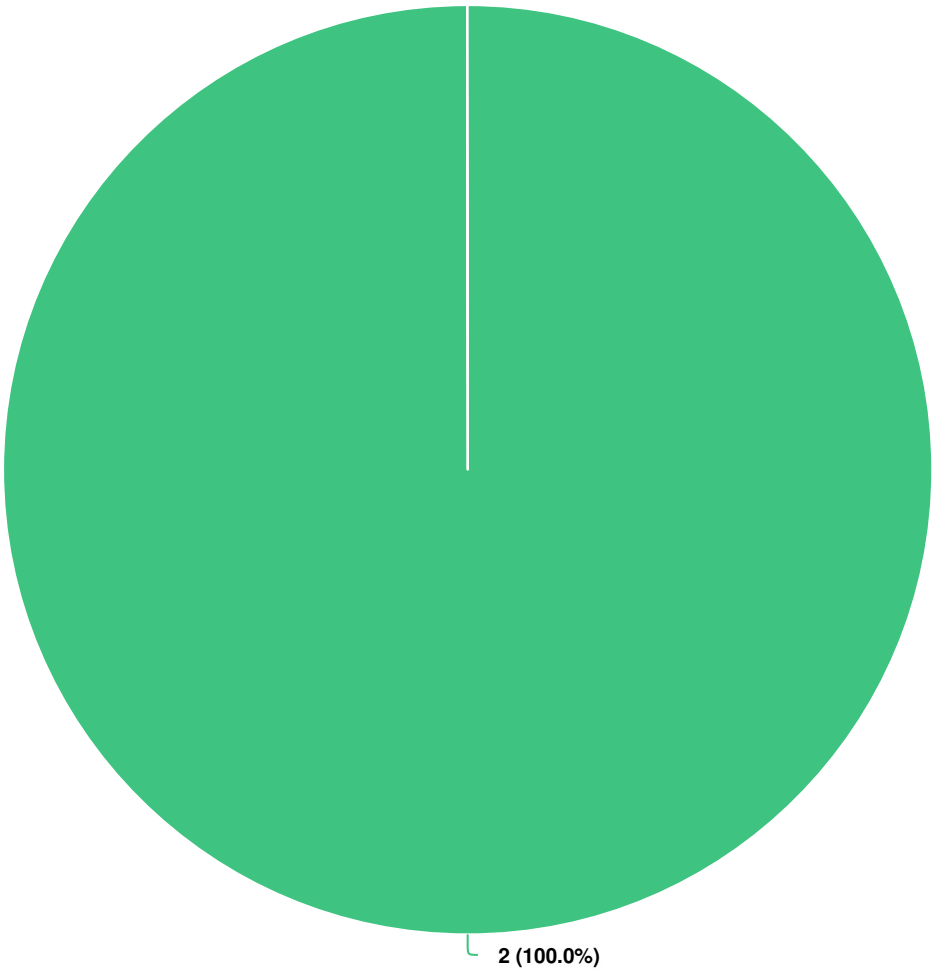
Question options

Had issues previously | Aging infrastructure | Neighbour has had issues | Other (please specify)

Optional question (26 response(s), 158 skipped)

Question type: Dropdown Question

Why are you very concerned?



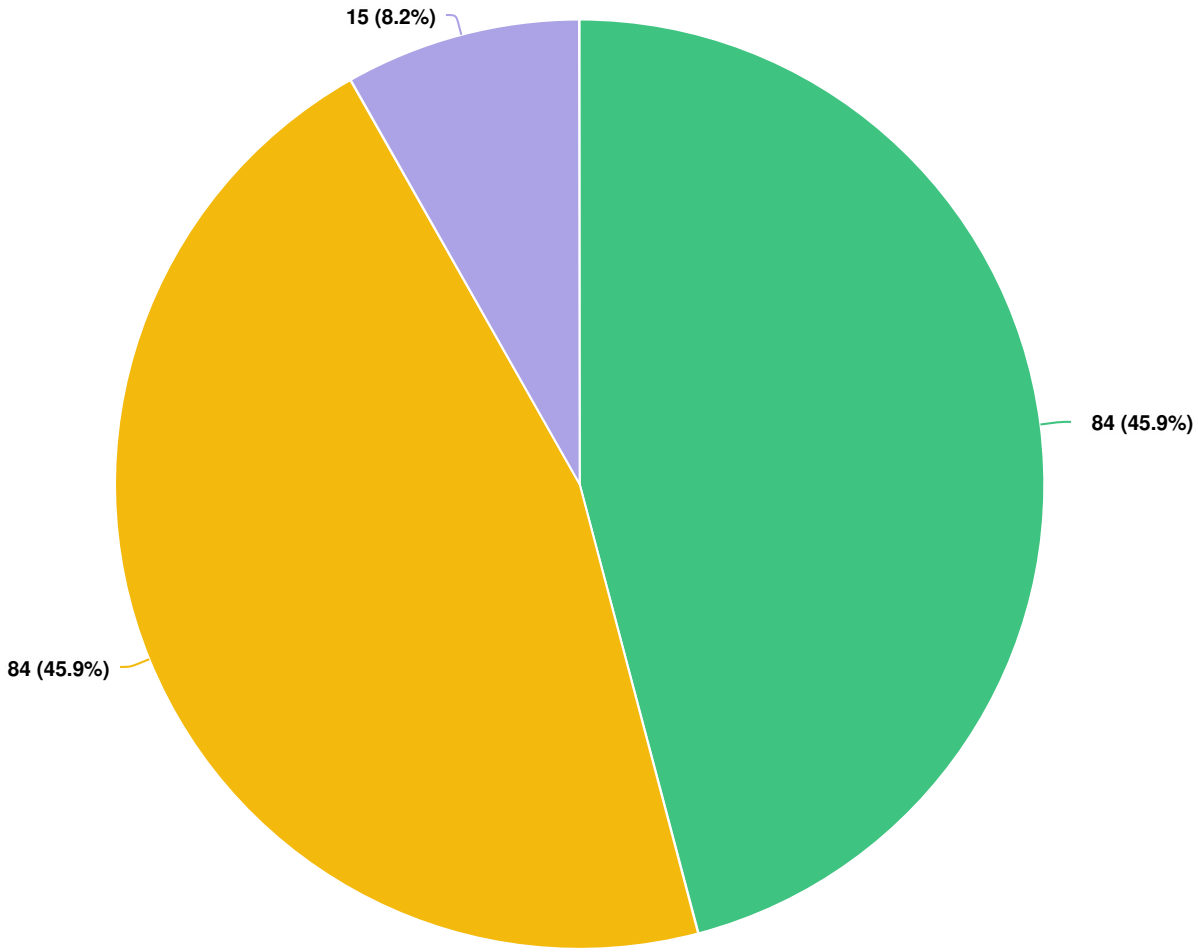
Question options

- Other (please specify)

Optional question (2 response(s), 182 skipped)

Question type: Dropdown Question

Have you ever noticed odour issues anywhere in the City related to wastewater services?



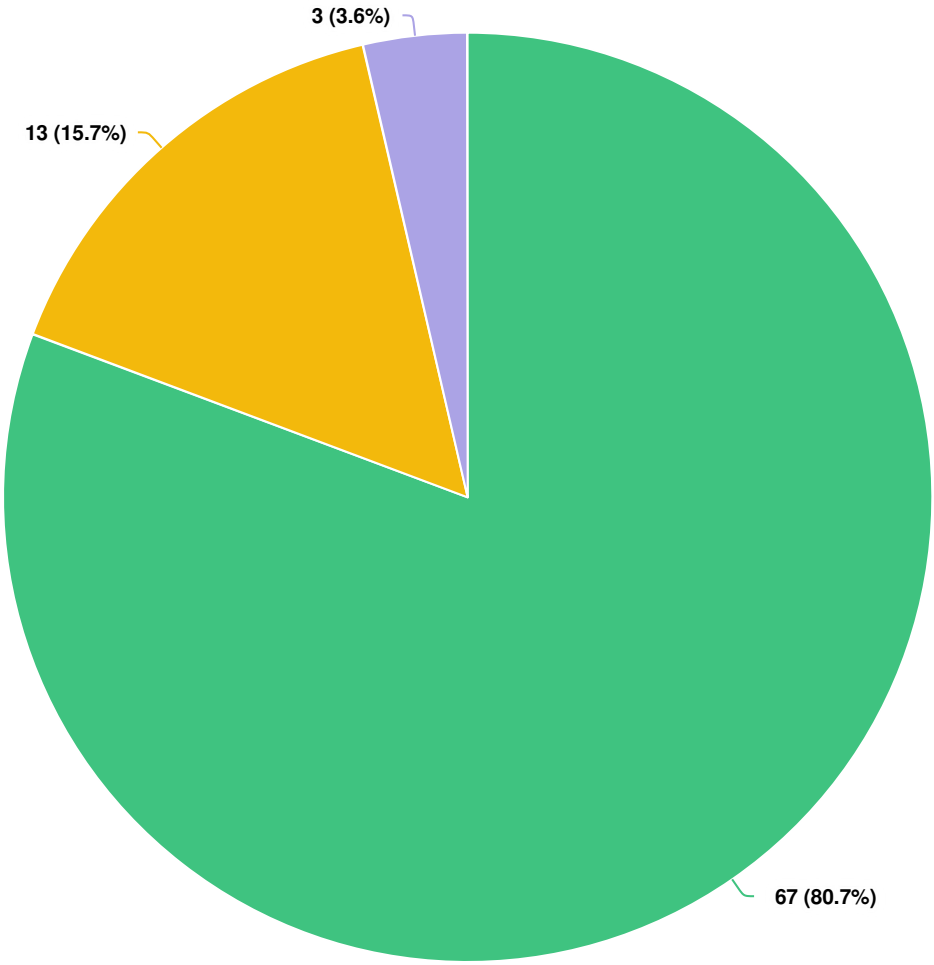
Question options

Yes No Not sure

Optional question (183 response(s), 1 skipped)

Question type: Dropdown Question

How often have these issues occurred?



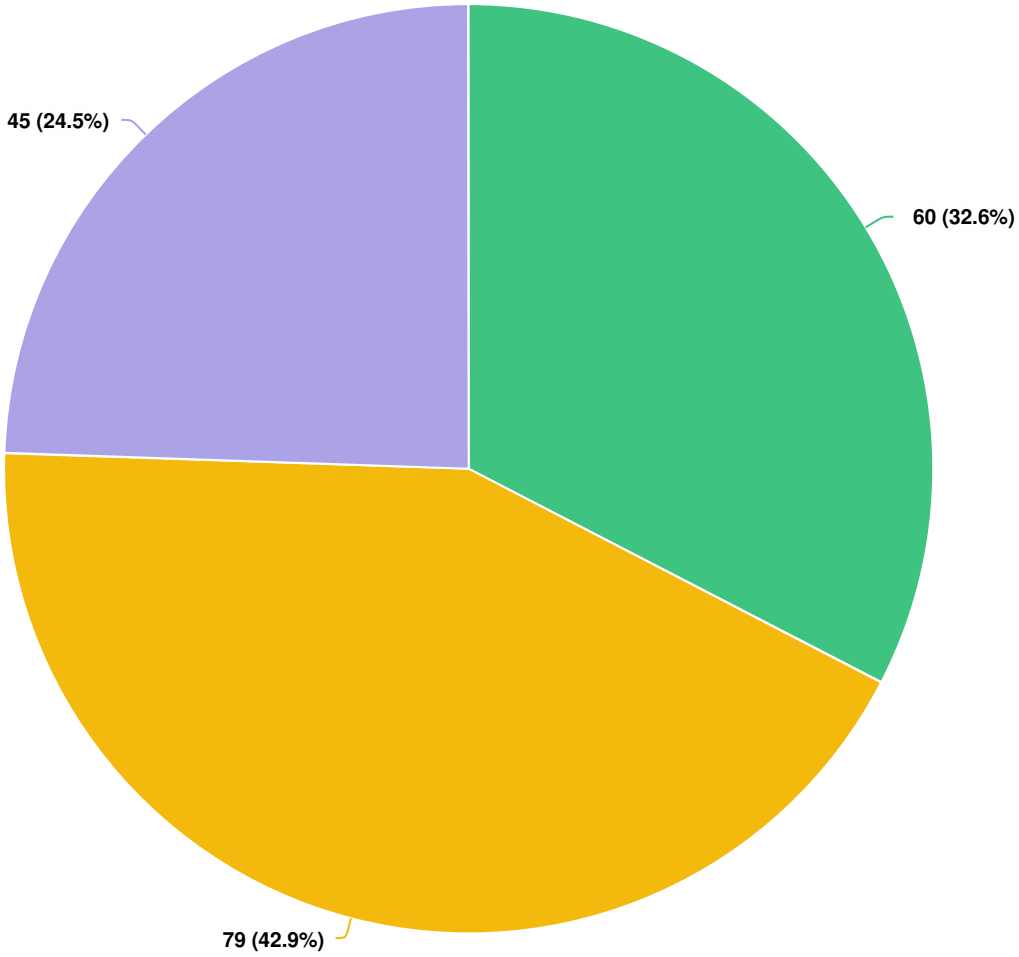
Question options

- Two or more time per year
- Once per year
- Once every few years

Optional question (83 response(s), 101 skipped)

Question type: Dropdown Question

Do you feel that Hamilton behaves responsibly when returning wastewater back to the environment?



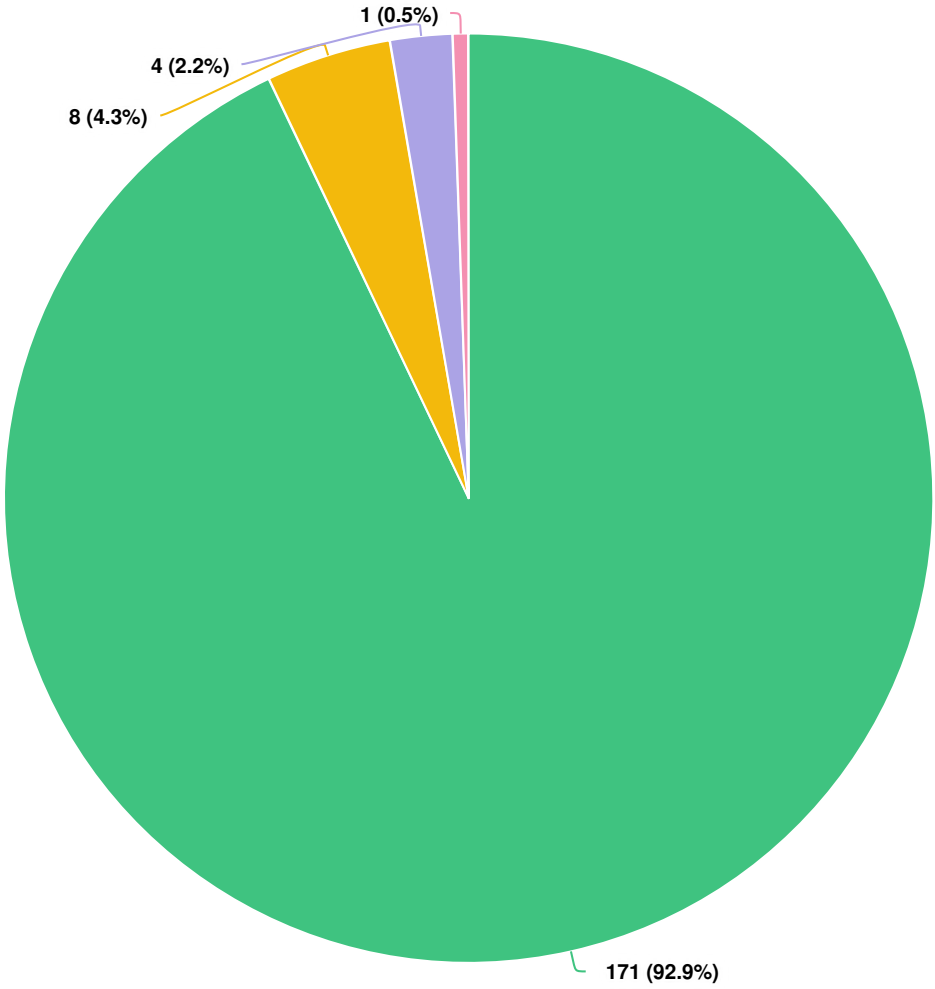
Question options

Yes No Not sure

Optional question (184 response(s), 0 skipped)

Question type: Dropdown Question

In the last 12 months how often have you had to delay or cancel travel due to roads being flooded or closed due to too much water?



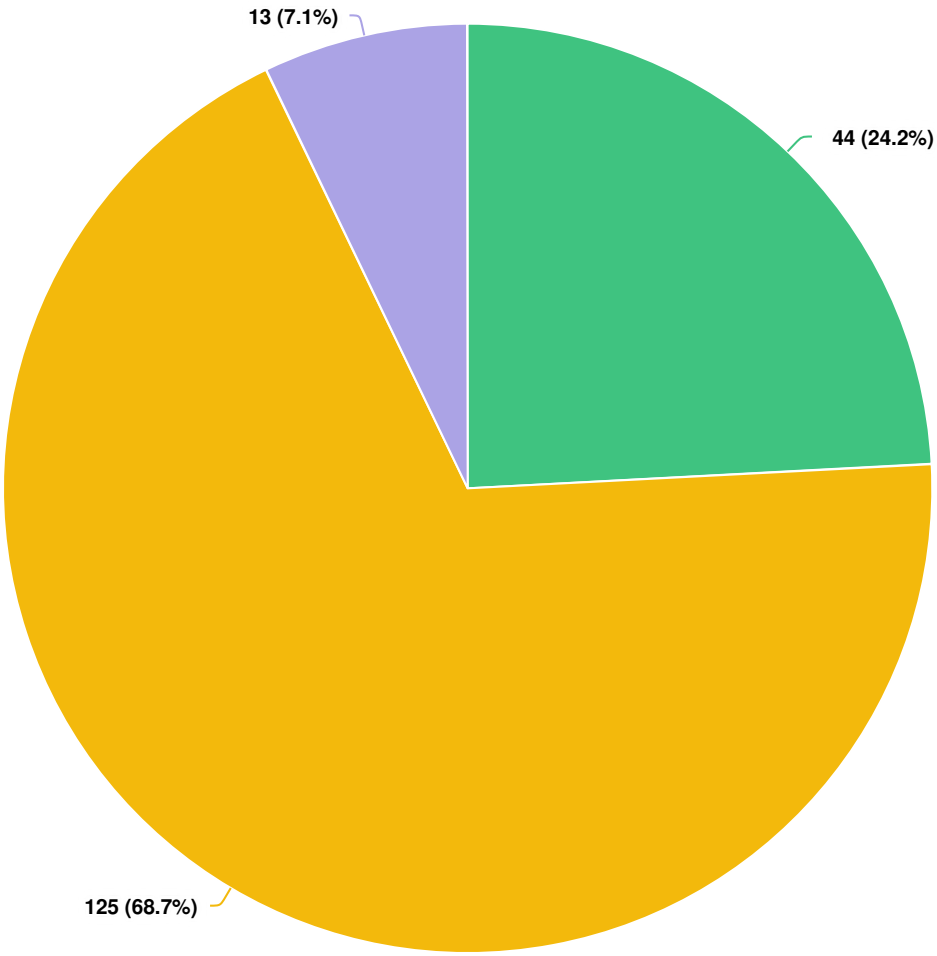
Question options

Never | Once a year | Less than 5 times a year | More than 5 times a year

Mandatory Question (184 response(s))

Question type: Dropdown Question

Do you have a sump pump?



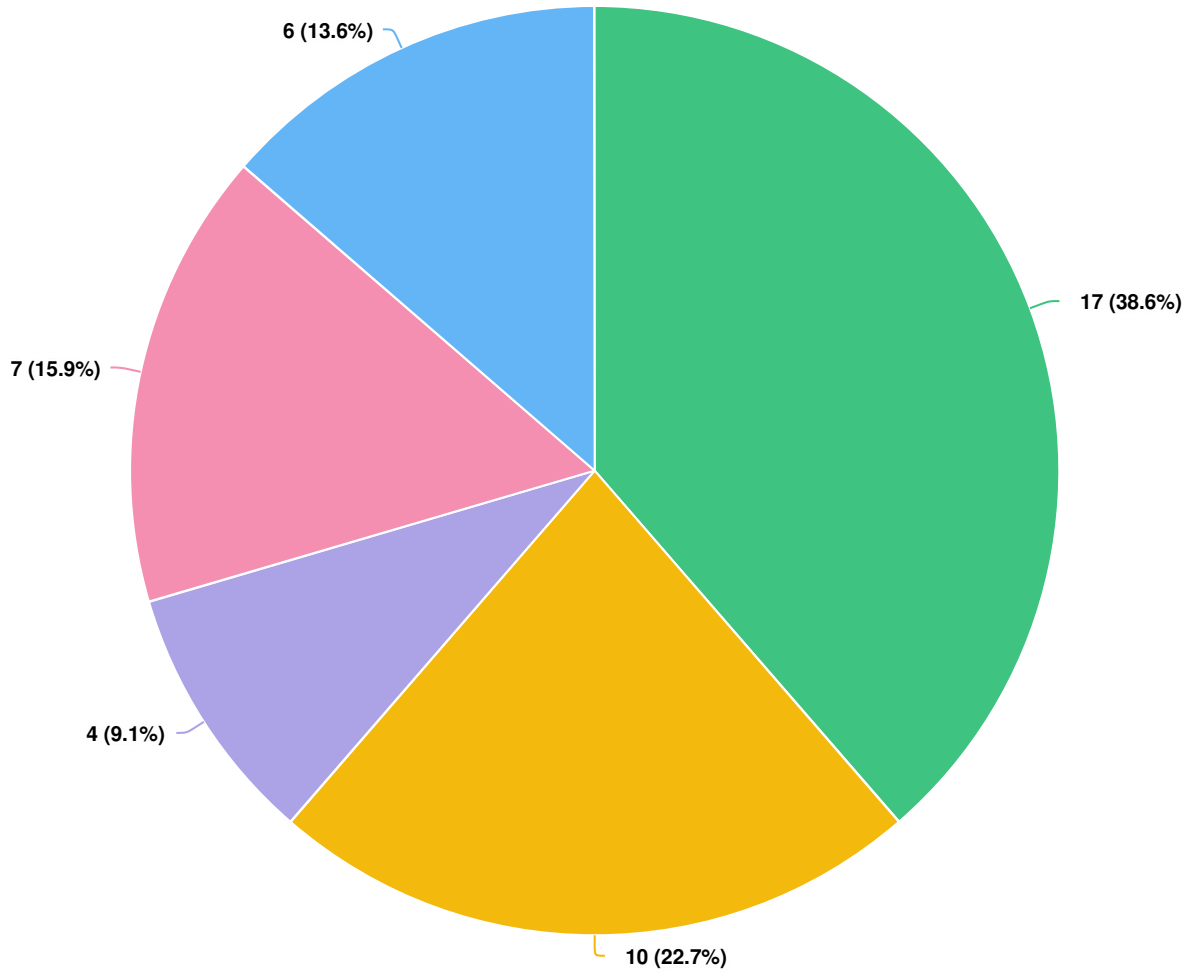
Question options

Yes No Not sure

Optional question (182 response(s), 2 skipped)

Question type: Dropdown Question

During heavy rainfall how often would you say your sump pump runs on average?



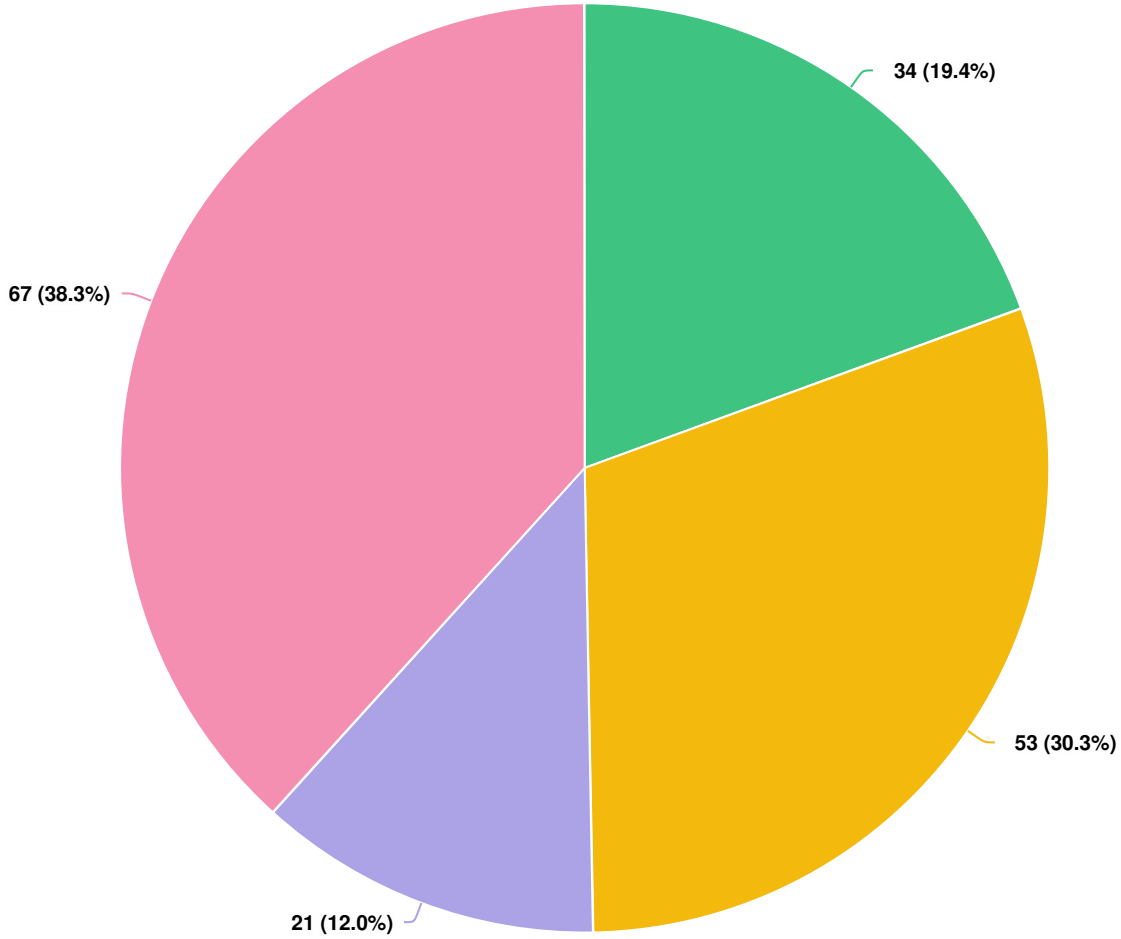
Question options

I don't notice it | Less than 30 minutes | Less than an hour | Between one and three hours | Seems like it's always on

Optional question (44 response(s), 140 skipped)

Question type: Dropdown Question

Does your property have a buried sewer, municipal drain or ditch?



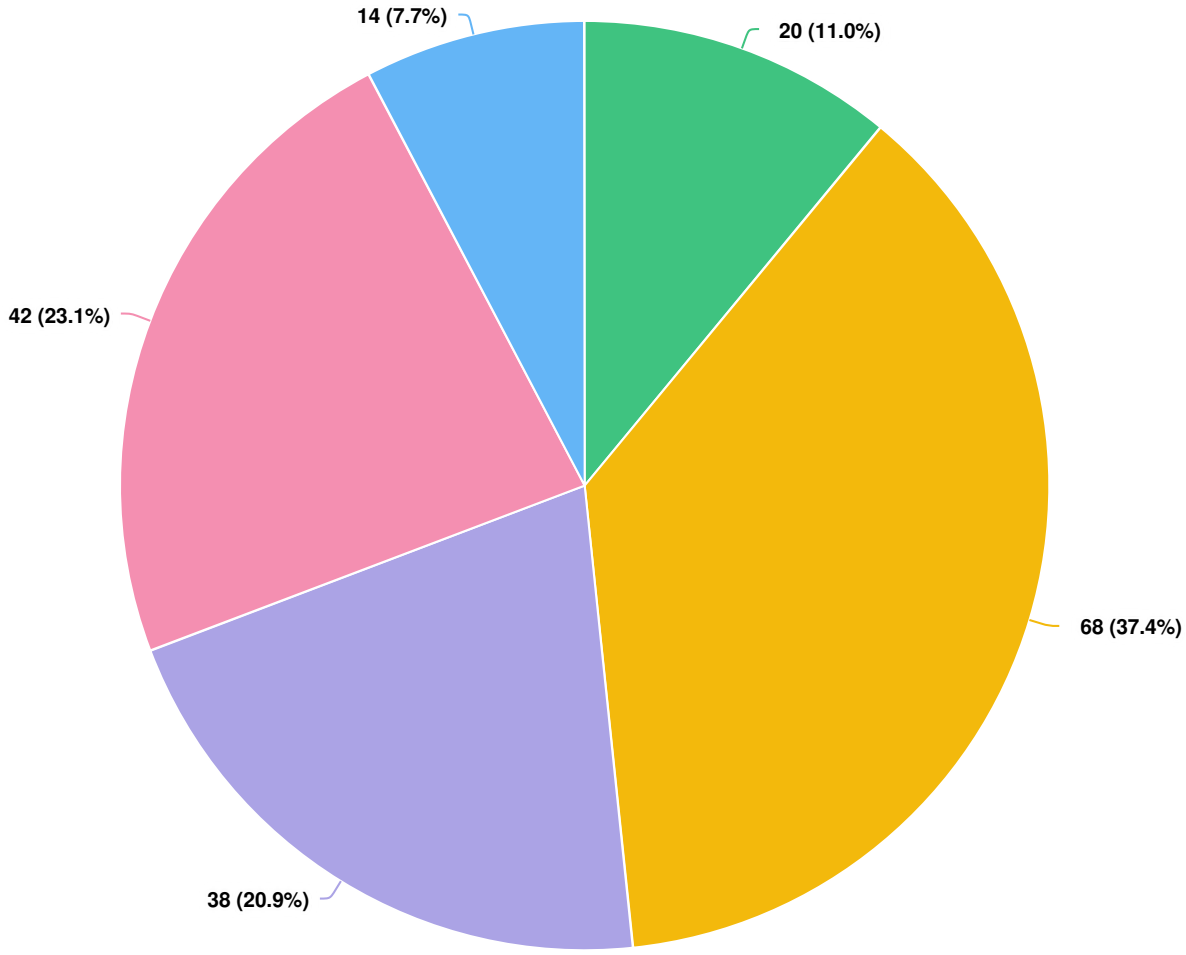
Question options

Municipal drain Buried sewer Ditch Not sure

Optional question (175 response(s), 9 skipped)

Question type: Dropdown Question

Are you concerned about flooding on your residential property, business, or local roads?



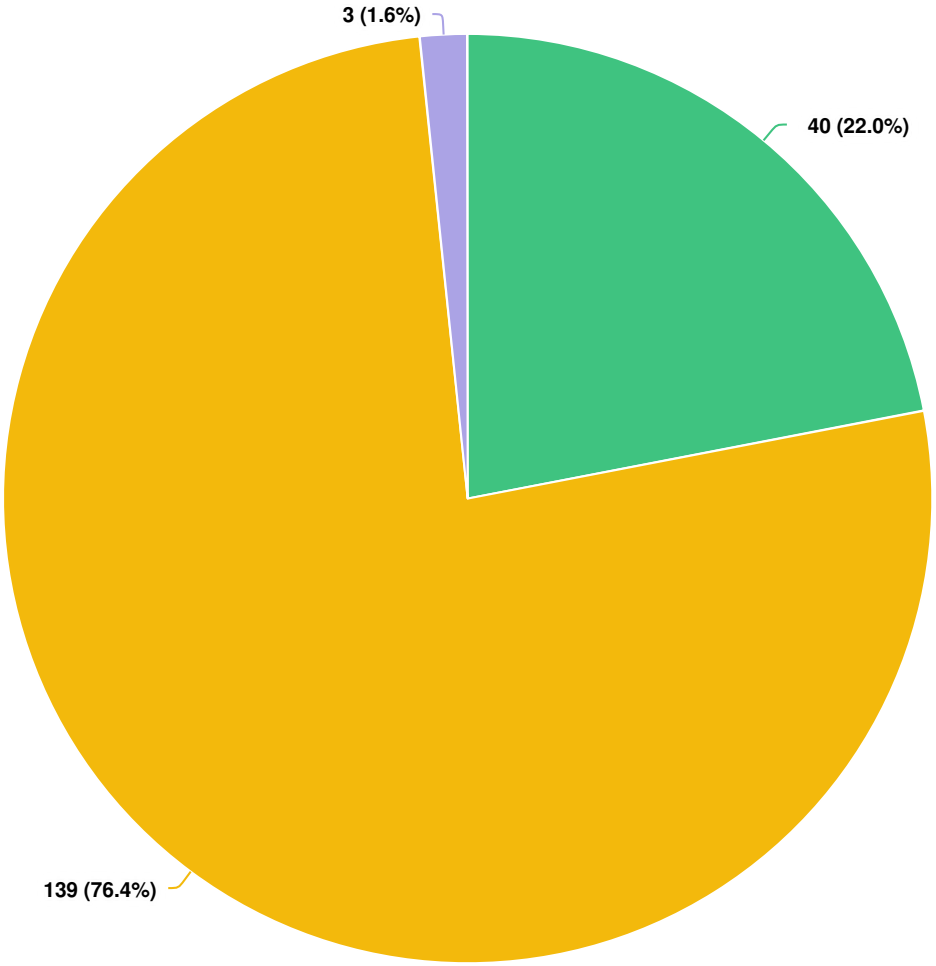
Question options

Very concerned | Somewhat concerned | Neutral | Not very concerned | Not concerned at all

Optional question (182 response(s), 2 skipped)

Question type: Dropdown Question

Have you personally experienced flooding impacts on your property?



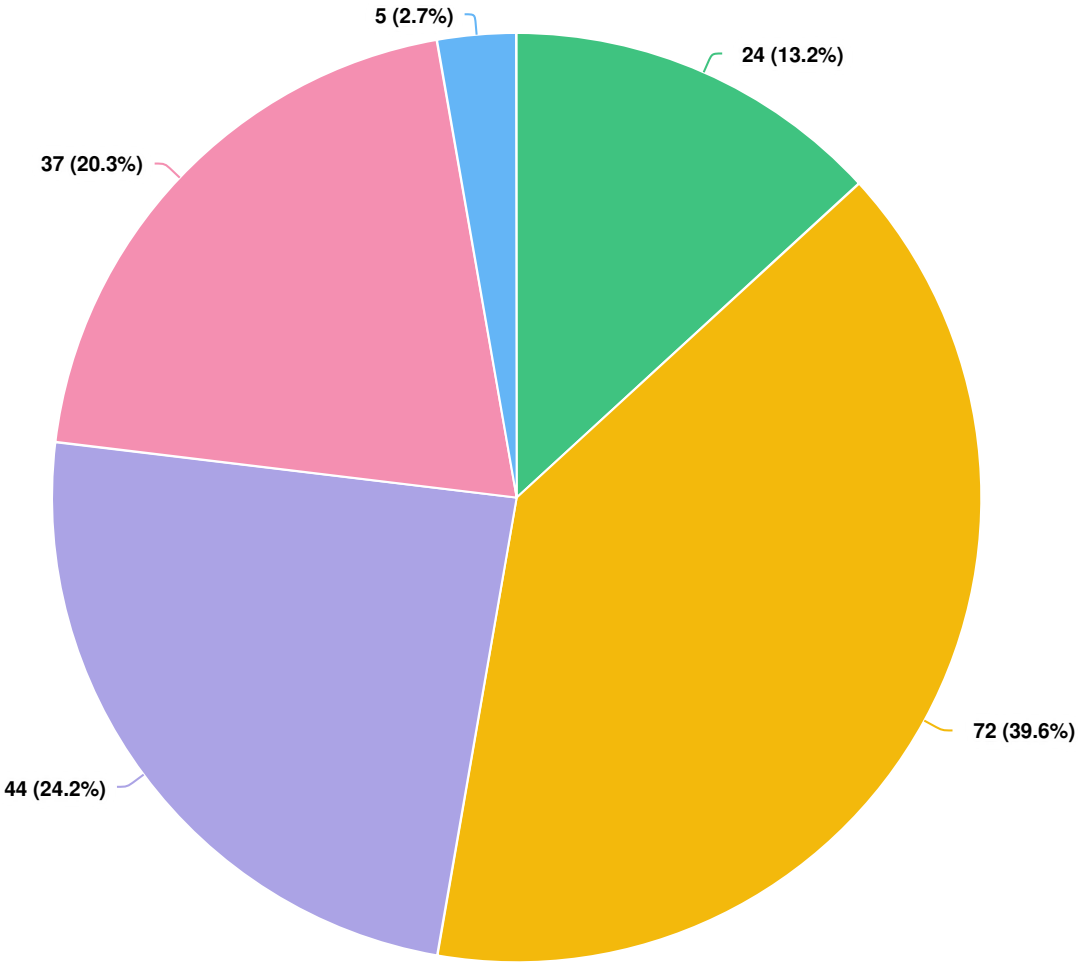
Question options

Yes No Not sure

Optional question (182 response(s), 2 skipped)

Question type: Dropdown Question

In the event of citywide flooding due to a significant storm, how confident are you that the City of Hamilton will respond quickly and help residents and businesses recover?



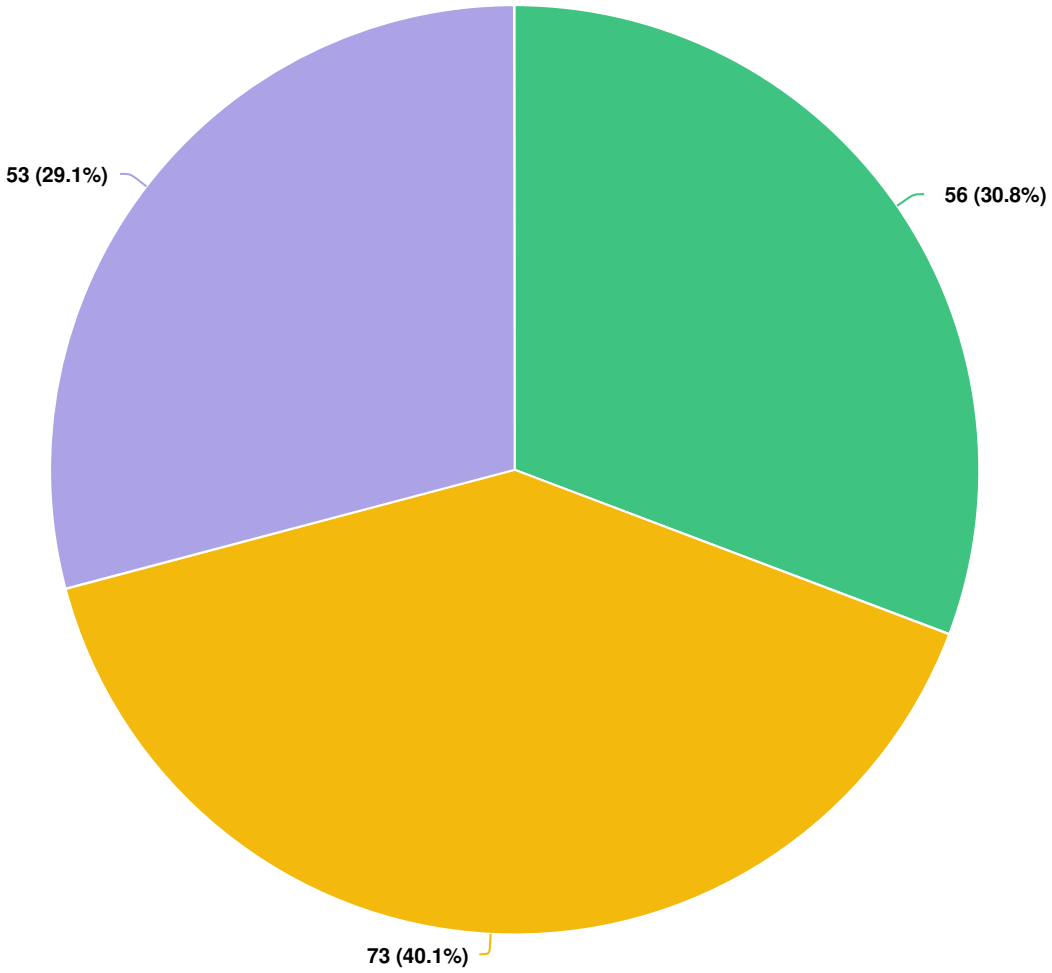
Question options

Very confident | Somewhat confident | Neutral | Not very confident | Not confident at all

Optional question (182 response(s), 2 skipped)

Question type: Dropdown Question

Do you feel that Hamilton behaves responsibly when returning stormwater back to the environment?



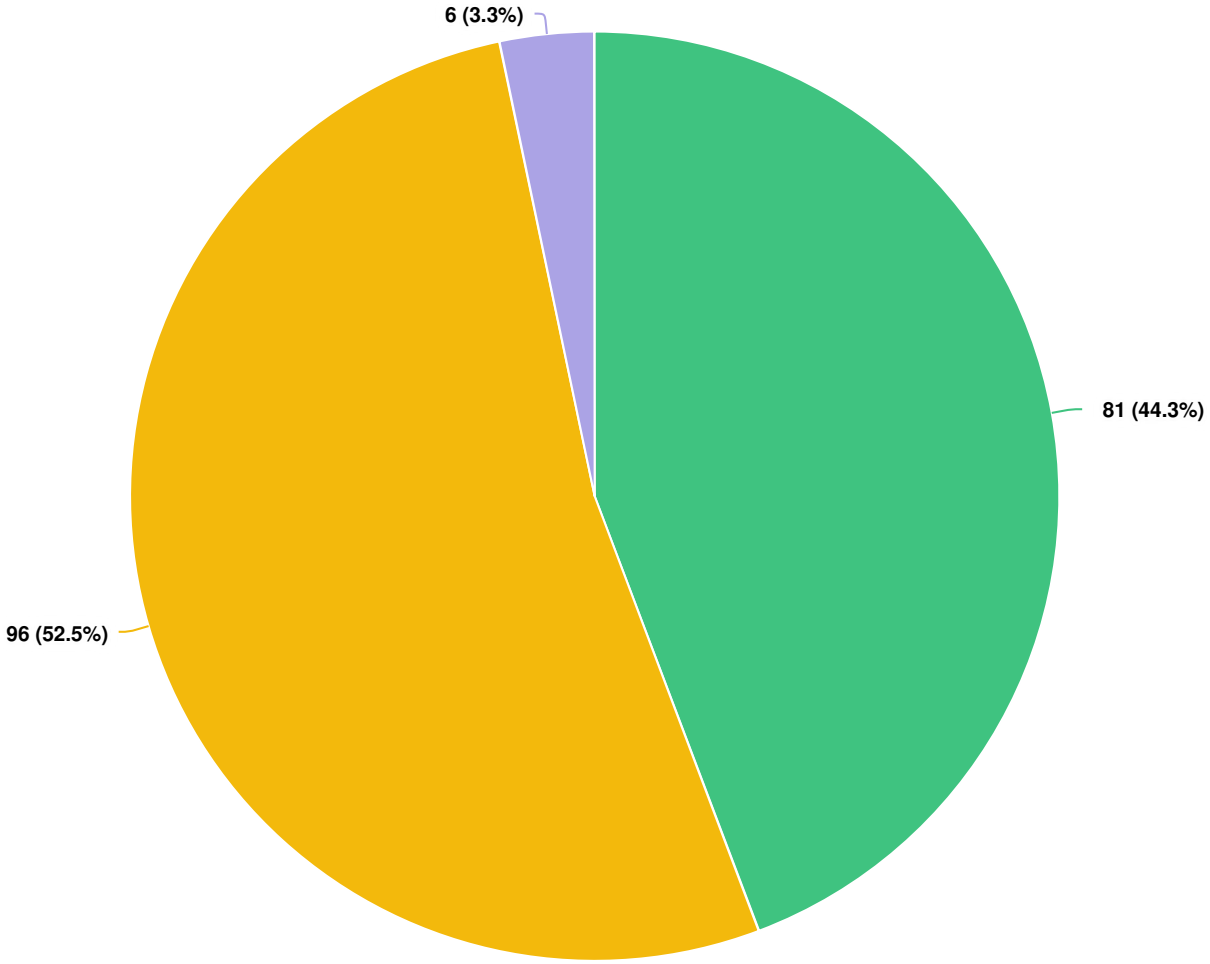
Question options

Yes No Not sure

Optional question (182 response(s), 2 skipped)

Question type: Dropdown Question

Have you or are you in the process of completing a project on your property to reduce stormwater runoff (e.g. rain barrel, downspout disconnection, permeable pavement etc.)?



Question options

Yes No Not sure

Optional question (183 response(s), 1 skipped)

Question type: Dropdown Question