Report

Anti Icing Pilot Evaluation Qualitative and Quantitative Findings

Report

Edmonton

August 2018

Leger

We know Canadians

CONTEXT AND OBJECTIVES

Context & Objectives

Context

The City of Edmonton piloted the use of an Anti-icer on select roadways in February and March 2017, expanding the pilot in Winter 2017-18 to cover about 40% of Edmonton's arterial and collector roads. The Anti-icer is intended to help roads to stay clear longer and make snow removal easier, reducing the need for plowing and sanding.

Objectives

The overall research objective is to understand the perceived effectiveness of the anti-icing program and the increased service level.

Specifically, the research was designed to…

- Measure the awareness of the Anti-Icing pilot program among drivers, pedestrians, cyclists and businesses (via the City's BRZs).
- Assess the effectiveness of the program, from a road users perspective, on their day to day usage of the roads. Additional research was conducted to obtain City of Edmonton staff perspectives.
- Understand the perceived benefits and drawbacks of the program.
- Provide a recommendation to continue with, or expand, change or cancel the program next year.

METHODOLOGY

Methodology (1)

Data Collection

General Public Survey

- Leger conducted an online survey of 1,054 Edmontonians who are members of Leger's online panel, Legerweb.com.
- Interviews were conducted between March 23rd and April 3rd, 2018.
- Data were weighted by age and gender according to Statistics Canada proportions.

City of Edmonton Consumer Insight Panel Survey

- The City of Edmonton conducted an online survey of 1,906 Edmontonians who are members of the City of Edmonton's Insight Community Panel
- Interviews were conducted between May 16th and June 12th, 2018.

City of Edmonton Website, Open Link Survey

- The City of Edmonton conducted an online survey of 4,211 Edmontonians using a open link that was available through the City of Edmonton's website for anyone interested to respond.
- Interviews were conducted between May 16th and June 12th, 2018.

Target Respondents

- Residents of City of Edmonton aged 15+ who have lived in Edmonton for at least 6 months.

Statistical Reliability

As non-random Internet surveys, a margin of error is not reported (margin of error accounts for sampling error). Had Leger's survey data been collected using a probability sample, the margin of error for a sample size of 1,054 would be ±3.0 percentage points, 19 times out of 20.

*Note: Statistical comparison's can not be made between the results of different surveys due to differences in methodologies.

Context

- On June 7, 2018, Global News published an article about the Anti-icing pilot and the surveys, including the link to the online survey as well as some anecdotal concerns about the Anti-icing pilot and the survey. This had a possible negative impact on the survey results for the open link survey specifically, as demonstrated by an increase in negative opinion among the 1,547 respondents who completed the survey on or after the publication date. The Edmonton Insight Community survey only had two responses after that date.

Methodology (2)

Focus Groups

To support and expand on the learning from the online survey, five focus groups were held with road users and stakeholders as follows…

Group	Date	Audience	Number of Participants
1	April 9th 2018	Drivers	8
2	April 10th	Cyclists	8
3	April 10th	Pedestrians/Dog Owners	8
4	April 16th	BRZ Executive Directors	8
5	April 16th	Professional Drivers	7

All groups were held in Leger's downtown focus group facility. With the exception of the BRZ representatives, all respondents were paid an incentive for participation.

- All were residents of Edmonton
- All had lived in Edmonton more than 2 years
- None was employed in competing industries or with the City of Edmonton

The qualitative findings in this report provide a summary of the opinions expressed by participants in focus group discussions. These discussions are exploratory in nature with the flexibility to uncover and examine topics and issues relevant to project objectives. Due to the limited number of respondents, results cannot be generalized or quantified, but rather are to be considered in a qualitative frame of reference.

Source: Focus Groups

SUMMARY OF FINDINGS

Summary of Findings

Initially, nearly two-in-five (37%) of general public respondents, three-in-ten (31%) Insight Community panel respondents, and just over one-in-five (21%) open link respondents indicate having a positive opinion of the Anti-icer pilot.

After being informed that the City of Edmonton has used a third as much sand as usual, as well as being able to clear roads within 12 hours instead of 36 hours, opinions improved for nearly three-in-five (58%) general public respondents, half (50%) of Insight Community panel respondents, and nearly three-in-ten (29%) open link respondents.

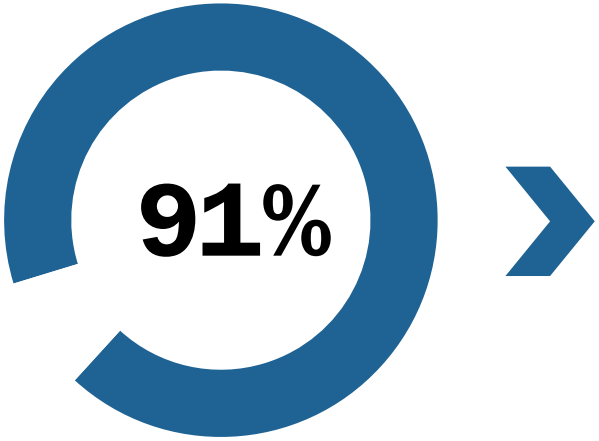
However, after considering all the benefits, as well as the possible downsides, almost half (47%) of general public respondents, over two-in-five (44%) Insight Community respondents, and one-quarter (25%) of open link respondents indicated having a positive opinion of the pilot overall.

All things considered, three-quarters (74%) of general public respondents, two-thirds (66%) of Insight Community panel respondents, and nearly two-in-five (37%) open link respondents feel that the City should continue the Anti-icer pilot on major roads next winter, and seven-in-ten (71%) general public respondents, nearly three-in-five (58%) Insight Community panel respondents, and one-third (34%) of open link respondents believe the program should be expanded to include more roads.

The survey results demonstrate that opinions about the Anti-icer improved as more information about the Anti-icer and its benefits and challenges were provided. Although initial opinions of the pilot may be less than optimal, a greater proportion of respondents not only feel that the program should be continued, but expanded.

DETAILED RESULTS

The majority of Edmontonians who responded to the survey have a driver's licence, learner's licence or GDL licence



Licence type*	n=963
Class 1 (Professional – Any vehicle)	9%
Class 2 (Professional – Bus)	1%
Class 3 (3-axle plus)	3%
Class 4 (Professional – Taxi, Ambulance)	1%
Class 5 (2-axle – Cars, Light Trucks, Motor Homes or Mopeds)	65%
Class 5 GDL Graduated Driver's License (passed basic road test)	17%
Class 6 (Motorcycle & Moped)	7%
Class 7 (Learners – 2-axel & Motorcycle & Moped)	5%
Not sure	1%

Base: Edmontonians who responded to the survey and currently have a valid driver's licence, learner's licence or GDL licence

*multiple responses allowed

Base: Edmontonians who responded to the survey (n=1,054)

Q1. Do you currently have a valid driver's license, learner's licence or GDL license? Q2. What kind of driver's license do you have that is currently valid?

Source: Survey

License Type

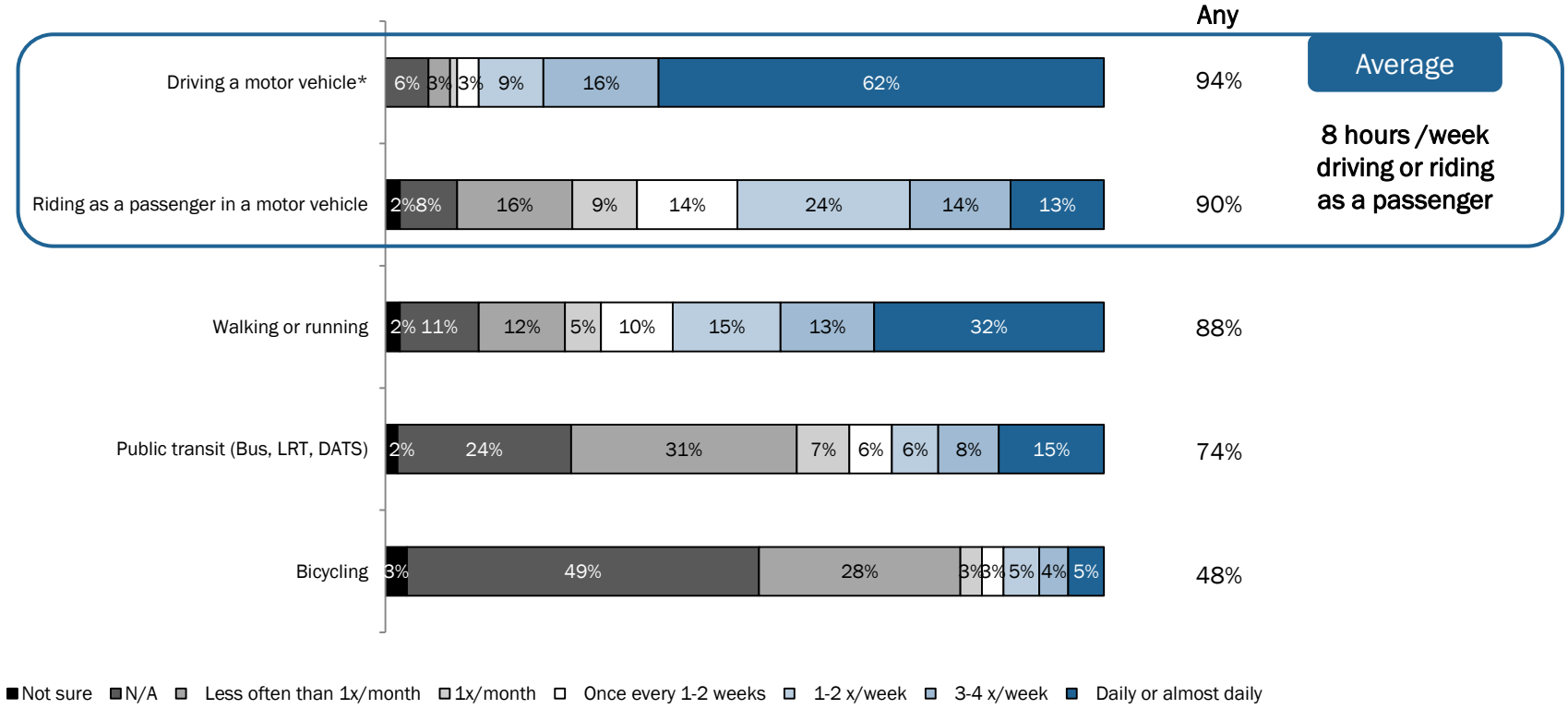
General Population, Insight Community, Open Link

Drivers License	General Population	Insight Community	Open Link
	n= 1,054	n= 1906	n= 4,211
Yes	91%	96%	99%
Base size	*n= 963*	*n= 1,839*	*n=4,171*
Class 1 (Professional – Any vehicle)	9%	4%	6%
Class 2 (Professional – Bus)	1%	2%	1%
Class 3 (3-axle plus)	3%	4%	6%
Class 4 (Professional – Taxi, Ambulance)	1%	1%	1%
Class 5 (2-axle – Cars, Light Trucks, Motor Homes or Mopeds)	65%	79%	75%
Class 5 GDL Graduated Driver's License (passed basic road test)	17%	9%	13%
Class 6 (Motorcycle & Moped)	7%	10%	15%
Class 7 (Learners – 2-axel & Motorcycle & Moped)	5%	1%	1%
Not sure	1%	1%	0%

Base: All respondents

Q1. Do you currently have a valid driver's license, learner's licence or GDL license? Q2. What kind of driver's license do you have that is currently valid?

Driving or riding as a passenger in a motor vehicle are the two most popular modes of transportation in winter time



Base: Edmontonians who responded to the survey (n=1,054)

*Base: Edmontonians who responded to the survey and currently have a valid driver's licence, learner's licence or GDL licence (n=963)

Q3. In winter time, how often do you use the following modes of transportation for all or part of a trip? Q4. Thinking only about winter time, about how many hours do you spend in a typical week driving or riding as a passenger in a motor vehicle?

Source: Survey

Mode of Transportation in Winter

General Population, Insight Community, Open Link

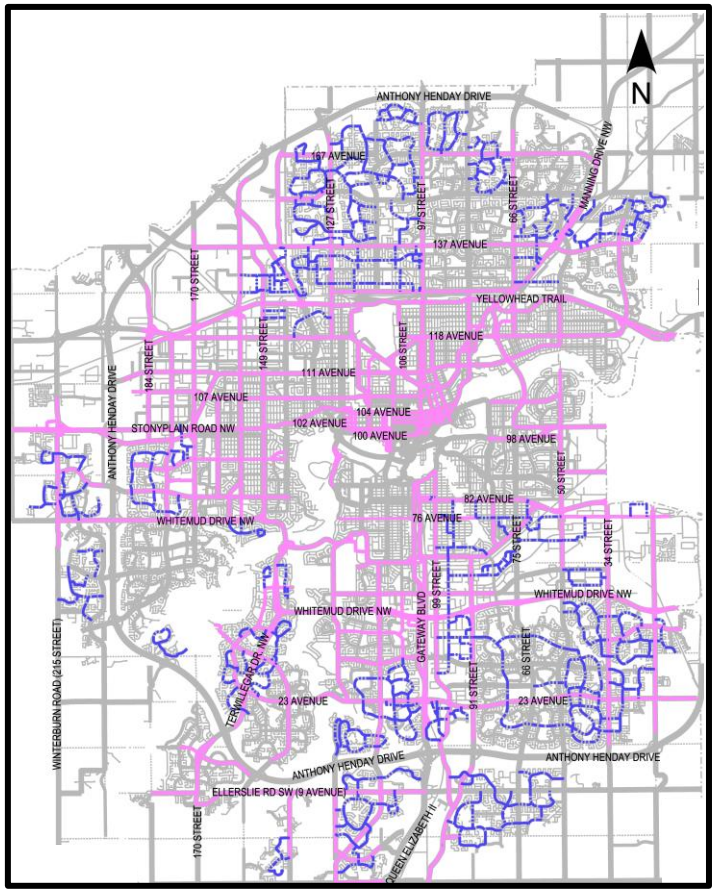
	Any		
	General Population	Insight Community	Open Link
	n= 1,054	n=1,906	n= 4,211
Driving a motor vehicle*	94%	95%	99%
Riding as a passenger in a motor vehicle	90%	96%	92%
Walking or running	88%	93%	87%
Public transit (Bus, LRT, DATS)	74%	87%	65%
Bicycling	48%	61%	56%

Base: All respondents

*Base: All respondents who currently have a valid driver's license, learner's license or GDL license (n=963)

Q3. In winter time, how often do you use the following modes of transportation for all or part of a trip? Q4. Thinking only about winter time, about how many hours do you spend in a typical week driving or riding as a passenger in a motor vehicle?

Use of anti-icing pilot roads



A high majority (93%)[1] who drive or ride as a passenger in a motor vehicle have been a driver or passenger on these roads at least once a week this winter.

Almost three-in-five (58%)[2] Edmontonians who responded to the survey and walk, run or cycle have regularly crossed any of these roads at least about once a week this winter.

One-in-seven (14%)[3] Edmontonians who responded to the survey and cycle have regularly ridden on cycle lanes on any of these roads this winter. **One-quarter (25%)**[3] have done so occasionally.

1. Base: Edmontonians who responded to the survey and drive or ride as a passenger in a motor vehicle in winter (n=1,033)
2. Base: Edmontonians who responded to the survey and walk, run or cycle in winter (n=946)
3. Base: Edmontonians who responded to the survey and cycle in winter (n=545)

Q5. Consider only the roads shown in pink and blue on the map. Have you been a driver or passenger in a motor vehicle on any of these roads at least about once a week this winter? Q6. Consider only the roads shown in pink and blue on the map. When you are **walking, running or cycling** in winter, have you regularly crossed any of these roads at least about once a week this winter? Q7. Consider only the roads shown in pink and blue on the map. This winter, have you ridden on cycle lanes on any of these roads?

Source: Survey

Transportation Mode Frequency

General Population, Insight Community, Open Link

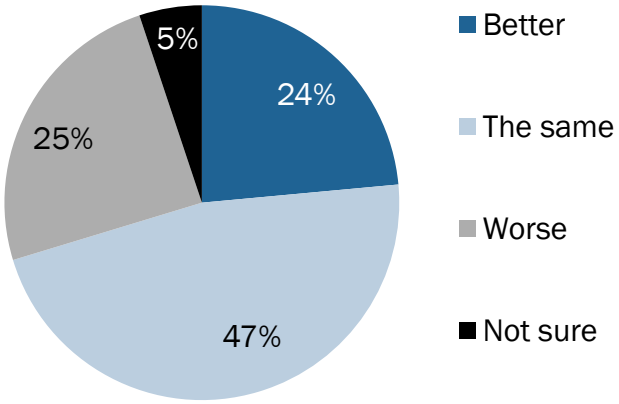
	Yes (Yes, yes regularly, yes occasionally)		
	General Population	Insight Community	Open Link
	n = 1,033	*n = 1,895*	*n = 4,204*
Have you been a driver or passenger in a motor vehicle on any of these roads at least about once a week this winter?	93%	97%	99%
	n = 946	n = 1,782	n = 3,709
When you are **walking, running or cycling** in winter, have you regularly crossed any of these roads at least about once a week this winter?	*58%*	*58%*	*55%*
	n = 545	n = 266	n = 620
This winter, have you ridden on cycle lanes on any of these roads.	*39%*	*52%*	*35%*

Base: All respondents

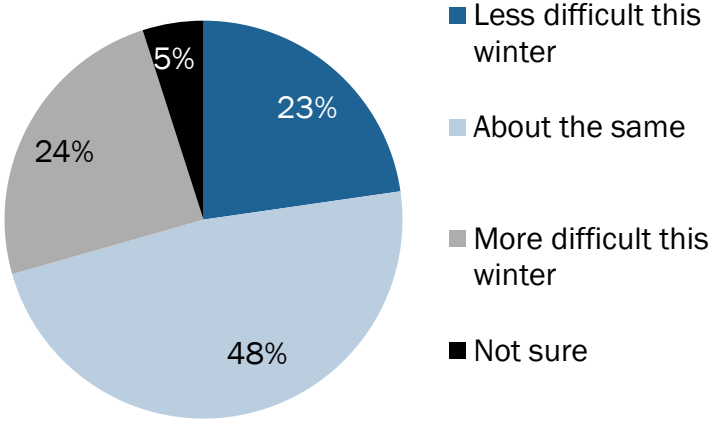
Q5. Consider only the roads shown in pink and blue on the map. Have you been a driver or passenger in a motor vehicle on any of these roads at least about once a week this winter? Q6. Consider only the roads shown in pink and blue on the map. When you are **walking, running or cycling** in winter, have you regularly crossed any of these roads at least about once a week this winter? Q7. Consider only the roads shown in pink and blue on the map. This winter, have you ridden on cycle lanes on any of these roads?

Road conditions winter 2017-2018

Road conditions this winter (2017-2018)



Impact of weather on City of Edmonton's ability to manage road conditions



About half of Edmontonians who responded to the survey and have lived in Edmonton more than one year think that road conditions and road condition difficulty are the same this winter (2017-2018), compared to last winter.

Older Edmontonians who responded to the survey (aged 55+) and those born in Canada are more likely to say that road conditions are better and roads are less difficult this winter. Those residing in North Edmonton are more likely to say that road conditions are better.

Base: Edmontonians who responded to the survey and have lived in Edmonton for one year or more (n=1,010)

Q8. Overall, do you think the road conditions this winter (2017-18) have been worse, the same, or better than last winter? Q11. As you know, weather can vary from year to year, with different temperatures and different amounts of snowfall. Considering the weather itself this winter (2017-18), would you say it made road conditions more difficult, about the same, or easier for the City of Edmonton to manage than last winter (2016-17)?

Source: Survey

Road Condition Comparison

Perceived Road Conditions this winter	General Population	Insight Community	Open Link
	n= 1,010	n= 1,904	n= 4,171
Better	24%	34%	27%
The Same	47%	37%	21%
Worse	25%	23%	48%
Not Sure	5%	7%	3%

Impact of weather	General Population	Insight Community	Open Link
	n= 1,010	n= 1,904	n=4,171
More difficult this winter	24%	24%	25%
About the same	48%	40%	44%
Less difficult this winter	23%	28%	24%
Not sure	5%	8%	7%

Base: All respondents.

Internal Staff were not asked questions regarding the impact of weather.

Q8/Q1. Overall, do you think the road conditions this winter (2017-18) have been worse, the same, or better than last winter? Q11. As you know, weather can vary from year to year, with different temperatures and different amounts of snowfall. Considering the weather itself this winter (2017-18), would you say it made road conditions more difficult, about the same, or easier for the City of Edmonton to manage than last winter (2016-17)?

Changes in road conditions this year

- In general, most respondents felt that the road conditions this past winter were on par with previous years with some saying worse, some saying better. The long, cold winter and the January freeze-thaw cycle were the frames of reference.

"It seems like a worse year than normal and it's been colder with more snow than usual and that might be marking how I feel about it because we've had so many more snowfall warnings, so much more freezing participation, freeze-thaw cycles clouding my judgement."

- However, many were aware of the City's anti-icing pilot program through the news so were able to immediately relate the perceived differences in the road conditions (versus previous years) to the presence of the anti-icer.

"I think it is a good thing because this last winter the intersections were ok and I don't remember getting choked about anything driving because of the roads."

- The professional drivers and business association directed tended to be more likely to notice differences in the road conditions this year that can be directly attributed to the anti-icing program.

"This is the first time I've seen the road wet in January rather than covered in snow"

- A few of the cyclists noticed that the roads were cleaner but also complained that their chains and gears on their bicycles corroded much faster this year and there was a need to change lubricants to accommodate the new road conditions.

- A few also commented that they received fewer stone chips on their windshields this winter.

Source: Focus Groups

Factors contributing to road conditions

Positive Factors	n=1010
Proper snow operations	24%
Better use of salt/brine	15%
Milder climate (less snow, ice, etc.)	11%
Road maintenance	5%
Preventative measures	2%
Specific road named (in general)	4%
Other	4%
No improvements / No answer	46%

Negative Factors	n=1010
More severe weather (snow, ice, etc.)	15%
Inadequate snow removal operations	13%
Road salt/deicer issues (in general)	9%
Icy roads, sidewalks (in general)	8%
Presence of potholes	6%
Construction issues (roadways, LRT, etc.)	4%
Bicycle path development	4%
Innovations, alternatives to road salt	3%
Inadequate infrastructure maintenance	3%
Traffic issues (in general)	3%
Poor drivers (in general)	2%
Parking issues (in general)	2%
Damage, abrasions to my vehicle	2%
Bike lanes plowed before streets	1%
Other	3%
Don't know / No answer	44%

Proper snow operations and better use of salt/brine are the top two factors that contribute to improving road conditions this winter as compared to previous typical winters.

More severe weather and inadequate snow removal operations are the top two factors that made the road conditions worse this winter as compared to previous typical winters.

Base: Edmontonians who responded to the survey and have lived in Edmonton for more than one year

Q9. Regardless of whether you think overall road conditions improved, worsened or stayed the same, are there any factors you can think of that helped contribute to improving road conditions this winter as compared to previous typical winters? Please be as detailed as possible, including any specific roads where you noticed any improvement. Q10. Regardless of whether you think overall road conditions improved, worsened or stayed the same, are there any factors you can think of that made the road conditions worse this winter as compared to previous typical winters? Please be as detailed as possible, including any specific roads where you noticed any particular challenges.

Source: Survey

Positive Factors Contributing to Road Conditions

General Population, Insight Community, Open Link

Positive Factors	General Population	Insight Community	Open Link
	n= 1,010	n= 1,412	n= 3,185
Proper snow operations	24%	21%	15%
Better use of salt/brine	15%	23%	19%
Milder climate (less snow, ice, etc.)	11%	17%	11%
Road maintenance	5%	2%	1%
Specific roads named (in general)	4%	9%	-
Preventative measures	2%	3%	2%
Installed winter tires	-	-	1%
Clearing parked vehicles	-	1%	-
Other	4%	3%	2%
No improvements / No answer	46%	41%	54%

Base: All respondents who have lived in Edmonton for more than one year.

Q9. Regardless of whether you think overall road conditions improved, worsened or stayed the same, are there any factors you can think of that helped contribute to improving road conditions this winter as compared to previous typical winters? Please be as detailed as possible, including any specific roads where you noticed any improvement.

Negative Factors Contributing to Road Conditions

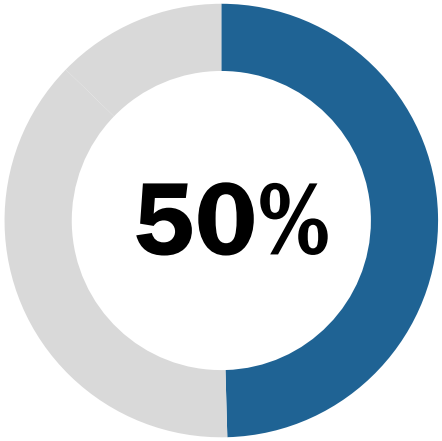
General Population, Insight Community, Open Link

Positive Factors	General Population	Insight Community	Open Link
	n= 1,010	n= 1,318	n= 3,257
More severe weather (snow, ice, etc.)	15%	14%	6%
Inadequate snow removal operations	13%	15%	8%
Road salt/deicer issues (in general)	9%	27%	45%
Icy roads, sidewalks (in general)	8%	15%	20%
Presence of potholes	6%	4%	1%
Construction issues (roadways, LRT, etc.)	4%	2%	-
Bicycle path development	4%	2%	1%
Innovations, alternatives to road salt	3%	3%	4%
Inadequate infrastructure maintenance	3%	3%	2%
Traffic issues (in general)	3%	1%	1%
Poor drivers (in general)	2%	2%	1%
Parking issues (in general)	2%	2%	1%
Damage, abrasions to my vehicle	2%	3%	6%
Bike lanes plowed before streets	1%	1%	-
Wasn't worse / no specific factors made it worse	-	8%	6%
Wetness / the roads always seemed wet / roads were never dry / water pooling	-	2%	7%
Lack of sand, less sand used (traction, gripping issues, etc.)	-	3%	4%
Slushier/more sloppy roads	-	2%	3%
Other	3%	8%	7%
Don't know / No answer	44%	11%	10%

Base: All respondents who have lived in Edmonton for more than one year.

Q9. Regardless of whether you think overall road conditions improved, worsened or stayed the same, are there any factors you can think of that helped contribute to improving road conditions this winter as compared to previous typical winters? Please be as detailed as possible, including any specific roads where you noticed any improvement.

Unaided awareness of new/different approaches to addressing road conditions



Half (50%) of Edmontonians who responded to the survey have heard about any new or different approaches the City of Edmonton has been using to address winter road conditions over the past year or so.

Unaided awareness increases with age.

New approaches heard of	n=516
New chemical/method	32%
Spray application	23%
Helps get rid of ice/snow (de-icing)	22%
Applied prior to snowfall/storm	15%
Salt product	15%
Calcium chloride product	12%
Prevents icing/snow on roads	11%
Used on major roadways (selective)	11%
Liquid product	9%
Brine solution	8%
Reducing use of sand/gravel/salt	6%
Makes snow operations easier/faster	3%
Effective / Good idea (in general)	2%
Improving snow operations	2%
Better parking enforcement	2%
Ineffective in extreme weather	1%
Other	6%
Don't know / No answer	3%

Base: Edmontonians who responded to the survey and have heard about any new or different approaches the City of Edmonton has been using to address winter road conditions over the past year or so

Base: Edmontonians who responded to the survey (n=1,054)

Q12. Over the past year or so, have you heard about any new or different approaches the City of Edmonton has been using to address winter road conditions?

Source: Survey

Awareness of Approaches to Addressing Road Conditions

General Population, Insight Community, Open Link

Perceived Road Conditions	General Population	Insight Community	Open Link
	n= 1,054	n=1,906	n= 4,211
Heard of new approaches (% Yes)	50%	79%	79%

Base: All respondents who have lived in Edmonton for more than one year.

Q12. Over the past year or so, have you heard about any new or different approaches the City of Edmonton has been using to address winter road conditions?

New Approaches to Addressing Road Conditions
General Population, Insight Community, Open Link

Perceived Road Conditions	General Population	Insight Community	Open Link
	n= 516	n=1,499	n= 3,317
New chemical/method	32%	8%	6%
Spray application	23%	19%	18%
Helps rid of ice/snow (de-icing)	22%	19%	26%
Applied prior to snowfall/storm	15%	4%	2%
Salt product	15%	18%	11%
Calcium chloride product	12%	13%	16%
Prevents icing/snow on roads	11%	2%	2%
Used on major roadways (selective)	11%	-	-
Liquid product	9%	14%	12%
Brine solution	8%	9%	9%
Reducing use of sand/gravel/salt	6%	4%	4%
Makes snow operations easier/faster	3%	-	-
Effective / Good idea (in general)	2%	-	-
Improving snow operations	2%	-	
Better parking enforcement	2%	-	--
Ineffective in extreme weather	1%	-	-
Anti-icing / Anti-icer (unspecified)	-	5%	12%
New product / formula / treatment (unspecified)	-	4%	3%
Other	6%	6%	5%
Don't know / No answer	3%	-	1%

Base: All respondents have heard about the different approaches to address road conditions.

Q12. Over the past year or so, have you heard about any new or different approaches the City of Edmonton has been using to address winter road conditions?

Awareness of Anti-icing program

Many were aware that the program was in place but there was some confusion about the product being used and virtually no understanding of the application processes. Examples of the product included mentions such as “pickle juice”, “salt mixture” or “brine”.

“it’s a new de-icer. I heard it would be better than salt, less damage to vehicles but I haven’t seen it working yet.”

Some believed that they were familiar with the product from their experience in other regions.

“I think they use it in Winnipeg.”

I used to regularly drive the Coquihallla Highway and they have been using it for years.”

“It’s calcium Chloride. It has some anti-corrosive substance added to it. To me, it’s good on the routes that are already clear, but on residential streets, the snow is still thick.”

“I liked it. You’re on bare pavement, not ice. If there’s a downside on it, the intersections seem to be skipped. As an example, I do a lot of Whitemud driving and take the 149th street exit and that exit is slippery. Whitemud is fine and all of a sudden it’s slippery.”

“You have to wash your vehicle every week because it will eat your paint.”

The professional driver and BIA groups tended to be better informed about the product.

Source: Focus Groups

Aided awareness

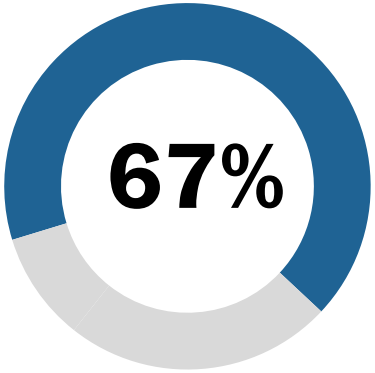
The City's current practice during snowstorms is to sand as soon as the snow falls and then follow immediately with plowing. The sand/plow cycle contains inherent inefficiencies because much of the investment in sand, labour and equipment utilized is lost when the sand is plowed. In addition, sand does not provide adequate traction during Edmonton's mid-winter melts, which produces ice buildup.

To address these challenges, the City Administration is investigating recent industry practices that utilize varied products and approaches to addressing snow and ice control.

Edmonton recently started a pilot project using an Anti-icer solution that is applied to roadways before a snowfall. This pilot used a threefold approach when it comes to snow removal:

1. Apply anti-icing agents to roadways to prevent the snow from bonding to the road surface.
2. Use mechanical means (e.g., plowing) to remove as much snow as possible.
3. Apply the most appropriate product (salt, sand, chloride), in the least amount possible, to achieve safest conditions and best levels of mobility.

The Anti-icer pilot project was introduced to a limited number of roadways in early 2017 and expanded in winter 2017-18 to include freeways and many of the main arterial and collector roadways throughout Edmonton.



Two-thirds (67%) of Edmontonians who responded to the survey have heard about the City of Edmonton using Anti-icer this winter. Aided awareness increases with age and years lived in Edmonton.

Base: Edmontonians who responded to the survey (n=1,054)

Q13. Have you heard about the City of Edmonton using Anti-icer this winter?

Source: Survey

Aided Awareness of Anti-icing Use

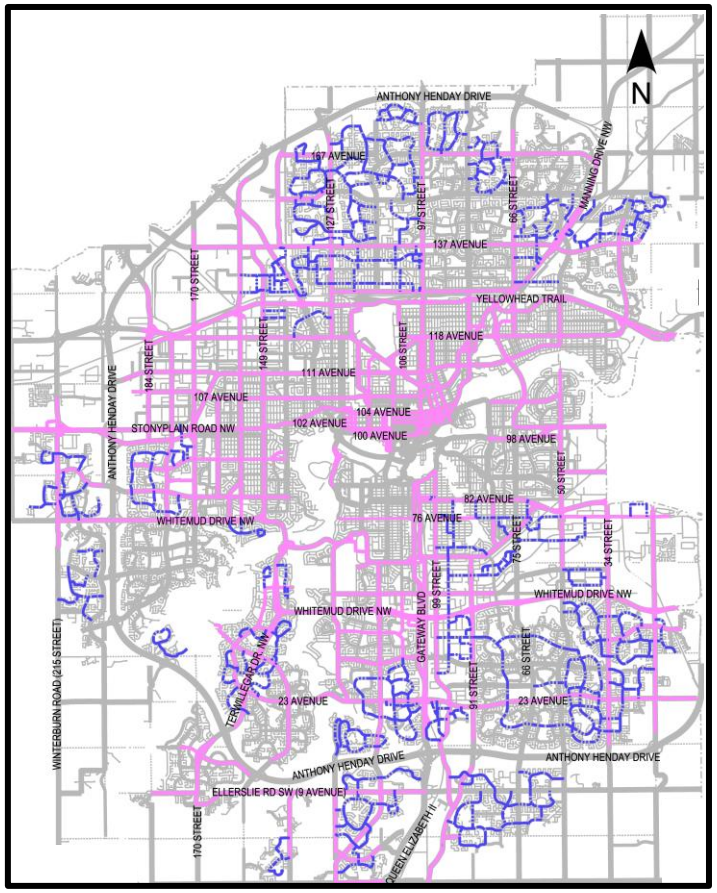
General Population, Insight Community, Open Link

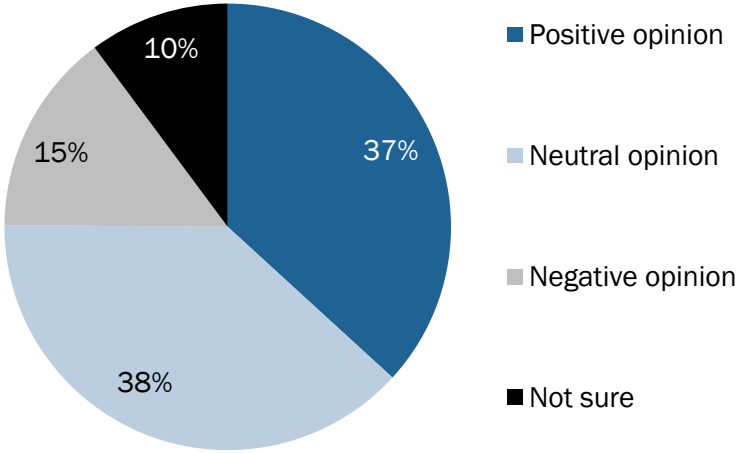
Anti-icing use	General Population	Insight Community	Open Link
	n= 1,054	n=1,906	n=4,211
Yes	67%	88%	95%

Base: All respondents.

Q13. Have you heard about the City of Edmonton using Anti-icer this winter?

Opinion of Anti-icer





Unaided attitude about use of the Anti-icer is largely neutral to positive. Positive ratings increase with age.

Edmontonians responding to survey who are more likely to have a positive opinion:

- Those with a full-time, part-time job or retired
- Those who cycle main roads in winter
- Those who feel road conditions in the 2017-2018 winter were the same or better than last winter

Base: Edmontonians who responded to the survey (n=1,054)

Q14a. From what you experienced or heard about the recent use of Anti-icer on main arterial roadways in Edmonton, do you have a negative opinion, a neutral opinion or a positive opinion about it?

Source: Survey

Opinion of Anti-icer

General Population, Insight Community, Open Link

Opinion of anti-icer	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
Positive Opinion	37%	31%	21%
Neutral Opinion	38%	33%	14%
Negative Opinion	15%	27%	61%
Not Sure	10%	9%	3%

Base: All respondents.

Q14a/Q5. From what you experienced or heard about the recent use of Anti-icer on main arterial roadways in Edmonton, do you have a negative opinion, a neutral opinion or a positive opinion about it?

Reasons for positive opinion about the recent use of Anti-icer on main arterial roadways

Positive opinion about the recent use of Anti-icer on main arterial and collector roadways	n=384
Roads were better (in general)	31%
Product is/was effective	25%
Good idea (in general)	19%
Roads were safer	13%
Less icy/slippery (in general)	11%
Roads felt smoother (feeling)	8%
Roads felt icier/slippery (worse)	2%
Ineffective in bitterly cold weather	2%
Damage, abrasions to vehicles	1%
Unsure of environmental impact	1%
Other	3%
Not sure / Haven't seen a difference	2%
Don't know / No answer	6%

Base: Edmontonians who responded to the survey and have a positive opinion about the recent use of Anti-icer on main arterial roadways
*multiple mentions allowed

Q14b. Why do you have a (positive/neutral/negative) opinion about the Anti-icer?

Source: Survey

Positive Opinion About Use of Anti-icer

General Population, Insight Community, Open Link

Positive opinion about the recent use of Anti-icer on main arterial and collector roadways	General Population n=384	Insight Community n=536	Open Link n=827
Roads were better (in general)	31%	23%	25%
Product is/was effective	25%	33%	25%
Good idea (in general)	19%	10%	9%
Roads were safer	13%	7%	13%
It was less icy/slippery (in general)	11%	18%	21%
Roads felt smoother (feeling)	8%	-	-
Roads felt icier/slippery (worse)	2%	1%	-
Ineffective in bitterly cold weather	2%	3%	2%
Damage, abrasions to vehicles	1%	8%	5%
Unsure of environmental impact	1%	4%	3%
Better for vehicles (no debris, build-up)	-	3%	3%
Product is harmful to animals	-	1%	-
Roads had better traction (feeling)	-	3%	6%
Roads were clear/cleaner	-	24%	24%
Bad for the environment	-	-	-
I have a positive opinion (in general)	-	-	-
Better operational planning	-	-	-
Other	3%	4%	5%
Not sure / Haven't seen a difference	2%	1%	1%
Don't know / No answer	6%	-	1%

Base: All respondents who have a postiive opinion about the recent use of Anti-icer on main arterial roadways

*multiple mentions allowed

Q14b/Q6. Why do you have a (**positive**/neutral/negative) opinion about the Anti-icer?

Neutral opinion about the recent use of Anti-icer on main arterial roadways

Neutral opinion about the recent use of Anti-icer on main arterial and collector roadways	n=407
Damage, abrasions to vehicles	9%
Good idea (in general)	7%
Product is/was effective	6%
Unsure of environmental impact	5%
Roads were better (in general)	4%
Ineffective in bitterly cold weather	3%
Roads felt icier/slippery (worse)	3%
Product is/was ineffective	2%
Too costly / Waste of money	1%
Product is harmful to animals	1%
It was less icy/slippery (in general)	1%
Roads felt smoother (feeling)	1%
Roads were safer	1%
Other	4%
Not sure / Haven't seen a difference	28%
Don't know / No answer	37%

Base: Edmontonians who responded to the survey and have a neutral opinion about the recent use of Anti-icer on main arterial roadways

*multiple mentions allowed

Q14b. Why do you have a (positive/neutral/negative) opinion about the Anti-icer?

Source: Survey

Neutral Opinion About Use of Anti-icer

General Population, Insight Community, Open Link

Neutral opinion about the recent use of Anti-icer on main arterial and collector roadways	General Population n=407	Insight Community n=522	Open Link n=508
Damage, abrasions to vehicles	9%	21%	33%
Good idea (in general)	7%	3%	3%
Product is/was effective	6%	6%	13%
Unsure of environmental impact	5%	10%	14%
Roads were better (in general)	4%	4%	6%
Ineffective in bitterly cold weather	3%	4%	10%
Roads felt icier/slippery (worse)	3%	6%	10%
Product is/was ineffective	2%	5%	6%
Too costly / Waste of money	1%	1%	1%
Product is harmful to animals	1%	2%	2%
It was less icy/slippery (in general)	1%	3%	-
Roads felt smoother (feeling)	1%	-	-
Roads were safer	1%	2%	1%
Roads had better traction (feeling)	-	-	1%
Need more study/info/evidence	-	-	-
I have a positive opinion (in general)	-	-	-
Bad for the environment	-	-	-
Better operational planning	-	-	-
Not worth it / A waste of money	-	-	-
Other	4%	1%	1%
Not sure / Haven't seen a difference	28%	56%	38%
Don't know / No answer	37%	3%	2%

Base: All respondents who have a neutral opinion about the recent use of Anti-icer on main arterial roadways

*multiple mentions allowed

Q14b/Q6. Why do you have a (positive/**neutral**/negative) opinion about the Anti-icer?

Reasons for negative opinion about the recent use of Anti-icer on main arterial roadways

Negative opinion about the recent use of anti-icer on main arterial and collector roadways	n=154
Roads felt icier/slippery (worse)	39%
Damage, abrasions to vehicles	34%
Ineffective in bitterly cold weather	13%
Product is/was ineffective	10%
Product is harmful to animals	7%
Unsure of environmental impact	7%
Too costly / Waste of money	3%
Good idea (in general)	2%
Roads were better (in general)	1%
Other	5%
Not sure / Haven't seen a difference	7%
Don't know / No answer	8%

Base: Edmontonians who responded to the survey and have a negative opinion about the recent use of Anti-icer on main arterial roadways
*multiple mentions allowed

Q14b. Why do you have a (positive/neutral/negative) opinion about the Anti-icer?

Source: Survey

Negative Opinion About Use of Anti-icer

General Population, Insight Community, Open Link

Negative opinion about the recent use of Anti-icer on main arterial and collector roadways	General Population n=154	Insight Community n=508	Open Link n=2,514
Roads felt icier/slippery (worse)	39%	42%	39%
Damage, abrasions to vehicles	34%	44%	56%
Ineffective in bitterly cold weather	13%	16%	14%
Product is/was ineffective	10%	25%	24%
Product is harmful to animals	7%	3%	3%
Unsure of environmental impact	7%	21%	20%
Too costly / Waste of money	3%	2%	4%
Good idea (in general)	2%	-	-
Roads were better (in general)	1%	-	-
Product is/was effective	-	2%	1%
Bad for the environment	-	-	-
I have a negative opinion (in general)	-	-	-
Damages infrastructure	-	-	-
Better operational planning	-	-	-
Not worth it / A waste of money	-	-	-
Need more study/info/evidence	-	-	-
Other	5%	2%	2%
Not sure / Haven't seen a difference	7%	1%	1%
Don't know / No answer	8%	1%	2%

Base: All respondents who have a negative opinion about the recent use of Anti-icer on main arterial roadways

*multiple mentions allowed

Q14b/Q6. Why do you have a (positive/neutral/**negative**) opinion about the Anti-icer?

Anti-Icing explained

The City's current practice during snowstorms is to sand as soon as the snow falls and then follow immediately with plowing. The sand/plow cycle contains inherent inefficiencies because much of the investment in sand, labour and equipment utilized is lost when the sand is plowed. In addition, sand does not provide adequate traction during Edmonton's mid-winter melts, which produces ice buildup.

To address these challenges, the City Administration is investigating recent industry practices that utilize varied products and approaches to addressing snow and ice control.

Edmonton recently started a pilot project using an Anti-icer solution that is applied to roadways before a snowfall. This pilot uses a threefold approach when it comes to snow removal:

Apply anti-icing agents to roadways to prevent the snow from bonding to the road surface.
Use mechanical means (e.g., plowing) to remove as much snow as possible.
Apply the most appropriate product (salt, sand, chloride), in the least amount possible, to achieve safest conditions and best levels of mobility.

Now answer the following questions:

Based on what you know so far, what is your opinion about the Anti-icer? (circle your answer)

Positive opinion
Negative opinion
Neutral opinion

Why do you have that opinion? _____

Source: Focus Groups

Opinion of Anti-Icer

On balance, the majority of respondents were positive about the product and the pilot after reading the initial description of the process.

Positive comments revolved around issues like safety, reduced sand usage and from the BIA directors the reduced costs of the spring cleanup from less sand. Also, after being informed that the new process reduces the target time for the City to clear the roads to 12 hours this was extremely well received.

There were, however, several (unaided) concerns raised about the Anti-icer. The most common concerns were around:

The potential environmental impacts when the product gets washed into the river or onto the shoulders in the spring.

The cleanup of the white haze that appeared on building fronts and roadside infrastructure.

The potential corrosive effect on vehicles including bicycles and the potential for significant costs for maintenance and repairs. Many had experience in jurisdictions that use salt on the roads and were very aware of the impact on vehicles in those places.

The potential corrosive effects on building facades (especially wood facades in Old Strathcona and brick pavers).

The increased number of potholes.

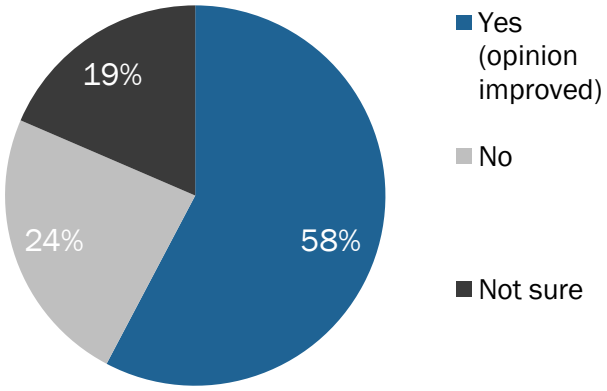
Some felt that there was an increased chance of the “slush” freezing and making the road conditions worse.

If the cost of the product and application, including the need for the City to acquire new equipment to spread the $CaCl_2$, is greater than the cost savings.

Source: Focus Groups

Three-in-five Edmontonians who responded to the survey have an improved opinion about the Anti-icer after learning about the benefits of using it

To date, the City of Edmonton has used one third as much sand as usual, reducing the amount of sand that will need to be collected and disposed of in the Spring. In addition, the City has endeavored to have the main roads cleared within 12 hours of a snow storm as opposed to the previous service level of 36 hours.



Edmontonians responding to the survey who are more likely to have an improved opinion:

- Those 18-34 years of age
- Those with high school education or less
- Those with annual income below $30,000
- Those who walk their dog in the winter
- Those who cycle main roads
- Those who feel road conditions in the 2017-2018 winter were better than last winter

Base: Edmontonians who responded to the survey (n=1,054)

Q14c. Does knowing this improve your opinion about the anti-icer?

Source: Survey

Improved Opinion of Anti-icer

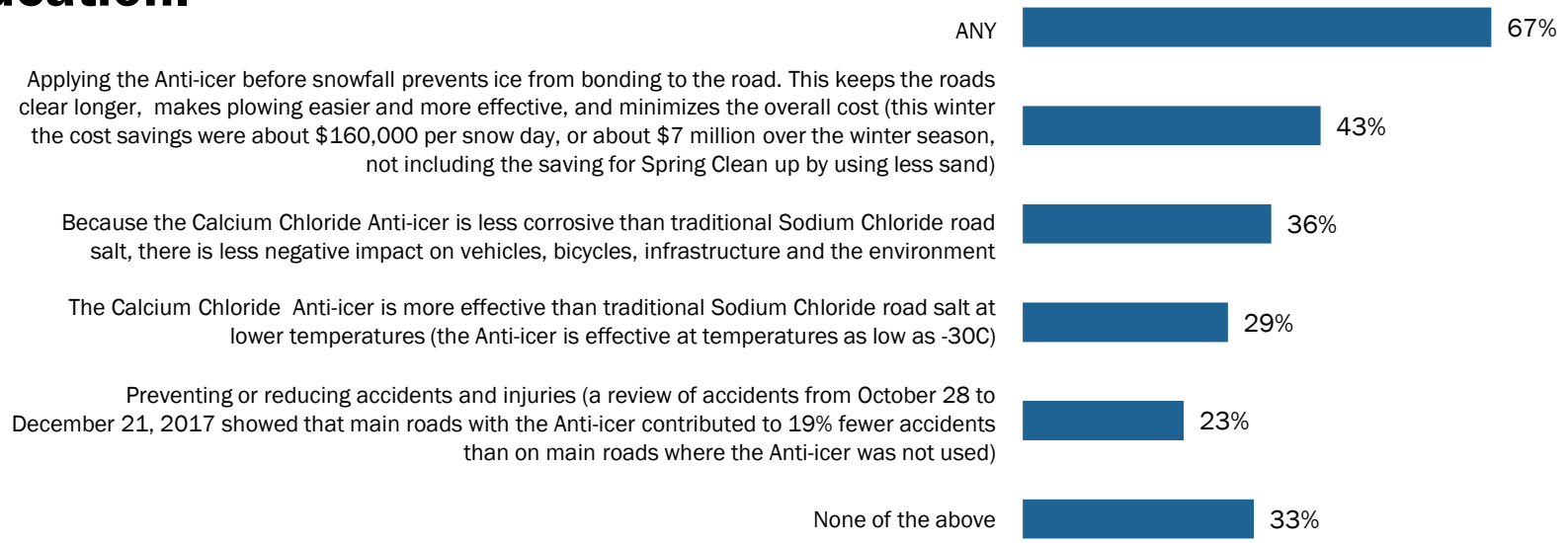
General Population, Insight Community, Open Link

Improved opinion of anti-icer	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
Yes	58%	50%	29%
No	24%	34%	62%
Not sure	19%	17%	9%

Base: All respondents.

Q14c/Q7. Does knowing this improve your opinion about the anti-icer?

Two-thirds of Edmontonians who responded to the survey are aware of one or more of the benefits of using the Anti-icer. Awareness of benefits is higher for those with more education.



Edmontonians responding to the survey who are more likely to be aware of any benefits of using the anti-icer:

- Males
- Those with college or university education
- Those with annual income of $60,000 to $99,999
- Those who walk their dog
- Those who work full time, part time, student or retired
- Those with Class 1 licence (professional – any vehicle)
- Those with better road conditions perception in 2017-2018 winter

Base: Edmontonians who responded to the survey (n=1,054)

Q15. The following are benefits of the Calcium Chloride Anti-icer the City of Edmonton used in the pilot. Before taking part in this survey, which of these benefits were you already aware of regarding the Anti-icer?

Source: Survey

Awareness of Benefits of Anti-icer

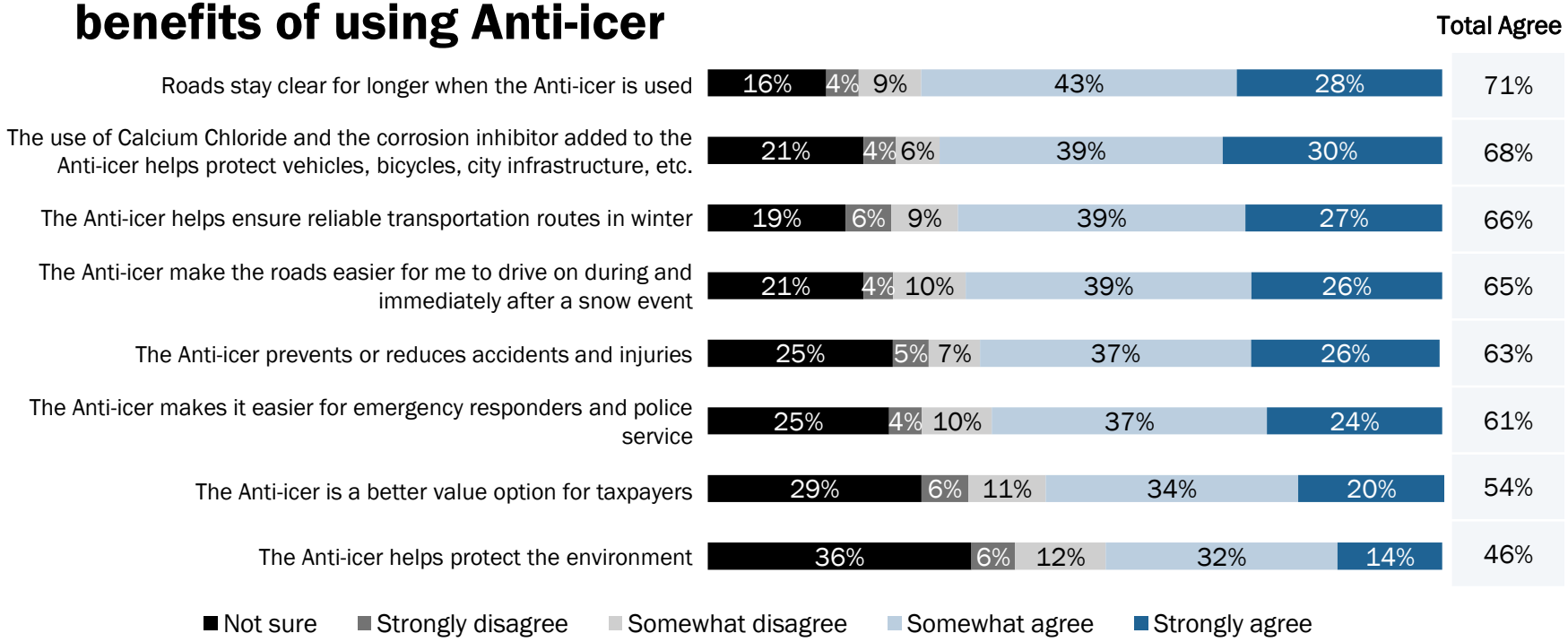
General Population, Insight Community, Open Link

Awareness of benefits of anti-icer	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
ANY	67%	70%	66%
Applying the Anti-icer before snowfall prevents ice from bonding to the road. This keeps the roads clear longer, makes plowing easier and more effective, and minimizes the overall cost (this winter the cost savings were about $160,000 per snow day, or about $7 million over the winter season, not including the saving for Spring Clean up by using less sand)	43%	53%	50%
Because the Calcium Chloride Anti-icer is less corrosive than traditional Sodium Chloride road salt, there is less negative impact on vehicles, bicycles, infrastructure and the environment	36%	39%	37%
The Calcium Chloride Anti-icer is more effective than traditional Sodium Chloride road salt at lower temperatures (the Anti-icer is effective at temperatures as low as -30C).	29%	41%	42%
Preventing or reducing accidents and injuries (a review of accidents from October 28 to December 21, 2017 showed that main roads with the Anti-icer contributed to 19% fewer accidents than on main roads where the Anti-icer was not used)	23%	18%	21%
None of the above	33%	30%	34%

Base: All respondents

Q15/Q8. The following are benefits of the Calcium Chloride Anti-icer the City of Edmonton used in the pilot. Before taking part in this survey, which of these benefits were you already aware of regarding the Anti-icer?

From one-in-seven to almost one-third of Edmontonians who responded to the survey are not sure about specific benefits of using Anti-icer



Edmontonians responding to the survey who are more likely to agree with most to all statements:

- Those 18-34 years of age
- Those with children in their household
- Those who reside in NE Edmonton
- Those who cycle on main roads in winter
- Those who feel road conditions in the 2017-2018 winter were the same or better than last winter

Base: Edmontonians who responded to the survey (n=1,054)

Q16_1. To what extent do you agree or disagree the Anti-icer can provide the following benefits?

Source: Survey

Benefits of Using Anti-icer

General Population, Insight Community, Open Link

	Total Agree (somewhat agree, strongly agree)		
	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
The Anti-icer helps ensure reliable transportation routes in winter	66%	61%	40%
The Anti-icer makes it easier for emergency responders and police service	61%	53%	38%
The Anti-icer makes the roads easier for me to drive on during and immediately after a snow event.	65%	54%	37%
Roads stay clear for longer when the Anti-icer is used	71%	54%	43%
The Anti-icer is a better value option for taxpayers	54%	58%	38%
The Anti-icer prevents or reduces accidents and injuries	63%	51%	34%
The use of Calcium Chloride and the corrosion inhibitor added to the Anti-icer helps protect vehicles, bicycles, city infrastructure, etc.	68%	44%	26%
The Anti-icer helps protect the environment	46%	36%	24%

Base: All respondents.
Q16_1/9. To what extent do you agree or disagree the Anti-icer can provide the following benefits?

Benefits explained

The Anti-icer is applied prior to snowfall and remains effective for four days. The Anti-icer uses a Calcium Chloride Solution ($CaCl_2$) and is applied in liquid form. This provides many benefits over the traditional Sodium Chloride road salt.

1. Applying the Anti-icer before snowfall prevents ice from bonding to the road. This keeps the roads clear longer, makes plowing easier and more effective, and minimizes the overall cost. This winter the cost savings were about $160,000 per snow day, or about $7 million over the winter season, not including the saving for Spring Cleanup by using less sand.

2. Preventing or reducing accidents and injuries. A review of accidents from October 28 to December 21, 2017 showed that main roads with the Anti-icer contributed to 19% fewer accidents than on main roads where the Anti-icer was not used.

3. Because the Calcium Chloride Anti-icer is less corrosive than traditional Sodium Chloride road salt, there is less negative impact on vehicles, bicycles, infrastructure and the environment.

4. The Calcium Chloride Anti-icer is more effective than traditional Sodium Chloride road salt at lower temperatures. The Anti-icer is effective at temperatures as low as -30C.

RANKING: Write in the benefit number for each rank

Most important benefit	#
Second most important benefit	#
Third most important benefit	#
Least important benefit	#

Source: Focus Groups

Benefits of Anti-Icer program

Group	Most	Second	Third	Fourth
Drivers	Reducing accidents	Cost savings	Less corrosive	Effectiveness at low temps
Cyclists	Reducing accidents	Cost savings	Less corrosive	Effectiveness at low temps
Pedestrians/ Dog Owners	Reducing accidents	Cost savings/ Less corrosive	Cost savings	Effectiveness at low temps
Professional Drivers	Reducing accidents	Cost savings/ Less corrosive	Effectiveness at low temps	Less corrosive

Note: XXXX/YYYY represents a virtual tie for that position among the group. The ranking was established from a very small base size, so results must be interpreted with caution.
BRZ Directors did not participate in this exercise.

Source: Focus Groups

Benefit 1 – Most important benefit

<u>Reducing Accidents</u>

This was clearly the most important benefit of the anti-icer program. Participants were able to tie the benefits of fewer accidents to social and financial benefits that far outpaced the other benefits. Some questioned the statistics and wondered if the dates and data presented were, in fact, an apples-to-apples comparison.

"I always think safety is number 1. If you're saving lives then that's a great thing. We don't want people going to hospitals or go through that kind of trauma."

"There are a lot of implications behind accidents, injuries, lost productivity at work, appointments, increased insurance."

"Every year with the first snowfall we get 100 accidents. So at 19%, that's 19 less accidents so that's 38 people who are less injured."

"With fewer accidents what you don't realize is that when you have less accidents that's less time waiting, less time the City has to spend on clean up. They're saving money, UPS drivers are saving money."

"19% is a lot."

Source: Focus Groups

Benefit 2 – Second most important benefit

Cost Savings

- While the implications of fewer accidents also includes cost savings as an added benefit (e.g., fewer insurance claims, less EPS time responding to crashes etc.) the direct savings to the City resulting from the new Anti-icer program was strongly appreciated.

- From the BIA group, it was also noted that there would be savings from lower costs for the annual spring clean up. However, this was tempered by the question if the cost to clean building fronts and on-street infrastructure was factored into the expected savings of if this would be an additional cost.

- Most wanted the cost savings to be directed back into roadways' budget (e.g. pothole repair, lighting, neighbourhood renewal) rather than into general revenue.

- Alternatively (and not surprisingly) some were hoping to see the saving translate into lower taxes.

- Many, however, wondered if there would be added costs to maintain or repair their vehicles and that this added cost wouldn't be factored into the equation.

- Professional drivers also noted that more efficient travel means lower costs for them; however, many complained that over the past winter they were required to wash their vehicles (and buses) much more often that meant an added cost to their businesses.

Source: Focus Groups

Benefit 3 – Third most important benefit

Less Corrosion

- As this was a significant concern for most participants (on an unprompted basis) it ranked third overall in terms of benefits. Most were unaware that the City currently uses a small amount of salt as part of the snow clearing process. They did not immediately see the benefit from the uses of $CaCl_2$ with the addition of an anti-corrosive agent since they believed the City only uses sand at the moment.

- Several of the winter cyclists had previously complained that the new compound was, in fact, damaging to their bike chains and gears so were skeptical that this anti-corrosion agent was, in fact, working.

- With some of the BIA members concerned about corrosion on building fronts and on-street infrastructure, the lower corrosion benefit was somewhat reassuring to them about the impact of the product.

Source: Focus Groups

Benefit 4 – Least important benefit

Effective at Lower Temperatures

- Many pointed out that the temperatures in Edmonton often dip below -30C so this benefit was somewhat moot compared with the previous benefits.

"How many times do we have more than -30C temperature. So we have to find a solution which works for -45 or -50 so we're more protected."

- Some were concerned about the impact on the pets, although this concern was not expressed a great deal since most felt their pets stayed on the sidewalks and the more general concern was the grit from the use of residential anti-icers in their dogs' paws.

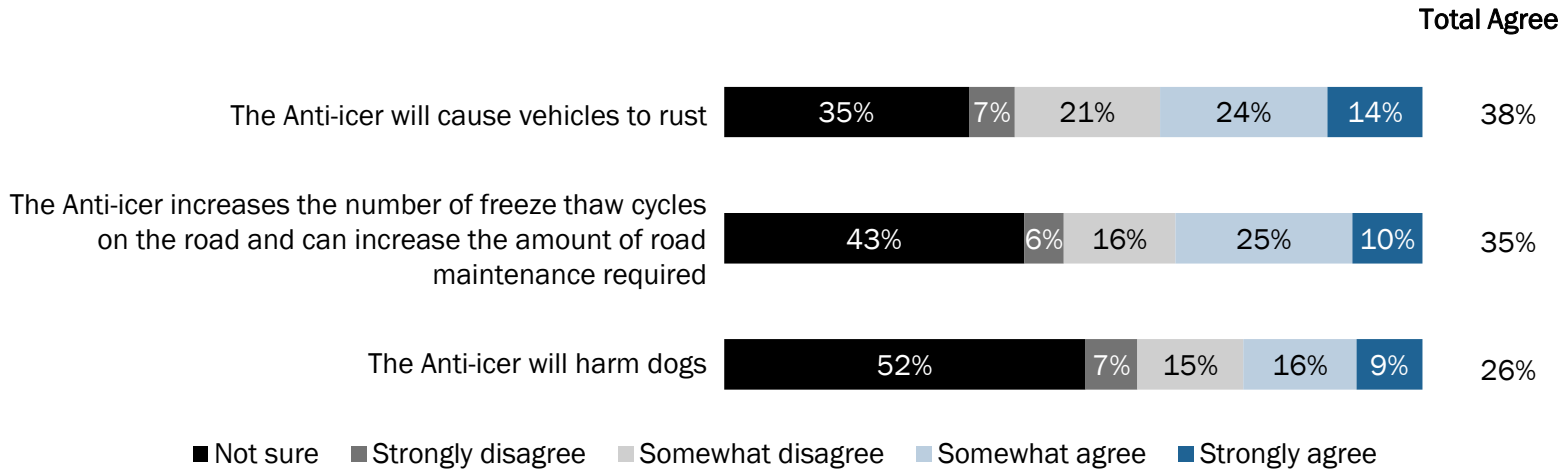
"If you've ever stuck your hand in the snow and in the salt and see how it feels, it's really painful. It reduces the temperature of the water to -20."

"I don't think I'm worried about the dog licking the snow."

- Others were concerned that at below -30C ice would form on the roads, making them even less safe than if they had not been plowed at all.

Source: Focus Groups

Edmontonians who responded to the survey are not sure about challenges of using the Anti-icer



Edmontonians responding to the survey who are more likely to agree with all/most statements:

- Males
- Those 15-54 years of age
- Those who are married/common law
- Those with an annual income of $100,000 to $124,999
- Students and those working full-time
- Those cycle on main roads in winter

Base: Edmontonians who responded to the survey (n=1,054)

Q16_2. To what extent do you agree or disagree with the following?

Source: Survey

Challenges of Using Anti-icer

General Population, Insight Community, Open Link

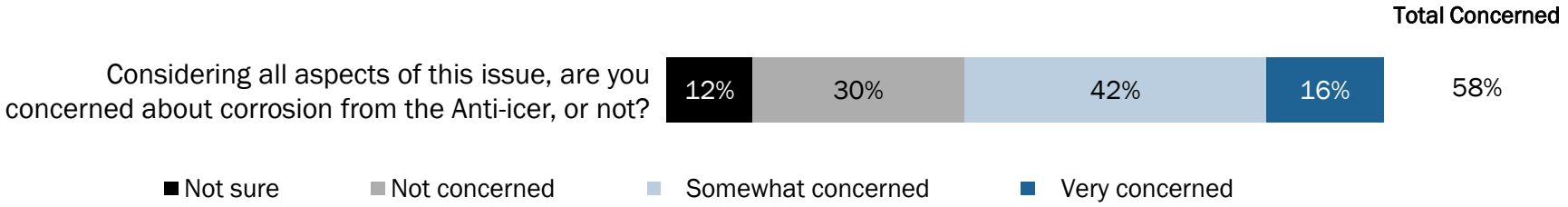
	Total Agree (somewhat agree, strongly agree)		
	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
The Anti-icer will cause vehicles to rust	38%	38%	64%
The Anti-icer increases the number of freeze thaw cycles on the road and can increase the amount of road maintenance required	35%	26%	42%
The Anti-icer will harm dogs	26%	18%	33%

Base: All respondents.
Q16_2/Q11. To what extent do you agree or disagree with the following?

Three-in-five Edmontonians who responded to the survey are concerned about corrosion from the Anti-icer

The chloride ion in chloride based road deicers accelerates the corrosion process of metals. The Anti-icer used in Edmonton includes a corrosion inhibitor that minimizes corrosion.

It is also important to note that vehicle construction has changed, using more corrosion resistant materials, new coating technology, resin seals and design configurations. The success of these efforts is evident today in the corrosion warranties offered. Most manufacturers offer corrosion coverage warranties exceeding 7 years and 100,000 miles compared to 1980 when only a few manufacturers were offering 3 year corrosion warranties.



Edmontonians responding to the survey who are more likely to be concerned:

- Males
- Those 15-34 years of age
- Those with annual income of $100,000 to $124,999
- Those with children in their household
- Those who work full-time or are a student
- Those with a Class 6 driver's licence (motorcycle & moped)
- Those who cycle on main roads
- Those who feel road conditions in the 2017-2018 winter were worse than last winter

Base: Edmontonians who responded to the survey (n=1,054)

Q16_3. Considering all aspects of this issue, are you concerned about corrosion from the Anti-icer, or not?

Source: Survey

Concern about Corrosion

General Population, Insight Community, Open Link

	Total Concerned (somewhat concerned, very concerned)		
	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
Considering all aspects of this issue, are you concerned about corrosion from the Anti-icer, or not?	58%	61%	79%

Base: All respondents.
Q16_3/Q10. Considering all aspects of this issue, are you concerned about corrosion from the Anti-icer, or not?

Challenges explained

The chloride ion in chloride-based road deicers accelerates the corrosion process of metals. To help address this, the Anti-icer used in Edmonton includes a corrosion inhibitor that minimizes corrosion.

It is also important to note that vehicle construction has changed, using more corrosion resistant materials, new coating technology, resin seals and design configurations. The success of these efforts is evident today in the corrosion warranties offered. Most manufacturers offer corrosion coverage warranties exceeding 7 years and 100,000 miles compared to 1980 when only a few manufacturers were offering 3-year corrosion warranties.

Considering all aspects of this issue, are you concerned about corrosion from the Anti-icer, or not?

1. Not concerned
2. Somewhat concerned
3. Very concerned
4. Not sure

Source: Focus Groups

Response to challenges

- Most were reasonably reassured about the corrosion issue and felt that since the product was less corrosive than salt, they would not experience the same challenges drivers in the East face.

- One professional driver felt that his stainless steel equipment (on his tow truck) was much more susceptible to the corrosive effects of the anti-icer.

- By far, however, the biggest concern was the potential (and unknown) environmental impact. Many believe the City still reclaims the roadway sand but were concerned about the impact of the $CaCl_2$ on the river, vegetation and wetlands.

"What is the run off compared to the old method? The birds? The water?"

- The City enjoys a degree of trust (i.e. they wouldn't spread a product that would significantly harm the environment) but respondents felt that this was an untested product so the environmental impacts may not be fully known. There should be an opportunity to see what other jurisdictions have done and their success with the product.

"I read something about this two years ago and they were using it in Saskatoon or Regina. If I were on City Council I would pick up the phone and ask. They've been running it, are they still running it? They've got at least two years of data? Why head out with blinder on?"

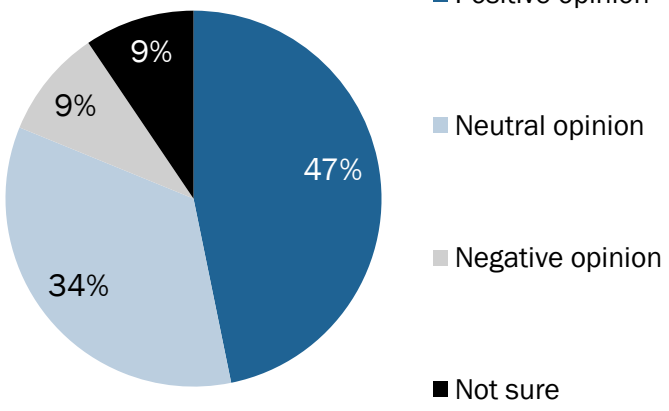
- The added downside of more freeze-thaw cycles was also a concern in that it would add cost to roadway repair and vehicle maintenance (from damage caused by potholes) which could potentially offset the savings from the improved winter maintenance.

"If it was redirected into the infrastructure that'd be an appropriate usage of funds."

Source: Focus Groups

Almost half of Edmontonians who responded to the survey have a positive opinion of Anti-icer after considering benefits and downsides

Opinion about the anti-icer after considering benefits and downsides



Edmontonians responding to the survey who are more likely to have a positive opinion of Anti-icer after considering benefits and downsides:

- Those 55+ years of age
- Those with other marital status
- Those with annual income of $60,000 to $99,999
- Those who are retired
- Those with same or better road conditions perception in 2017-2018 winter

Base: Edmontonians who responded to the survey (n=1,054)

Q17. Now that you know all of the benefits and have considered possible downsides, do you have a positive opinion, a neutral opinion or a negative opinion about the Anti-icer?

Source: Survey

Opinion after Consideration

General Population, Insight Community, Open Link

Opinion after consideration	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
Positive Opinion	47%	44%	25%
Neutral Opinion	34%	29%	16%
Negative Opinion	9%	20%	55%
Not Sure	9%	7%	4%

Base: All respondents.

Q17/Q12. Now that you know all of the benefits and have considered possible downsides, do you have a positive opinion, a neutral opinion or a negative opinion about the Anti-icer?

Reasons for opinions about Anti-icer

Edmontonians who responded to the survey and have a positive opinion about the Anti-icer	n=488
Good idea (in general)	32%
Roads were safer	20%
Cost efficient process	16%
Product is/was effective	15%
Roads were better (in general)	14%
Minimal damage to vehicles	9%
Roads felt smoother (feeling)	5%
Makes operations easier	5%
Better for environment	5%
Damage, abrasions to vehicles	2%
It was less icy/slippery (in general)	2%
Bad idea (in general)	1%
Environmental problems	1%
Product is harmful to animals	1%
Other	2%
Not sure / Haven't seen a difference	1%
Don't know / No answer	8%

Edmontonians who responded to the survey and have a negative opinion about the Anti-icer	n=97
Damage, abrasions to vehicles	29%
Roads felt icier/slippery (worse)	17%
Bad idea (in general)	15%
Environmental problems	11%
Product is/was ineffective	10%
Roads were dangerous	6%
Product is harmful to animals	5%
Too costly / Waste of money	4%
Better for environment	3%
Minimal damage to vehicles	2%
Ineffective in bitterly cold weather	2%
Makes operations easier	1%
Other	3%
Not sure / Haven't seen a difference	6%
Don't know / No answer	16%

Good idea (in general) is the top mention for those with a positive opinion about the Anti-icer after learning about all of the possible benefits and drawbacks. Damage and abrasions to vehicles is the top mention for those with negative opinion about the Anti-icer after learning about all of the benefits.

Q18. Why do you have a (positive/negative) opinion?

Source: Survey

Positive for Opinions about Anti-icer

General Population, Insight Community, Open Link

	General Population n = 488	Insight Community n = 601	Open Link n = 778
Good idea (in general)	32%	10%	10%
Roads were safer	20%	18%	25%
Cost efficient process	16%	20%	15%
Product is/was effective	15%	24%	20%
Roads were better (in general)	14%	14%	20%
Minimal damage to vehicles	9%	14%	11%
Roads felt smoother (feeling)	5%	-	-
Makes operations easier	5%	4%	4%
Better for environment	5%	8%	5%
Damage, abrasions to vehicles	2%	1%	2%
It was less icy/slippery (in general)	2%	5%	7%
Bad idea (in general)	1%	-	-
Environmental problems	1%	2%	1%
Product is harmful to animals	1%	-	-
Roads felt icier/slippery (worse)	-	1%	-
Ineffective in bitterly cold weather	-	-	1%
Benefits outweigh the negatives	-	7%	6%
I do not believe the benefits / claims	-	1%	1%
I now have learned more about it / Good information	-	8%	4%
Increased cost to citizens (more washing of vehicles, repairs, re-painting, replacing parts, etc.)	-	1%	1%
Just remove the snow / Have better snow removal	-	-	1%
Reduces amount of sand used	-	8%	5%
Roads / Vehicles / Sidewalks are a mess (wet, sloppy, sludge, slush, white film, etc.)	-	1%	-
Roads remain clearer for a longer period of time	-	5%	7%
There were more accidents this past winter	-	-	1%
Need more study/info/evidence	-	-	-
Other	2%	7%	7%
Not sure / Haven't seen a difference	1%	-	-
Don't know / No answer	8%	5%	3%

Base: All respondents who have a positive opinion about the Anti-icer.

Q18/Q13. Why do you have a (**positive**/negative) opinion?

Negative for Opinions about Anti-icer

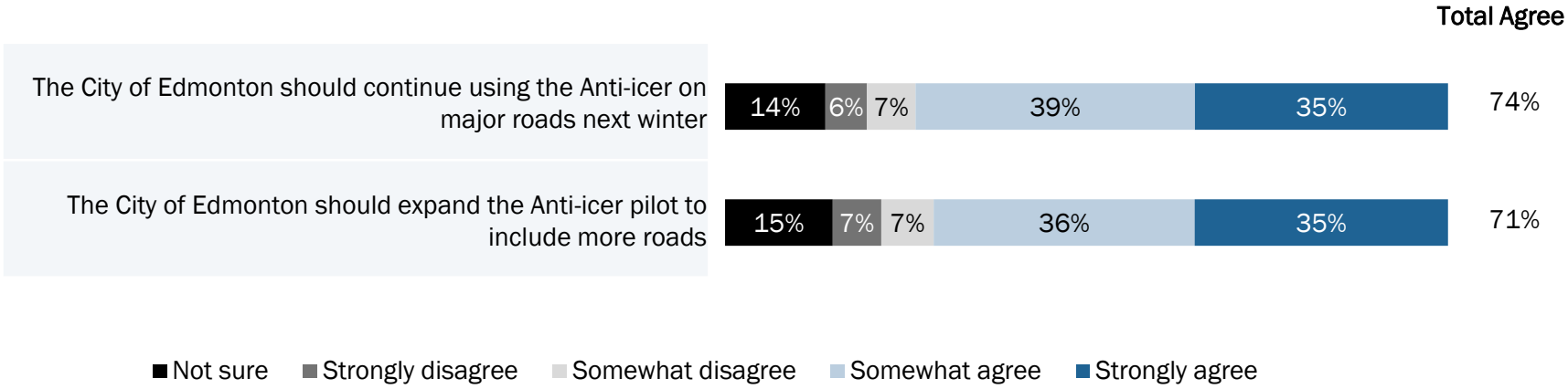
General Population, Insight Community, Open Link

	General Population n = 97	Insight Community n = 336	Open Link n = 2,058
Damage, abrasions to vehicles	29%	42%	48%
Roads felt icier/slippery (worse)	17%	24%	25%
Bad idea (in general)	15%	3%	5%
Environmental problems	11%	19%	15%
Product is/was ineffective	10%	13%	11%
Roads were dangerous	6%	7%	8%
Product is harmful to animals	5%	8%	5%
Too costly / Waste of money	4%	4%	4%
Better for environment	3%	-	-
Ineffective in bitterly cold weather	2%	8%	8%
Damages clothing / footwear	-	2%	2%
Educate drivers on how to drive in the winter (winter driving courses)	-	3%	2%
Garage / driveway is covered in stains / corroding	-	2%	4%
Go back to using sand / sand mix	-	7%	6%
Health hazard (burning eyes, throat, lungs, red skin, etc.)	-	-	2%
I do not believe the benefits / claims	-	8%	5%
Increased corrosion of infrastructure (storm sewers, roads, bridges, etc.)	-	6%	6%
Increased cost to citizens (more washing of vehicles, repairs, re-painting, replacing parts, etc.)	-	9%	10%
Just remove the snow / Have better snow removal	-	5%	4%
Make winter tires mandatory	-	1%	5%
Roads / Vehicles / Sidewalks are a mess (wet, sloppy, sludge, slush, white film, etc.)	-	6%	6%
There were more accidents this past winter	-	4%	5%
Roads need maintenance	-	-	-
Need more study/info/evidence	-	-	-
I have a negative opinion (in general)	-	-	-
Other	3%	1%	2%
Not sure / Haven't seen a difference	6%	-	-
Don't know / No answer	16%	5%	7%

Base: All respondents who have a negative opinion about the Anti-icer.
Mentions less than 2% (across all methodologies) not shown

Q18/Q13. Why do you have a (positive/**negative**) opinion?

Close to three quarters of Edmontonians who responded to the survey agree that the Anti-icer pilot should continue and/or be expanded



Edmontonians responding to the survey who are more likely to agree that the Anti-icer pilot should continue and/or be expanded:

- Those 15-17 years of age
- Those who are single
- Those with annual income of $60,000 to $99,999
- Students
- Those who walk the main roads in winter
- Those who cycle the main roads in winter
- Those who feel road conditions in the 2017-2018 winter were the same or better than last winter

Base: Edmontonians who responded to the survey (n=1,054)

Q19a. Based on your experience with the Anti-icer and everything you have heard about it, rate the extent to which you agree or disagree with the following.

Source: Survey

Continuation and Expansion of Anti-icer

General Population, Insight Community, Open Link

	Total Agree (somewhat agree, strongly agree)		
	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
The City of Edmonton should continue using the Anti-icer on major roads next winter	74%	66%	37%
The City of Edmonton should expand the Anti-icer pilot to include more roads	71%	58%	34%

Base: All respondents.

Q19a/14. Based on your experience with the Anti-icer and everything you have heard about it, rate the extent to which you agree or disagree with the following.

Expanding the program

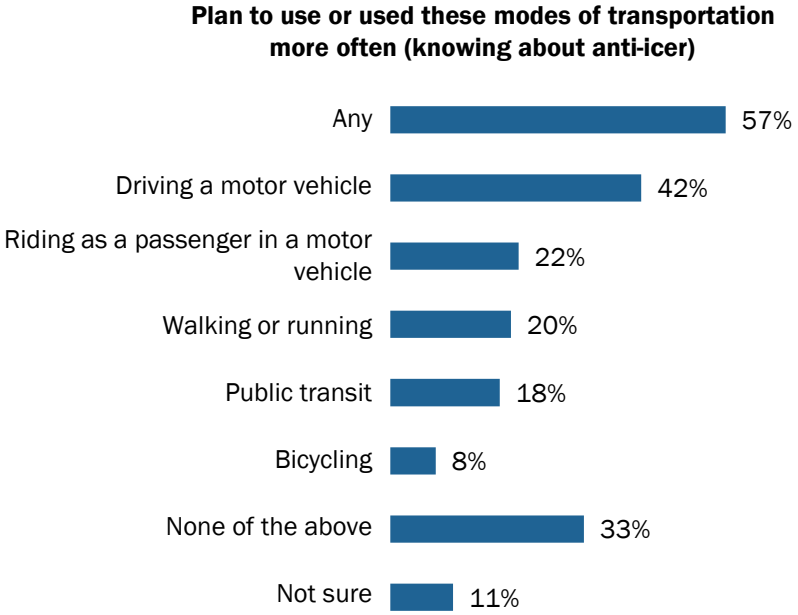
There is generally a high level of support to continue the project for at least another 3 or 4 seasons to…

- Gather more data
- Realize the benefits
- Assess the environmental impact
- To evaluate the effectiveness over different kinds of winters

There was less support with the idea of expanding the program to include residential streets however because of the potential risk to animals, the added environmental risk and the risk of added corrosion from spraying parked cars, etc.

Source: Focus Groups

Almost three-in-five Edmontonians who responded to the survey used, or plan to use, some modes of transportation more often in winter now that they know about the Anti-icer



Base: Edmontonians who responded to the survey (n=1,054)

Q20. Do you plan to, or did you use any of the following modes of transportation more often in winter now that you know about the Anti-icer?

Source: Survey

Use of Transportation with Knowledge of Anti-icer

General Population, Insight Community, Open Link

	General Population	Insight Community	Open Link
	n=1,054	n=1,906	n=4,211
ANY (% yes)	57%	36%	39%
Driving a motor vehicle	42%	29%	36%
Riding as a passenger in a motor vehicle	22%	14%	17%
Walking or running	20%	12%	13%
Public transit	18%	11%	7%
Bicycling	8%	4%	2%
None of the above	33%	50%	49%
Not sure	11%	14%	12%

Base: All respondents.

Q20. Do you plan to, or did you use any of the following modes of transportation more often in winter now that you know about the Anti-icer?

RESPONDENT PROFILE

General Population, Insight Community, Open Link

Respondent profile

	General Population	Insight Community	Open Link
n=	1,054	1,906	4,211
Quadrant			
NW	35%	36%	32%
NE	17%	13%	16%
SW	22%	25%	23%
SE	20%	25%	25%
Refused	6%	<1%	4%
Gender			
Male	48%	48%	61%
Female	51%	50%	35%
Age			
Between 15 and 17	6%	-	-
Between 18 and 24	7%	2%	5%
Between 25 and 29	9%	6%	12%
Between 30 and 34	11%	9%	13%
Between 35 and 39	8%	12%	13%
Between 40 and 44	6%	10%	10%
Between 45 and 49	6%	8%	9%
Between 50 and 54	9%	11%	9%
Between 55 and 64	19%	24%	18%
65 or older	20%	19%	11%

Respondent profile

	General Population	Insight Community	Open Link
n=	1,054	1,906	4,211
Children in Household	(n=806)		
Yes	35%	22%	28%
No	63%	76%	66%
Prefer not to answer	2%	2%	6%
People in Household			
1	24%	-	-
2	36%	-	-
3	17%	-	-
4 or more	23%	-	-
Marital Status			
Single, that is, never married	29%	17%	18%
Married	46%	55%	53%
Common law	8%	11%	11%
Separated/Divorced	9%	9%	5%
Widowed	5%	3%	2%
Prefer not to answer	3%	5%	10%

Base: All respondents who do not live alone

Respondent profile (cont'd)

	General Population	Insight Community	Open Link
n=	1,054	1906	4,211
Employment Status			
Working full-time (30+ hours per week)	45%	61%	69%
Working part-time (less than 30 hours per week)	9%	7%	6%
Unemployed or looking for a job	4%	2%	1%
A student	8%	1%	1%
Retired	24%	22%	12%
Permanently unable to work	3%	2%	1%
Homemaker	4%	2%	2%
Maternity/Paternity Leave	-	-	1%
Prefer not to answer	2%	3%	7%
Income			
$29,999 or less	9%	3%	3%
Between $30,000 and $59,999	19%	9%	8%
Between $60,000 and $99,999	26%	20%	20%
Between $100,000 and $124,999	14%	18%	14%
$125,000 or more	15%	27%	28%
Prefer not to answer	16%	23%	27%

Respondent profile (cont'd)

	General Population	Insight Community	Open Link
n=	1,054	1,906	4,211
Education			
Less than high school (no certificate, diploma or degree)	4%	-	1%
High school diploma or equivalent	22%	8%	11%
Trades certificate	4%	4%	9%
Registered apprenticeship certificate	1%	1%	2%
College certificate or diploma	21%	20%	22%
University certificate below bachelor's level	5%	4%	5%
Bachelor's degree	23%	31%	25%
University certificate above bachelor level	6%	4%	4%
Medical degree	1%	1%	1%
Master's degree	8%	17%	8%
Earned doctorate	3%	4%	2%
Prefer not to answer	2%	4%	10%
Tenure in Edmonton			
At least six months but less than one year	4%	-	1%
1-2 years	-	1%	1%
3-5 years	-	5%	5%
1-5 years	15%	-	-
5 years +	-	94%	93%
6-10 years	12%	-	-
11-20 years	16%	-	-
21-30 years	13%	-	-
31-40 years	14%	-	-
Over 40 years	26%	-	-

Respondent profile (cont'd)

	General Population	Insight Community	Open Link
n=	1,054	1,906	4,211
Born in Canada			
Yes	78%	85%	86%
No	20%	13%	10%
Prefer not to answer	1%	2%	4%
Mobility Impairments			
Yes	13%	9%	7%
No	86%	88%	89%
Prefer not to answer	1%	3%	4%
Dog for a walk in winter			
Yes	28%	31%	39%
No	71%	68%	57%
Prefer not to answer	1%	1%	4%

Source: Survey

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