



Office of the Auditor General of Ontario

Value-for-Money Audit: Science Centres



December 2023

Science Centres

1.0 Summary

A science centre is an educational facility that uses hands-on exhibits and activities to educate the public about science, technology, engineering and mathematics. Ontario is home to the two largest science centres in Canada—the Ontario Science Centre (opened in 1969) in Toronto and Science North (opened in 1984) in Sudbury. The two science centres are provincial agencies with a legislated mandate to stimulate public interest in science and technology, collect and display exhibits, and deliver educational programs. The Ministry of Tourism, Culture and Sport (Ministry) has oversight responsibility for both science centres.

Our audit reviewed the operations for both provincial science centres, focusing on their financial sustainability, educational programming and exhibits. In 2022/23, children and youth under the age of 18 made up more than 50% of visitors at both science centres. Based on our discussions with school boards in the Greater Toronto Area and Sudbury and a survey of science teachers we conducted, the science centres performed consistently well in delivering educational programs to students. In surveys conducted by the science centres, the majority of visitors said they were satisfied by their experience at the centre they attended. Yet attendance and memberships for both science centres have been declining over the past decade. Pre-pandemic attendance for the Ontario Science Centre had fallen by 12.5% from peak attendance in 2013/14, while pre-pandemic attendance at Science North had decreased by 8% from its

peak in 2016/17. In both cases, the science centres have done relatively well recovering from the pandemic, with the Ontario Science Centre recovering to 80% of pre-pandemic levels and Science North surpassing pre-pandemic levels by 3% in 2022/23.

We also assessed the major initiatives under way at each science centre. Science North was in the midst of a major expansion project, at an overall estimated cost of \$15 million as of October 2023. After our audit was under way, the Ontario government announced plans to relocate the Ontario Science Centre to Ontario Place. We therefore reviewed the relocation project as well.

Ontario Science Centre Relocation

The decision to relocate the Ontario Science Centre comes at a time when the centre is facing significant challenges, including a decline in attendance and memberships, a key pedestrian bridge connecting the main entrance to the exhibition halls deemed unsafe and therefore not in use, capital repairs and maintenance increasingly mounting to about \$370 million, and aging exhibits in need of a refresh.

On April 18, 2023, the government announced that a new Ontario Science Centre would be built as part of the redevelopment of Ontario Place, making use of the “pods” (five interconnected pavilions) and Cinesphere (an IMAX movie theatre) on site. The Minister of Infrastructure noted that it was ultimately more cost-effective to build a new science centre at Ontario Place than to repair and upgrade the existing building.

We noted that the recent relocation decision was not fully informed and based on preliminary and incomplete

costing information, and had proceeded without full consultation from key stakeholders or a clear plan for the existing site.

Moving the Ontario Science Centre to a revitalized Ontario Place is not a new idea. In 2016, the Ministry of Tourism, Culture and Sport first engaged Infrastructure Ontario (a provincial agency under the Ministry of Infrastructure) to complete a business case on how to modernize the Ontario Science Centre, with one option being to reopen at Ontario Place with a new building and new exhibits. The business case at that time estimated that relocating to Ontario Place would save the Province around \$250 million on a net present value basis over a 50-year period. This business case was shared with the Ontario Science Centre Board, which noted that, due to deferred maintenance, the status quo was no longer sustainable. However, no action was taken at that time.

In 2020, direction was once again given to develop a strategy for the relocation of the Ontario Science Centre to Ontario Place. In 2021, the then Ministry of Heritage, Sport, Tourism and Culture Industries (now the Ministry of Tourism, Culture and Sport) was asked to undertake detailed project planning for a relocation of the science centre to Ontario Place, including working with Infrastructure Ontario on a delivery model analysis. In March 2023, Infrastructure Ontario completed its work with the information that it had at that time, which was used to inform the government's April 2023 decision to relocate the science centre.

The following are some of our significant audit findings with respect to the relocation project:

- **The 2023 cost/benefit analysis used to support the decision to relocate the Ontario Science Centre did not include all costs for both options assessed—relocation and the rehabilitation of the current site.** A business case prepared by Infrastructure Ontario in March 2023 with assistance from an external consultant incorporated a cost/benefit analysis that concluded the relocation would save the Province \$257 million (net present value) over a 50-year period, which is consistent with the 2016 business case. This analysis was included in the

April 2023 proposal to government decision-makers. In our review of the cost/benefit analysis, we found that costs for both options were not fully identified and determined. For example, financing, transaction and legal costs projected under the public-private partnership (P3) model to design, build, finance and maintain (DBFM) the new site at Ontario Place were not included in the analysis. Similar costs for the repairs and upgrade of the science centre were also not included, since an assessment for the delivery model for the repairs and upgrade of the current site was not done. At the time of the finalization of this report, Infrastructure Ontario informed us that it was reassessing whether the DBFM model would be the approach used for the project. In addition, the incremental parking costs were not included in the cost/benefit analysis.

- **The April 2023 relocation proposal to government decision-makers did not include concerns raised about expected attendance, travel times and car access to the Ontario Place location, especially for suburban families and certain school groups.** A 2016 environmental scan and market assessment concluded that, although overall attendance figures were anticipated to improve at the new location, school group and suburban family attendance was expected to decline. An attendance study conducted in 2022 noted that suburban families and repeat visitors, a core market for the Ontario Science Centre, would have a longer travel distance to Ontario Place than to the current site. The study also concluded that, until the implementation of subway or light rail links to Ontario Place, access by car and difficulty with parking would be a “limiting factor” on attendance. By contrast, the study found the new location would give the science centre better access to tourists staying in downtown Toronto and projected that total attendance would increase to about one million visitors. We found that, while the information about increased tourist attendance was included

in the proposal to government decision-makers, the information about decreased local attendance was not included.

- **Discussions with the City of Toronto before the decision was made to relocate were limited in any substance or detail and the Toronto and Region Conservation Authority and large school boards within the Greater Toronto Area directly impacted by the relocation were not consulted.** The science centre has a 99-year lease with the City of Toronto and the Toronto and Region Conservation Authority and does not have the right to terminate the lease. The Province would first have to enter into negotiations with the City and the Conservation Authority to terminate the lease. Staff of the large school boards within the Greater Toronto Area that would be directly impacted by the relocation (Toronto District School Board, Toronto Catholic District School Board, Durham District School Board, Peel District School Board, and Halton District School Board) told us that the Boards were not asked for input on relocating the science centre. Students from elementary and high schools make up approximately 25% of visitors to the Ontario Science Centre.
- **Plans to continue to construct, sell and rent exhibits—legislated objectives—remain uncertain with the relocation announcement.** The construction, sale and rental of exhibits is a source of self-generated revenue for the Ontario Science Centre and is required under the legislation that governs the science centre. However, no fabrication facility was included in the functional plan of the relocated Ontario Science Centre, and it is unclear if this will continue at an alternative facility.
- **Current Ontario Science Centre lands considered for a Transit-Oriented Community since 2020.** A May 2020 proposal submitted to government decision-makers by the then Ministry of Heritage, Sport, Tourism and Culture Industries noted that the relocation of the Ontario Science Centre would unlock the

site at Don Mills Road and Eglinton Avenue for Transit-Oriented Communities-related development. According to the Ministry of Infrastructure, planning for a Transit-Oriented Community on the Ontario Science Centre site is premature until the transit needs in the area are finalized by Metrolinx, an agency of the Province responsible for all modes of transportation in the Greater Toronto and Hamilton Area.

- **The decision to relocate the Ontario Science Centre was presented to government decision-makers as contributing to a site-wide parking solution integrated with the new building at Ontario Place.** The Ministry of Infrastructure proposal to government decision-makers submitted in April 2023 noted that a site-wide parking solution integrated with the new Ontario Science Centre would contribute to meeting the Province's existing legal obligations under the lease it had signed with Therme Group and for its potential lease obligations with Live Nation.

Ontario Science Centre Operations

The following are some of our significant audit findings with respect to the operations of the Ontario Science Centre:

- **Deferred maintenance projects that were at risk of critical failure have been repeatedly denied funding.** Based on the most recent engineering assessment conducted in April 2022, the overall cost of deferred maintenance and critical repairs needed for the Ontario Science Centre building is about \$370 million, not including costs for fixing a bridge currently closed due to structural issues. Since 2017, due to a lack of funding, 42 projects deemed critical and at risk of failure had not been repaired. Of these 42 projects, seven had been put forward in at least three of the past five years and were denied funding each time. One was a \$4 million request to renew the water distribution of the plumbing systems throughout the kitchens, restaurants, workshops, labs and washrooms.

According to Infrastructure Ontario, there was a lack of funding available to manage the Province's real estate portfolio, so the repairs could not be paid for. In addition to deferred maintenance, the centre's planetarium has been closed to the public since September 2022 because of outstanding capital repairs and ongoing technical issues with equipment that had reached the end of its useful life.

- **The cost of shuttling visitors as a result of the closure of the pedestrian bridge connecting the main entrance to the exhibition halls was \$2.4 million in 2022/23 and has negatively impacted visitor experience.** Before it was closed in June 2022, the centre's pedestrian bridge took visitors from the main entrance across a wooded ravine. Infrastructure Ontario has cited an estimated cost of \$16 million just to stabilize the bridge. We found the agency had not obtained a cost estimate for fixing the bridge so visitors could use it. In February 2023, Infrastructure Ontario procured an engineering firm to conduct a feasibility study to evaluate the bridge's condition prior to repair. At the time of our audit, the feasibility study had not been completed and there was no targeted timeline for actually repairing the bridge. Therefore, these costs were not included in the \$370 million needed for critical repairs and deferred maintenance mentioned earlier. Until the bridge is fixed, the Ontario Science Centre needs to shuttle visitors by bus from the entrance, where the OMNIMAX theatre is located, to a temporary entrance at the back of the building. Waiting in line and riding a bus to enter at the rear has had a significant impact on the visitor experience. The bridge closure has also presented an obstacle to venue rental.
- **Pre-pandemic attendance declined by 12.5% from 2013/14 to 2018/19.** Total attendance for the Ontario Science Centre peaked during the last decade in the fiscal year 2013/14, when the centre attracted 920,000 visitors. Overall attendance had dropped to 805,000 visitors in 2018/19 (the last fiscal year not impacted by the

COVID-19 pandemic), a decrease of 12.5%. The COVID-19 pandemic and provincial response measures significantly impacted the centre in the last month of 2019/20, and in 2020/21 and 2021/22. Attendance recovered to about 80% of pre-pandemic levels in 2022/23. Further, the total number of Ontario Science Centre memberships has decreased 31% in the past decade, from 20,677 in 2012/13 to 14,312 in 2022/23. According to the Ontario Science Centre, changing demographics and increased competition from other attractions in the City (for example, Ripley's Aquarium, the Royal Ontario Museum, the Art Gallery of Ontario) were factors contributing to lower attendance and membership levels. The science centre also noted that the reduced lanes and closures from the construction of the Eglinton LRT at the corner of Don Mills Road and Eglinton Avenue impacted traffic flow and, hence, attendance (including school visits).

- **Exhibits were not always evaluated for effectiveness (for example, for their popularity and educational value).** Exhibits are integral to carrying out the science centre's key objective to stimulate public interest in science and technology. The average age of the exhibits at the Ontario Science Centre at the time of our audit was about 14 years. Only the KidSpark, Science Arcade, HotZone, Community Reef and the Weston Family Innovation Centre have changed significantly since 2018. The Ontario Science Centre uses visitor satisfaction surveys to evaluate the effectiveness of its exhibits. In our review of surveys from 2012/13 to 2021/22, we found that the questions in some years did not ask the visitors to rate all permanent and temporary (travelling) exhibits. Also, in 2022/23, the Ontario Science Centre did not conduct any visitor satisfaction surveys due to a staff shortage in the research group. We also noted that there was limited assessment of the feedback received from surveys by the Ontario Science Centre, resulting in little improvement to the existing exhibits.

- **Ontario Science Centre could be doing more to improve its financial sustainability.** The Ontario Science Centre does not allocate its indirect operating costs to their various lines of business. Without allocating these costs, it is difficult to assess which lines of business are profitable and which need to manage costs more effectively. In addition, the science centre had not assessed its potential for other revenue sources as compared to other science centres, such as through expanding its retail operations and venue rental opportunities. In November 2022, the Ministry of Tourism, Culture and Sport asked the Ontario Science Centre to submit a cost management plan for the remainder of 2022/23.

Science North

At the time of our audit, Science North was undergoing an expansion. It had undertaken a multi-million-dollar project to expand its model mine in Sudbury, and had sought Board approval for the construction of two new science centres in Thunder Bay and Kenora.

We found that costs for the first project (Go Deeper project) had substantially increased—from an initial budget of \$5 million in October 2020 to \$15 million by October 2023—primarily due to increases in excavation and construction costs. The cost had increased despite a reduction in the project’s scope to alleviate the increasing expenses.

The project had also run into significant delays. In 2019 Science North proceeded with the project, setting an initial completion date of February 2023. At the time of our audit, the project was expected to be completed by winter 2024. The delay was mostly due to the COVID-19 pandemic, the City of Greater Sudbury identifying additional requirements for site remediation, which delayed municipal permit approvals, and a lack of available funding.

We found that the cost overrun and delay were caused by poor planning and ineffective project management. For example, no reliable third-party estimate was completed during the planning phase to assess the

reasonableness of the cost projections. A more reliable cost estimate would have been produced if a consultant with an engineering and construction background had been engaged during the planning phase. Science North also failed to involve its project management team during the planning phase of the project. The project management team at Science North is responsible for managing projects that include co-ordinating with internal and external stakeholders, managing the progress and deadlines of projects, and resolving any issues that might arise during the project.

With costs increasing and no funding available, key elements of the project have been paused and Science North has further reviewed the project to identify areas to reduce scope and costs.

Based on preliminary estimates from a construction consulting firm, the northwestern Ontario expansion to Thunder Bay and Kenora was estimated to cost over \$90 million. Science North sought Board approval for this expansion without the benefit of a business case that would include a cost/benefit analysis and assessment of alternative options. At the time of our audit, Science North had received only conditional Board support for the expansion and had not yet sought funding for the expansion from any level of government or from the private sector.

Science North estimated that the annual operating budget for the two new science centres would total \$5.5 million, and at the time of our audit was in discussion with the Ministry to request \$4 million in annual operating funding for these facilities and projects. Centre management projected that self-generated revenue would cover the remaining \$1.5 million. The Ministry had not assessed the feasibility and financial sustainability of the expansion to Thunder Bay and Kenora.

The following are some of our other significant audit findings for Science North:

- **Pre-pandemic attendance declined by 8% from 2016/17 to 2018/19.** Total attendance for Science North declined by 8% in 2018/19 (the last fiscal year not impacted by the COVID-19 pandemic) from its peak in the last decade in 2016/17. The COVID-19 pandemic and provincial response measures severely impacted the centre

in 2019/20, 2020/21 and 2021/22. According to Science North, the decrease in overall attendance reflected fewer visitors to the IMAX theatre, where attendance fell by 26% from 2015/16 to 2018/19. In 2022/23, attendance has increased by 3% from pre-pandemic levels. Science North projected attendance to remain at this level in the upcoming three fiscal years.

- **Feedback on Science North's educational and outreach programs was positive, but attendance has also dropped.** Sudbury's Rainbow District School Board and the Sudbury Catholic District School Board, the two main boards served by Science North in the City of Sudbury, were both satisfied with the school programs offered by Science North. The school boards said Science North had been very responsive to their needs and was working effectively with teachers in delivering programs to their students. The Canadian Association of Science Centres noted that Science North was successful in its outreach to Northern Ontario communities for schools that did not have access to the science centre due to high transportation costs. However, total attendance for on-site school programs has decreased 32% in the past five years. Similarly, student attendance at public school outreach programs has decreased by 62%. Fiscal year 2022/23 was the first year since the onset of the COVID-19 pandemic when Science North was fully open year-round. Staff at Science North told us that some schools were still hesitant to attend public programs and some schools still had COVID-19 measures in place as of spring 2022.
- **Science North could better evaluate the effectiveness (for example, the popularity and educational value) of its exhibits.** The average age of Science North's exhibits was 11 years. Similarly, the average age of exhibits at Dynamic Earth was 11 years, and no major exhibits had changed significantly since 2017. The mining technology showcased at Dynamic Earth is from early 2000; mining operations have changed significantly since. At the time of

our audit, Science North was in the process of expanding its model mine at Dynamic Earth to better showcase modern mining and the future of mining. Science North evaluated some of its exhibits through a behavioural assessment tool. For a sample of visitors, staff reviewed video footage to examine the learning behaviours of visitors. However, over the last 10 years, only 90 out of the total 338 exhibits (27%) were evaluated in this manner.

- **A contractor that committed to a sponsorship agreement for the Go Deeper project was awarded an excavation contract.** A \$2 million excavation contract for the Go Deeper project was awarded to a mining company that committed to providing \$1.5 million in conditional sponsorship funding from 2022 to 2026. As of September 2023, Science North had received \$600,000 from the company with a balance of \$900,000 remaining. The sponsorship agreement allows for the termination of the contract if the company ceases to carry on business.
- **Science North could be doing more to improve its financial sustainability.** Science North does not allocate its indirect operating costs to their various lines of business. Without allocating these costs, it is difficult to assess which lines of business are profitable and which need to manage costs more effectively.

This report contains 16 recommendations, with 42 action items, to address our audit findings.

Overall Conclusion

Our audit concluded that the science centres performed well in delivering educational programs to students, based on our discussions with school boards in the Greater Toronto and Sudbury areas and on the feedback collected from science teachers in Ontario.

However, we also found that attendance for both science centres had declined in 2018/19 (the last fiscal year not impacted by the COVID-19 pandemic) by 8% (Science North) from a peak in 2016/17 and 12.5%

(Ontario Science Centre) from a peak in 2013/14. The COVID-19 pandemic and provincial response measures significantly impacted the two centres in the last month of 2019/20, and in 2020/21 and 2021/22. However, attendance at both centres is on the road to recovery post-pandemic.

Higher costs have added pressure to generate revenues. We found that both science centres could do more to improve financial sustainability, such as assessing which existing lines of business are profitable and where costs need to be managed more effectively, and exploring new opportunities to generate revenue.

The future may look much different, particularly for the Ontario Science Centre, due to the Province's recent decision to relocate it to Ontario Place. Although the Province has been assessing this relocation since 2016, our audit found that the recent decision for the relocation was made without the benefit of input from all stakeholders and with preliminary and incomplete cost information. Also, in some instances where information was available, it was not included in the proposal to government decision-makers.

Multiple qualitative and quantitative factors need to be taken into consideration for decisions for both the new science centre at Ontario Place and the existing site moving forward.

Our audit concluded that Science North's expansion project had proceeded without proper planning and consultation, resulting in substantial cost overruns and delays. The Go Deeper project to expand its model mine had, at the time of our audit, been delayed by almost two years, and even with a reduced scope its costs had increased by \$10 million in a three-year period (from \$5 million in October 2020 to \$15 million by October 2023). The lessons learned from the Go Deeper project should be applied to all capital projects moving forward.

OVERALL MINISTRY OF INFRASTRUCTURE RESPONSE

The Ministry of Infrastructure (Infrastructure Ministry) welcomes and appreciates the Auditor General's review into this matter. The Infrastructure

Ministry believes sound planning occurred based on best information available with reliance on third-party experts and is committed to taking into consideration the improvement opportunities identified in this audit report. Although the decisions around the future of the existing Ontario Science Centre site are still pending, many activities and business processes are currently in place; the Infrastructure Ministry will advance the implementation of Auditor General's recommendations, including the improvement opportunities identified in the audit report across the Infrastructure Ministry and other responsible parties.

OVERALL MINISTRY OF TOURISM, CULTURE AND SPORT RESPONSE

The Ministry of Tourism, Culture and Sport (Ministry) will work with the Ontario Science Centre and Science North to enhance the already world-class science-based programming offered by the two centres.

The Ministry will explore opportunities to improve efficiencies, performance assessment and collaboration between the two science centres, as well as continuing to assess critical capital projects.

The existing Ontario Science Centre located at Don Mills Road and Eglinton Avenue is open and continues to welcome guests. The government will continue to work with and support the Ontario Science Centre in its current location and will share more details about the move as decisions are made.

OVERALL ONTARIO SCIENCE CENTRE RESPONSE

The Ontario Science Centre welcomes the recommendations made by the Auditor General of Ontario. The Ontario Science Centre is committed to enhancing operational improvements and continuing to provide value for money for the people of Ontario. As a vibrant hub for innovative and accessible science education, the Ontario Science Centre will continue to spark curiosity and inspire

children and families, teachers and students, and visitors from across Canada and around the world.

OVERALL SCIENCE NORTH RESPONSE

Science North would like to thank the Office of the Auditor General of Ontario for preparing this report and conducting a review of the value for money that Science North delivers for the people of Ontario. Science North agrees with the recommendations outlined in this report and will seek to implement the recommendations as resources allow. With a vision to be the leader in engaging audiences with entertaining, educational, and inclusive science experiences, Science North is committed to a culture of continuous learning and improvement and will seize the opportunities presented in this report for continued growth.

In leveraging new technology, Science North will improve its current process for allocating appropriate costs to lines of business where able and will continue to seek and analyze new opportunities for self-generated revenue. The organization will take additional measures to ensure visitor feedback informs all major exhibits and their renewals, while further leveraging memberships with Canadian and international science centre associations to streamline research and best practices.

Science North will work with the Ministry of Tourism, Culture and Sport and its Board of Trustees to improve performance measures, taking into consideration metrics that include all legislated mandates and further enhancing the organization's transparency and accountability through its business plans and annual reports.

Science North values innovation, collaboration, accountability, inclusiveness, respect and striving towards excellence. This value-for-money audit provided Science North with the unique opportunity to review and modify its documentation processes and authorization thresholds. The organization

will apply applicable lessons learned and is grateful for the opportunity to further improve its operations and enhance its organizational impact. Through continued service to the vast 800,000 square kilometres that make up Northern Ontario, Science North endeavours to inspire all people to be engaged with science in the world around them.

2.0 Background

2.1 Overview

Science centres develop or acquire displays and exhibits of scientific and technological importance and present these to the public for the purposes of education, research and enjoyment. Ontario has two science centres: the Ontario Science Centre, located in Toronto, and Science North in Sudbury.

The Ontario Science Centre (whose legal name is Centennial Centre of Science and Technology), a 568,000-square-foot facility, opened in 1969. It is a provincially funded agency that is overseen by a Board of Trustees. Employees of the Ontario Science Centre are part of the Ontario Public Service. The organization's CEO reports into both the Board of Trustees and the Deputy Minister as an Assistant Deputy Minister equivalent.

Science North, a 200,000-square-foot facility, opened 15 years later, in 1984. It was established as a provincially funded agency, overseen by a Board of Trustees. This centre's employees are not part of the Ontario Public Service. Science North CEO's direct reporting responsibility is to the Board of Trustees.

The Ministry of Tourism, Culture and Sport (Ministry) oversees both science centres and provides them with annual funding. As provincial agencies, the board chairs of the science centres are required to report to the Minister. In fiscal year 2022/23, \$19.4 million in operating funding went to the Ontario Science Centre and \$6.8 million to Science North.

2.1.1 Mandates and Missions

The Ontario Science Centre and Science North each have their own governing legislation: the *Centennial Centre of Science and Technology Act* and the *Science North Act*, respectively. Each organization's legislation specifies its mandate, as shown in **Figure 1**.

The Ontario Science Centre states that its mission is “to inspire passion for the human adventure of discovery.” Science North sets out a similar mission: “to inspire all people to interact with science in the world around them.”

The 2023/24 mandate letters provided to the Board Chairs of the science centres by the Minister of Tourism, Culture and Sport laid out expectations that the science centres focus on the following general government priorities: Competitiveness, Sustainability and Expenditure Management; Transparency and Accountability; Risk Management; Workforce Management; Diversity and Inclusion; Data Collection; and Digital Delivery and Customer Service. In addition to the general government priorities, there were specific priorities and expectations in the 2023/24 mandate letters from the Minister, which are outlined in **Appendix 1**.

Figure 1: Legislative Objectives of the Science Centres

Source of data: *Centennial Centre of Science and Technology Act* and *Science North Act*

Ontario Science Centre*	Science North
<ul style="list-style-type: none"> a) to depict to the public and to conduct a program of education in the origins, development and progress of science and technology, and their relationship to society; b) to depict the role of Ontario in the furtherance of science and technology; c) to stimulate the interest of the public in matters depicted by the Centre; d) to collect, manufacture, market, exhibit and sell objects and displays; and e) to maintain and operate a science centre and related facilities for the furtherance of the objects set out in clauses (a) to (d) and to provide consulting services in relation to all the matters set out in this section. 	<ul style="list-style-type: none"> a) to depict to the public and to conduct a program of education, throughout northern Ontario, in the origins, development and progress of science and technology and their relationship to society; b) to operate and maintain a model mine; c) to collect, develop and exhibit objects and displays and to maintain and operate a museum, science centre and related facilities for the furtherance of the objects of the Centre; d) to stimulate the interest of the public, throughout northern Ontario, in matters depicted by the Centre; and e) to develop, produce and market exhibits and to sell exhibits and provide consulting services.

* Legal name for the Ontario Science Centre is Centennial Centre of Science and Technology.

2.2 Lines of Business

The science centres have several business lines relating to on-site exhibits and visitor programs; school outreach programs; IMAX theatres, planetarium and film production; the sale and rental of fabricated exhibits; and facility rentals and concessions.

The centres offer general admission pricing for adults, youth, seniors and children and various admission packages, as shown in **Figure 2**.

2.2.1 On-Site Exhibits and Programs for Visitors

The Ontario Science Centre is located on Don Mills Road in the Flemingdon Park community of Toronto, situated in wooded ravine lands of the Don Valley. There are 19 main halls and spaces (indoors as well as outdoors), with a total of 402 exhibits. Different types of science topics are presented—anatomy, astronomy, physics, environmental biology, and others—along with important and interesting discoveries in these fields.

Science North has 338 exhibits in its two Sudbury locations, a main building on the shores of Ramsey

Figure 2: General Admission Fees at Ontario Science Centre and Science North as of March 2023 (\$)

Source of data: Ontario Science Centre and Science North

Age Category	Ontario Science Centre			Science North			
	Science Centre	OMNIMAX Film	Science Centre + OMNIMAX Film	Science Centre	Dynamic Earth (without Underground Tour)	Dynamic Earth + Underground Tour	IMAX ¹
Child² (3-12 or 4-12)	13	9	19	21	16	21	7
Youth (13-17)	16	9	22	23	18	23	8
Adult (18-64)	22	12	28	25	20	25	9
Senior (65+)	16	9	22	23	18	23	8

1. Science North also offers IMAX Remastered films (regular movies that have been refined and converted into IMAX films) at a higher price: \$10 for child, \$11 for youth, \$12 for adult, \$11 for senior.
2. Child admission is for ages 3 to 12 at Ontario Science Centre and ages 4 to 12 at Science North. Admission is free for children under the age of three at the Ontario Science Centre and free for children under the age of four at Science North.

Lake, and Dynamic Earth, which includes a model mine. Science North's main centre is a five-storey snowflake-shaped building embedded in the Canadian Shield.

Both centres were designed by the renowned Canadian architect Raymond Moriyama.

The main attraction at Dynamic Earth is an underground mine tour that takes visitors seven storeys below the surface. Created from the former Big Nickel Mine, Dynamic Earth opened in 2003. At the time of our audit, it was undergoing an expansion (called “Go Deeper”), with the purpose of showcasing more modern mining technology and the future of mining. The project had been delayed due to the COVID-19 pandemic and funding shortfalls. It was scheduled to open in 2025.

On-Site Events and Demonstrations

The Ontario Science Centre and Science North offer a variety of personalized experiences to visitors throughout the year. The Ontario Science Centre offers public programs delivered by staff or with a variety of partners (for example, the Toronto Beekeepers Collective

demonstrations), recreational and family programs and demonstrations (such as the hair-raising experience from the Van de Graaff generator) as well as summer camps, winter and March Break camps. Science North offers after-school day care, professional activity day programs, summer camp programs, adult-only events (Nightlife on the Rocks), and specialist high-skills major certification programs.

2.2.2 School Programs

Both centres offer a variety of school programs for teachers and students from kindergarten to Grade 12. The purpose of school programs is to teach students scientific principles through demonstrations and hands-on activities. As of March 2023, the Ontario Science Centre offered eight types of school programs and Science North offered seven types of school programs. **Appendix 2** shows the different types of school programs offered by the science centres for the 2022/23 fiscal year. Some programs occur on-site, at the science centre; in others, science centre staff host workshops and classes at schools or online.

According to the Ministry of Education, science centres are main hubs for expertise around science education, and it has been providing the Ontario Science Centre and Science North with grant funding for educational programs to make them more accessible to students. In an August 2023 announcement, the Province further committed to fund the Ontario Science Centre, through the Ministry of Education, \$1 million per year for two years beginning in 2024, for the science centre to create hands-on learning experiences and virtual lesson plans for students, as well as STEM (science, technology, engineering and mathematics) teaching materials for educators.

The Ontario Science Centre also operates a science school on its premises, where about 30 Grade 12 students from across the province attend one semester of classes. The science school is open to all students in Ontario and is funded by the Ministry of Tourism, Culture and Sport in partnership with school boards in the Greater Toronto Area.

2.2.3 IMAX Theatres, Planetarium and Film Production

The IMAX theatres at both science centres provide visitors with giant-screen film adventures. The OMNIMAX theatre (Ontario Science Centre) seats 324 people and is the only IMAX dome screen in Ontario that provides an immersive experience. It has 44 speakers delivering 13,000 watts of wrap-around sound.

The planetarium at the Ontario Science Centre has been closed to the public since September 2022 because of outstanding capital repairs and ongoing technical issues with equipment that is at the end of its useful life. When it was operational, the planetarium was used to demonstrate space and astronomy programming through projections and live demonstrations. At the time of our audit, the Ontario Science Centre was in the process of purchasing equipment to reopen the planetarium.

Science North opened an IMAX theatre in 1994 and started developing its own IMAX films. Over the years,

Science North has become one of Canada's leading producers of giant-screen films focused on environmental and natural history. It produces films in its own large-format film production unit and uses a combination of in-house and third-party distributors to sell films to other attractions. The IMAX theatre at Science North seats 200 people, features a 26-metre by 20-metre screen and digital surround sound, and can show IMAX 2D and 3D films.

Science North also has a planetarium that features films and live presentations about astronomy and other space topics, projected on an 8.4-metre dome.

2.2.4 Exhibit Design, Production and Sales

The Ontario Science Centre and Science North not only display exhibits, but design and produce them as well. The former has on-site facilities to design and manufacture unique and bespoke science exhibits of all kinds, for example, the popular MindWorks psychology travelling exhibit completed in 2019. It won the award for Best Show or Exhibit in 2020 from the Canadian Association of Science Centres. The Ontario Science Centre's fabrication department can create customized exhibits, modify exhibits, fabricate and install exhibits. The construction of an exhibit involves everything from creating the concept to installing the finished display and all of its components. The way that visitors interact with an exhibit is envisioned, mapped out and incorporated in the material production of the exhibit.

The fabrication facility includes electricians, wood-workers and painters. As of March 31, 2023, the design and fabrication departments had 34 full-time-equivalent staff.

These exhibits are sold to other centres and organizations across the country and internationally. When the Ontario Science Centre sells an exhibit, it remains involved with setting the exhibit up, training any staff who will participate in the exhibit, and maintaining the exhibit. The centre was one of the first interactive science museums in the world and is recognized internationally. It has offered consultation services for other

science centres that are developing their own exhibits in China, Japan, the United States, Thailand, South Africa, Singapore and Ireland, among other places.

Exhibits can also be rented out to other locations, and become travelling exhibits. As of May 2023, the Ontario Science Centre had created five travelling exhibits for rent: MindWorks; Imagine; Circus!; Motion Mania; and Behind Racism. Three of the five were being rented out at the time of our audit, while the remaining two were in storage.

Science North employees also design exhibits, though the majority are fabricated by third-party providers since that centre's in-house workshop is suitable only for small-scale projects. As part of its exhibit sales, Science North offers consulting services in conceptual program development, business planning, feasibility studies, interpretive staff training, evaluating exhibits and experiences, and creating educator guides and marketing plans. Science North has also produced and sold films internationally on topics such as climate change and human biology.

As of March 2023, Science North had nine travelling exhibits on tour: The Science of Guinness World Records; Beyond Human Limits; Beyond Human Limits Lite; Arctic Voices; Our Climate Quest (small and large); Game Changers; Wild Weather; and Trailblazing: Women in Canada Since 1867.

2.2.5 Facility Rentals and Concessions

In addition to the above key lines of business, both science centres offer rental spaces for private events such as meetings, birthday parties, trade shows, product launches, holiday parties, conferences, networking events, gala dinners, weddings, media events, speaker event and film shoots.

Both science centres have on-site gift shops, cafes and restaurants that provide a variety of food and gift options to visitors. The restaurants at the Ontario Science Centre are outsourced to third parties, while the gift shop is managed in-house. All restaurants and

gift shops at Science North are managed by Science North staff.

2.3 Boards of Trustees

The Ontario Science Centre and Science North are each governed by a Board of Trustees, both of which are accountable to the Ministry through their Board Chair. The Boards' responsibilities include:

- setting goals, objectives and strategic direction for the agency; and
- ensuring that senior management carries out the roles and responsibilities assigned to it by the organization's governing legislation and by applicable government policies and directives.

Appendix 3 shows the composition and committees for each Board of Trustees as of March 2023. The trustees are appointed by the Lieutenant Governor in Council based on the Minister's recommendations. According to the memorandum of understanding (MOU) between the Ministry and Ontario Science Centre, the Board Chair is to engage with the Deputy Minister and seek input from the members of the Board on the recruitment, selection and appointment of a chief executive officer (CEO). In contrast, as outlined in the *Science North Act* and the MOU between the Ministry and Science North, Science North's CEO is hired by its Board without Deputy Minister input.

2.4 Ministry's Responsibilities

The Ministry of Tourism, Culture and Sport (Ministry) is responsible for ensuring that the Ontario Science Centre and Science North fulfill their legislated mandates and comply with applicable government directives and policies. The Ministry's responsibilities are carried out by the Agency Relations and Accountability Division (Division). The Division's key responsibilities include:

- outlining, through the government's mandate letter, the expectations, key commitments and performance priorities of each science centre (see **Appendix 1**);

- reviewing and approving the science centres' annual business plans;
- recommending to the Treasury Board each science centre's provincial funding allocation;
- reporting and responding to the Treasury Board on the science centres' performance and compliance with applicable government policies and directives;
- reviewing, approving and tabling in the Legislature the science centres' annual reports; and
- when appropriate or necessary, taking action or directing that the science centres take corrective action with respect to their administration or operations.

3.0 Audit Objective and Scope

The objective of our audit was to assess whether the Ministry of Tourism, Culture and Sport (Ministry), the Ontario Science Centre and Science North had effective systems and procedures in place to:

- meet legislated requirements, comply with government directives, and adhere to best practices for the operation of the science centres in a cost-effective manner that educates and stimulates the interest of students and the public in science and technology; and
- measure, evaluate, and publicly report on the effectiveness of the science centres.

In planning our work, we identified the audit criteria we would use to address our audit objective (see **Appendix 4**). These criteria were established based on a review of applicable legislation, policies and procedures, internal and external studies, and best practices. Senior management at the science centres and the Ministry reviewed and agreed with the suitability of our objectives and associated criteria.

We conducted our audit between January 2023 and September 2023. We obtained written representation

from the Ministry and the science centres' management that, effective November 27, 2023, they had provided us with all the information they were aware of that could significantly affect the findings or the conclusion of this report.

Our audit work was conducted at the Ontario Science Centre and Science North, and included an analysis of policies and procedures, as well as discussions with senior management and staff responsible for managing overall operations, managing exhibits, delivering education programs, and measuring and reporting on the performance of the centres. We also assessed whether the two centres comply with applicable legislative requirements, government directives, their own policies, and applicable best practices.

We also assessed whether the Ministry provided effective oversight of the two science centres.

We reviewed the proposal to government decision-makers to relocate the Ontario Science announced by the Province on April 18, 2023, and the decision-making process that led up to it, including all relevant proposals, business cases and studies, as well. We met with representatives of the City of Toronto, Toronto and Region Conservation Authority, Infrastructure Ontario, and the Ministry of Infrastructure to understand the planned changes and their impacts on the Ontario Science Centre; and long-term plans for the current science centre site.

We also met with the Toronto District School Board, Toronto Catholic District School Board, Durham District School Board, Peel District School Board, Halton District School Board, Sudbury Rainbow District School Board, Sudbury Catholic District School Board and the Science Teachers' Association of Ontario (STAO) to get their views on the school programs offered by the science centres and the relocation of the Ontario Science Centre to Ontario Place. We also surveyed the members of STAO about the effectiveness of programming offered by the science centres and for their views on the relocation.

We engaged in discussions with the Canadian Association of Science Centres and the Association of Science and Technology Centers to obtain their perspectives on best practices and the challenges of operating science centres.

We also met with the Ministry of Education to get its input on the role of the science centres in the Ontario elementary and secondary school curriculum.

On November 16, 2023, the Ontario government introduced Bill 151, *Improving Real Estate Management Act, 2023* (Real Estate Act). If the Real Estate Act is passed, this will prohibit both science centres from acquiring or disposing of a freehold interest in real estate property without approval from the Minister of Infrastructure. Therefore, this Act could have an impact on some of our findings and recommendations (such as the planned relocation of the Ontario Science Centre, discussed in **Section 4.0**, and the northwest expansion project at Science North, discussed in **Section 6.2.2**). We will consider the impact of this legislation on our recommendations when we perform our follow-up audit on this report.

We conducted our work and reported on the results of our examination in accordance with the applicable Canadian Standards on Assurance Engagements—Direct Engagements, issued by the Auditing and Assurance Standards Board of the Chartered Professional Accountants of Canada. This included obtaining a reasonable level of assurance.

The Office of the Auditor General of Ontario applies Canadian Standards on Quality Management and, as a result, maintains a comprehensive system of quality management that includes documented policies and procedures with respect to compliance with rules of professional conduct, professional standards, and applicable legal and regulatory requirements.

We have complied with the independence and other ethical requirements of the Code of Professional Conduct of the Chartered Professional Accountants of Ontario, which are founded on fundamental principles of integrity, objectivity, professional competence, and due care, confidentiality and professional behaviour.

4.0 Detailed Audit Observations— Proposal to Relocate Ontario Science Centre

On April 18, 2023, the Premier of Ontario, the Minister of Infrastructure, and the Minister of Tourism, Culture and Sport announced publicly that the Ontario Science Centre would be shut down and redeveloped at Ontario Place on Toronto’s waterfront. Plans for the existing site were not firm, although the government suggested that the relocation presented an opportunity for housing and community infrastructure on the site of the Ontario Science Centre.

Construction of a new 275,700-square-foot science centre at Ontario Place was promised to begin in 2025 using the public-private partnership (P3) design, build, finance and maintain model. A request for proposal (RFP) deadline for planning and design was set for October 26, 2023. A second RFP for the construction phase was scheduled for 2024 for construction starting in summer 2025 and a scheduled opening of 2028. **Figure 3** shows the two locations, which are 15 kilometres apart.

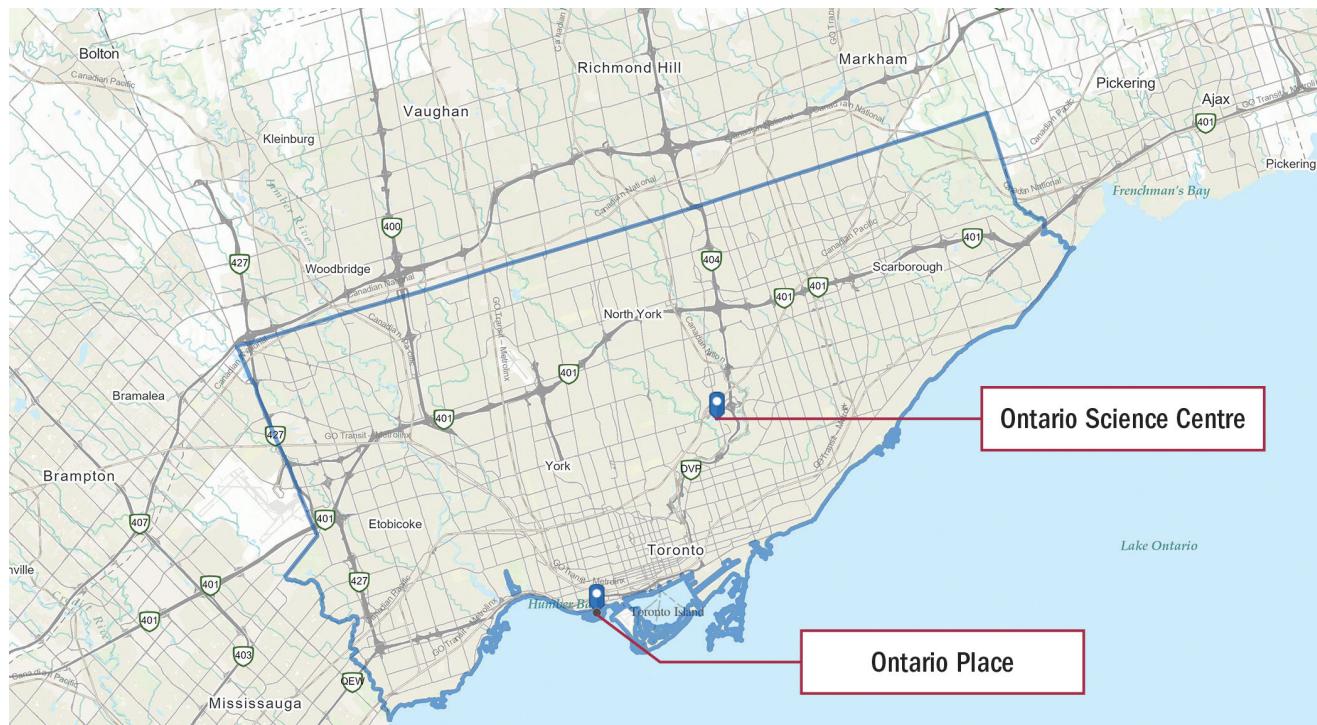
The announcement caught many stakeholders by surprise; they said they were never consulted. The Toronto and Region Conservation Authority (TRCA), which owns the majority of the land for the existing site of the Ontario Science Centre, issued a press release days after the Premier’s that clarified: “To date, no conversations have been held between the Province, City of Toronto, and TRCA regarding the Province’s desire to move the Science Centre, build housing on the lands, and/or cancel the Science Centre lease agreement.”

In this section of the report, we present our audit findings related to the proposed relocation and redevelopment of the Ontario Science Centre.

Section 5.0 presents the results of our audit of the ongoing operations of the Ontario Science Centre, which is also relevant for an analysis of relocation. In that section, we analyze admission trends and the financial picture of the centre, deferred maintenance costs, and infrastructure challenges faced by the Ontario Science Centre.

Figure 3: Map of Toronto with Locations of Ontario Science Centre and Ontario Place

Source of data: City of Toronto



4.1 Decision-Making Was Based on Incomplete Information and Excluded Important Stakeholders

4.1.1 Relocation First Assessed as an Option by Government in 2016

The idea of moving the Ontario Science Centre to a revitalized Ontario Place is not a new idea. However, our audit found that the Province held no discussions with key stakeholders before arriving at the decision to downsize and relocate the science centre (see **Section 4.1.2**). **Appendix 5** sets out a timeline of significant events surrounding the Premier's announcement of the decision.

In 2009, the Province commissioned a study to develop a plan to support the growth and long-term viability of tourism in Ontario. The report noted the potential to move the Ontario Science Centre to Ontario Place as part of a revitalization project. In 2016, the Ministry of Tourism, Culture and Sport first engaged Infrastructure Ontario (an agency of the Province under the Ministry of Infrastructure) to complete a

business case on how to modernize the Ontario Science Centre. The two options under consideration were to: (A) remain on site with a plan to renovate exhibits and address repairs and deferred maintenance; or (B) reopen at Ontario Place with a new building and new exhibits on provincially owned land.

Infrastructure Ontario worked with management of the Ontario Science Centre on a business case. The 2016 business case proposed that redeveloping the Ontario Science Centre in a 318,000-square-foot building at Ontario Place with significantly reduced maintenance and operating costs would save the Province around \$250 million on a net present value basis over a 50-year period. The document noted that the relocation option would provide the government with an opportunity to simultaneously revitalize two provincial assets, Ontario Place and the Ontario Science Centre, with one financial investment. This 2016 business case was shared with the Ontario Science Centre Board. In November 2016, the Board, in a letter to the Minister, acknowledged that due to deferred maintenance, the status quo was not sustainable. While

supportive of options presented in the business case, the Board put forward a third option to build a new science centre at its current site and move it closer to the Eglinton Crosstown LRT, and to finance the project by mixed development in the remaining lands. No action was taken on the recommendations of this business case.

In 2019, Ontario Science Centre's Board and management again assessed options for addressing the need for capital investments and critical repairs needed for the centre. In a June 2019 presentation to the Ministry of Tourism, Culture and Sport, management stated, "After 20 years of limited investment, aging exhibits and outdated infrastructure, the [Ontario Science Centre] is less able to fulfill its mission." Management and the Board were considering three options: (1) reinvest in the existing Don Mills site; (2) relocate closer to the Eglinton LRT station (corner of Don Mills Road and Eglinton Avenue); or (3) relocate to Ontario Place. In December 2019, the then CEO of the Ontario Science Centre also asked the Deputy Minister to request the investments needed for the existing centre through the Ministry's multi-year planning process. However, the COVID-19 pandemic then shifted the focus of the Board and management toward relief funding to sustain operations and to open the centre safely during provincial health restrictions.

In May 2020, government decision-makers approved redeveloping Ontario Place using a multi-partner approach, consisting of the Therme Group, Live Nation and Écorécréo Group, and asked the Ministry to report back on a strategy for the potential relocation of the Ontario Science Centre. The May 2020 proposal submitted by the then Ministry of Heritage, Sport, Tourism and Culture Industries noted that the use of the pods and Cinesphere at Ontario Place was a potential option for a new Ontario Science Centre. The proposal also noted that the Ministry was engaged with the Ministry of Transportation and Infrastructure to ensure that the potential Ontario Science Centre relocation is consistent with the government's Transit-Oriented Communities initiatives (see **Section 4.5.1**). The relocation of the Ontario Science Centre would unlock the site at Don Mills Road and Eglinton Avenue for Transit-Oriented Communities-related development.

In August 2020, the Minister of Infrastructure asked Infrastructure Ontario to develop a proposal that identified capital costs and general benefits associated with the Ontario Science Centre relocating to the Ontario Place site, in consultation with the then Ministry of Heritage, Sport, Tourism and Culture Industries, and the Ontario Science Centre.

In June 2021, the Ministry informed management of the Ontario Science Centre that relocating the centre to Ontario Place was a "priority project" and that it planned to submit a proposal to government decision-makers in summer 2022. In July 2021, the Ministry of Heritage, Sport, Tourism and Culture Industries submitted a proposal to government decision-makers to request planning approval for a potential relocation of the Ontario Science Centre to Ontario Place. The proposal updated the analysis prepared in 2016 and identified a potential savings from the relocation of more than \$200 million (net present value basis over a 50-year period). In the proposal, the Ministry noted that a new Ontario Science Centre at Ontario Place could also incorporate potential satellite locations in Toronto (including retaining programming at the Don Mills Road site) and elsewhere in the province along with expanded travelling exhibits. The Ministry proposed reporting back to the decision-makers with details on potential satellite locations at a future date.

In December 2021, government decision-makers approved funding for the Ministry of Heritage, Sport, Tourism and Culture Industries to undertake detailed project planning for a relocation of the science centre to Ontario Place, including working with Infrastructure Ontario on a delivery model analysis. It did not request the Ministry to report back on potential satellite locations. Between April 2022 and March 2023, Infrastructure Ontario conducted an attendance study and an Economic Impact Assessment, and prepared a business case. This planning and analysis informed the April 2023 proposal submitted by the Ministry of Infrastructure to government decision-makers, which led to the April 18 announcement of the relocation of the Ontario Science Centre to Ontario Place.

From September 2021 to April 2023, leading up to the provincial announcement, Ontario Science Centre

senior management provided updates to the Board on the Ministry requests for input associated with the potential relocation. In a March 2023 meeting, the CEO informed the Board that a business case for relocation was expected to be submitted to government decision-makers in the spring, followed by a public announcement, but no dates were yet confirmed. On April 17, 2023, one day before the public announcement of the relocation, the Board approved, in principle, the relocation of the Ontario Science Centre to Ontario Place.

At the same time, over the years, various parties have been interested in development on the Ontario Science Centre site. **Appendix 5** contains the timelines and details of the proposals for development received by the City and the science centre.

4.1.2 Decision-Making Process Was Not Fully Informed

Limited Public Consultations about Science-Based Programming at Ontario Place Did Not Mention Relocating Ontario Science Centre

In August 2021, the Ministry of Heritage, Sport, Tourism and Culture Industries and Infrastructure Ontario were directed to conduct preliminary planning to evaluate relocating the Ontario Science Centre.

As part of an Ontario Place public survey conducted between August and October, the Ministry of Infrastructure asked Ontarians about the types of science-based programming and activities they might like at Ontario Place. We noted that the survey contained no questions related to a potential relocation of the Ontario Science Centre.

A few months later (December 2021), the Ministry of Heritage, Sport, Tourism and Culture Industries received Stage 1 planning approval for a proposed relocation. However, the project was later put on hold. The science centre proposed a 353,000-square-foot facility in September 2022 for Ontario Place at a cost estimated at up to \$610 million. The government instead requested that a smaller facility be explored. In June 2022, the ministry division leading the Ontario Place Revitalization (including the Ontario Science

Centre relocation) was transferred from the Ministry of Tourism, Culture and Sport to the Ministry of Infrastructure by the government, as it decided that the Ministry of Infrastructure would lead the redevelopment of Ontario Place.

In April and October of 2022, the Ministry of Infrastructure hosted two consultations with the public, held as live virtual events. In total, 370 members of the public responded to design concepts for Ontario Place. The presentations at these events promised that the Province would lead the development and execution of science-related programming in collaboration with the Ontario Science Centre. No mention was made of a potential relocation of the Ontario Science Centre itself.

Discussions with the City of Toronto Were Limited in Any Substance or Detail Regarding the Relocation Announcement

In April 2022, the Minister of Infrastructure requested the Chair of Infrastructure Ontario to provide support to the then Ministry of Heritage, Sport, Tourism and Culture Industries in engaging the City of Toronto in negotiations to relocate the Ontario Science Centre to the Ontario Place site. The Minister's mandate letter instructed Infrastructure Ontario, at the same time, to provide support to the Province as it negotiated with the City of Toronto to open the existing Ontario Science Centre lease for the Don Mills Road and Eglinton Avenue site.

According to Infrastructure Ontario, discussions with the City of Toronto took place in July and August 2022 and touched on the opportunity that could be created for affordable housing on the Don Mills Road site.

At the time of the finalization of this report, however, City staff told us the focus of the July and August 2022 meetings was the Province's redevelopment of Ontario Place. While the Ontario Science Centre was on the agenda for these meetings, the item was framed as a medium- to long-term priority. City staff had Council direction to engage with provincial officials on the Ontario Place redevelopment, but did not have Council direction to engage with provincial officials on repurposing or redeveloping the Ontario

Science Centre at its Don Mills Road site. According to the City of Toronto, the Province approached the City about the possibility of incorporating science programming at Ontario Place. The scenario of shutting down or relocating the existing Ontario Science Centre facility was not discussed in any substance or detail.

On July 20, 2023, Toronto City Council voted 21 to 3 in favour of exploring the feasibility for the City of Toronto to take over operations of the science centre or create another public-facing attraction in the existing facility and location. City staff planned to report back to Council on this during the second half of 2024. Subsequent to the finalization of this report, the Province had agreed to discuss partnership opportunities with the City for maintaining public, community-oriented science programming at the existing site of the science centre.

The Ministry of Infrastructure did host a town hall event for the public on April 27, 2023, after the relocation was announced. The event was attended by 265 members of the public. The Ministry presented concept designs for the Ontario Science Centre and asked for feedback on them.

The feedback from participants was mainly negative. Participants voiced concerns about the project, including:

- the lack of transparency in the government's decision-making;
- the projected costs of relocation;
- the negative impact that closing the existing Ontario Science Centre would have on nearby communities;
- the traffic congestion in the Ontario Place area;
- the lack of consultation with employees of the Ontario Science Centre and members of the public; and
- the smaller size of the new science centre, possibly impacting staffing and the quality of exhibitions.

Participants also voiced strong support for maintaining the current building and the existing Ontario Science Centre.

According to the Ministry of Infrastructure, the concerns raised at its April 27, 2023 event were addressed

as part of the environmental assessment of the redevelopment of Ontario Place conducted in June 2023. Infrastructure Ontario also told us that certain views were taken into consideration as part of the assessment. However, when we reviewed the environmental assessment report, we found that commentary regarding the decision to relocate the Ontario Science Centre to Ontario Place was determined as outside the report's scope and therefore was not considered.

Large School Boards within the Greater Toronto Area Directly Impacted by the Relocation Were Not Consulted Prior to the Announcement

Students from elementary and high schools make up approximately 25% of visitors to the Ontario Science Centre. We met with members of the large school boards within the Greater Toronto Area that would be directly impacted by the relocation (Toronto District School Board, Toronto Catholic District School Board, Durham District School Board, Peel District School Board, and Halton District School Board). All of these school boards told us they were not asked for their input on relocating the science centre.

4.1.3 All Costs Were Not Considered in the Estimate to Relocate the Ontario Science Centre

The decision to relocate the Ontario Science Centre was informed by a cost/benefit analysis contained in the March 2023 business case completed by Infrastructure Ontario, prepared with assistance from an external consultant. The analysis compares the net present value of revenues and costs over a 50-year period (2023/24–2072/73) for two options: (A) remain at the current location; or (B) downsize and relocate to Ontario Place. According to this financial analysis, remaining on site would cost the Province \$1.304 billion, while the cost of relocating would be \$1.047 billion, a savings of \$257 million. See **Figure 4** for a reproduction of the cost/benefit analysis created by Infrastructure Ontario.

Option A assumed a one-year closure of the Don Mills site for renovations and projected a slight increase

Figure 4: Infrastructure Ontario's Cost/Benefit Analysis¹ for Ontario Science Centre Relocation (\$ million)

Source of data: Infrastructure Ontario

Financial Impact	Option A: Remain on Site	Option B: Relocate⁴	Difference: B minus A
General admissions	213	243	30
Ancillary operations ²	406	378	(28)
Interest income	7	8	1
Interim revenue impacts ³	-	(26)	(26)
Total revenue	626	603	(23)
Operating expense ³	(1,221)	(984)	237
One-time expenses – severance	-	(7)	(7)
Total operating expense	(1,221)	(991)	230
Don Mills building repairs	(306)	(31)	275
Ontario Science Centre lifecycle maintenance	(297)	(231)	66
Ontario Place common area maintenance	-	(11)	(11)
Total maintenance	(297)	(242)	55
Ontario Science Centre capital – exhibits	(65)	(64)	1
Ontario Science Centre construction – Don Mills cosmetic upgrades	(41)	-	41
Ontario Science Centre construction – buildings and pods at Ontario Place	-	(290)	(290)
Ontario Science Centre one-time relocation expenses	-	(32)	(32)
Total capital expenses	(106)	(386)	(280)
Total project surplus/(shortfall)	(1,304)	(1,047)	257

Note: As noted in **Section 4.1.3**, the analysis does not consider all relevant costs associated with the relocation and rehabilitation of the Ontario Science Centre. Costs not considered include the financing and transaction costs relating to a public-private partnership (P3) model proposed for the construction of the new science centre. Similar costs may also be incurred for rehabilitating the existing site. Parking costs for the new science centre at Ontario Place are also not included in the analysis.

1. The cost/benefit analysis prepared by Infrastructure Ontario used the net present value of revenues and costs over a 50-year period (April 1, 2023–March 31, 2073), with a 3% discount rate, for two options: (A) remain at the current (Don Mills) location; and (B) relocate to Ontario Place.
2. Ancillary operations include revenue from concessions, donations and sponsorship, external sale and rental of exhibits, facility rentals, memberships, OMNIMAX theatre, programming (educational and recreational), and other revenue.
3. The Ministry of Tourism, Culture and Sport proposed an interim operating solution for the relocation scenario whereby the Ontario Science Centre operations would be reduced to one building at the existing site for a maximum of five years (April 1, 2023–March 31, 2028). Interim revenue impact of \$26 million (net present value) represents estimated revenue loss associated with the period between the Ontario Science Centre exiting its current site and relocating to the proposed new facility at Ontario Place. Included in operating expense under the relocation scenario is interim expense savings of \$33 million (net present value) which represents estimated expense reduction associated with the period between the Ontario Science Centre exiting its current site and opening at the proposed new facility at Ontario Place.
4. No fabrication facility was included in the proposed relocated Ontario Science Centre and the analysis assumed that revenues and expenses from external sale and rental of exhibits would not continue after March 31, 2028 under the relocate scenario.

in attendance. It treated costs as consistent with current operations. Option B proposed a combination of a new four-storey, 275,700-square-foot building and renovation of the existing Ontario Place pods, Cinesphere and connecting bridges. The revenues projected for Option B assumed the Ontario Science Centre would remain open at its Don Mills location

for five years until construction at Ontario Place was completed. This scenario estimated an increase in attendance to a total of approximately one million visitors per year (up 54% from the level in 2022/23) in the first year of operation at the Ontario Place site. The attendance was projected based on comparable attractions in Canada and the US.

We could not conclude on the reasonableness of the cost/benefit analysis, since all relevant costs associated with the relocation and rehabilitation of the Ontario Science Centre were not available and included in the analysis. Examples of costs not considered are detailed in the sections below.

Transaction and Financing Costs Associated with P3 Delivery Were Omitted

From our review of the analysis, we noted that certain costs that could impact the calculation were not included. The cost/benefit analysis did not include financing costs projected under the public-private partnership (P3) model to design, build, finance and maintain (DBFM) the new site at Ontario Place. In addition, the analysis did not include transaction costs (legal fees, proposal fees and other project management fees associated with using the P3 model) or special purpose vehicle (SPV) costs (such as company start-up costs, legal costs, overhead, salaries, and administrative costs for the project company during construction).

Similar costs could also be incurred under the option to repair and upgrade the science centre. However, at the time of our audit, an assessment of the delivery model for the repairs had not been done.

Infrastructure Ontario told us that it did not include the financing, transaction and SPV costs related to a P3 build because the cost/benefit analysis was silent as to which delivery model to use for the new Ontario Place build, and also because a similar level of cost details was not available for remaining on the existing site. At the time of the finalization of this report, Infrastructure Ontario informed us that it was assessing whether the DBFM model was appropriate for the project. Specifically, it was assessing whether the model will result in sufficient competition by generating interest among prospective bidders.

Costs for Parking Were Not Included

At the time of our audit, the redevelopment of Ontario Place planned to involve three tenants: Therme Group Canada Inc. (Therme), which plans to build and operate an indoor waterpark and spa, Live Nation

Canada, which is redeveloping the existing Budweiser Stage amphitheatre, and the Ontario Science Centre. According to the proposal submitted to government decision-makers, the parking needs for the revitalized Ontario Place were approximately 2,700 spaces. Of that total, a portion of the parking spots were assumed to be allocated to Therme as per its lease agreement with the Province. The lease signed with Therme obligates the Province to provide a number of dedicated parking spaces for Therme between 2028 and 2030. If the Province does not meet its obligations to Therme, as per the contract, it faces a financial penalty.

According to the 2023 proposal submitted to government decision-makers, a site-wide parking solution was needed to meet the Province's existing legal obligations under the lease it had signed with Therme Group and for its potential lease obligations with Live Nation (pending approval of a final agreement), as well as to meet the needs of future tenants, such as the science centre. The submission proposed that the new parking be integrated with the new Ontario Science Centre building in order to dispel public/stakeholder concerns relating to cost and impact on the environment. The recommended plan in the proposal to the government decision-makers was to use 700 of the existing parking spaces at Ontario Place and to build a multi-storey parking garage under the new Ontario Science Centre for the remaining 2,000 parking spaces. The Ministry of Infrastructure had obtained a high-level preliminary estimate of \$307 million (\$277 million net present value) to build the remaining 2,000 parking spaces, which its proposal noted would result in capital savings to the government. The proposal further noted that if the parking structure were to be built as a standalone structure, there was a risk that future development opportunities above the parking structure could be limited. Subsequent to the finalization of this report, the Province had agreed with the City of Toronto to explore relocating the parking structure to the grounds of Exhibition Place in order to improve public access to the shoreline.

Incremental parking costs were not included in Infrastructure Ontario's cost/benefit analysis. Infrastructure Ontario told us that the parking costs were not included because parking was not dedicated to the

Ontario Science Centre but was, rather, required for the overall redevelopment of Ontario Place.

4.2 Ontario Science Centre Relocation Was Being Planned Irrespective of Another Anchor Tenant Pulling Out of Ontario Place

News came in September 2022 that the Quebec-based company Écorécréo, which was to have built an adventure park at the Ontario Place redevelopment, would no longer be involved with the Ontario Place redevelopment. According to the Ministry of Infrastructure, Écorécréo was no longer in a position to pursue the opportunity at Ontario Place due to unforeseen challenges and prior commitments to its existing operations. The Ministry said at the time that the loss of Écorécréo, one of three future tenants for the project, would have no impact on the timeline for Ontario Place.

The April 2023 relocation proposal drew the conclusion that relocation of the Ontario Science Centre would expedite the redevelopment of Ontario Place by delivering a third anchor tenant to provincially owned lands, occupy the vacant pods and Cinesphere, and help make Ontario Place a year-round family destination.

However, we noted that in addition to the three other future tenants, the Ontario Science Centre was being planned as a viable option to occupy the Cinesphere and the pods at Ontario Place in 2020.

As for the existing site, the 2023 proposal to government decision-makers requested permission to engage the City of Toronto to finalize a lease break at this site. The document highlighted that relocation also created a “unique opportunity” to reconsider the future function of the Don Mills Road site to meet other government priorities, such as housing. The proposal noted that, through Infrastructure-Ontario-led negotiation with the City, the government could explore future use of the site and redevelopment opportunities.

The proposal, however, noted that there was a risk that full closure of the existing Ontario Science Centre facility would draw criticism, and there may also be

criticism that the public was not consulted on this decision, as noted in **Section 4.1.2**.

4.3 Proposed Science Centre Will Have Less Space for Exhibits and No Facilities for the Fabrication of Exhibits

4.3.1 New Science Centre Would Have 18% Less Indoor Exhibit Space, Outdoor Space Remains Unplanned

We compared the proposed new centre’s interior (building) space to the existing space at the Ontario Science Centre and determined that the proposed centre would be approximately half (49%) the existing centre’s size, in square footage. Specifically, at 770 Don Mills Road, the buildings provide a total of 568,000 square feet. The proposed space within the Ontario Place location—comprising the mainland building, pods, bridges and the Cinesphere—is 275,700 square feet.

The proposed centre contains 110,000 square feet of indoor exhibit space, which is 18% less when compared to 134,000 square feet (which includes the rainforest, planetarium and travelling exhibit space) at the existing Don Mills site. Infrastructure Ontario’s request for proposal (RFP) indicated that the new site would not have certain core exhibits that are part of the current centre, such as the indoor immersive rainforest or a planetarium.

The outdoor adventure playground was also not intended to be reproduced. The existing Ontario Science Centre offers an outdoor area where visitors can enter into the Don River valley ravine. At the time of our audit, there was no information available about the nature of the outdoor space that would be part of the new Ontario Science Centre.

The project’s RFP states that “during development of the Functional Program, a number of program elements were not included in the Functional Program due to a required reduction in the size of the building/square footage, requiring rationalization of the current activities.” And, in the April 2023 proposal to government decision-makers, the Don Mills Road site was

described as “oversized and inefficient, with significant ongoing operating expenses” compared to which “the new modernized facility will operate more efficiently.” According to the cost/benefit analysis performed by the Ministry of Infrastructure (see **Section 4.1.3**), 90% of the projected savings from the redevelopment (\$257 million in net present value) are based on lower operating expenses at the smaller facility.

4.3.2 Plans to Continue to Construct, Sell and Rent Exhibits—Legislated Objectives—Remain Uncertain with the Relocation

We noted that in the March 2023 business case on the modernization of the Ontario Science Centre prepared by Infrastructure Ontario the business line associated with the fabrication and sale of exhibits was not part of the functional plan of the new science centre at Ontario Place, but remains an option outside of the new science centre. Infrastructure Ontario confirmed with us that no fabrication facility was included in the design requirements of the relocated Ontario Science Centre. The business case was used to inform the April 2023 proposal to government decision-makers, although the proposal did not mention that fabrication and sale of exhibits were not part of the relocation option.

As discussed in **Section 2.2.4**, the construction, sale and rental of exhibits is a source of self-generated revenue for the Ontario Science Centre. From 2012/13 to 2018/19 (the last complete fiscal year in which operations were not impacted by the COVID-19 pandemic), the external sales and rental of exhibits earned the centre an average annual revenue of \$2 million and incurred an average of \$1.7 million in annual direct costs, resulting in a 15% profit margin.

Further, one of the Ontario Science Centre’s legislated objectives is “to collect, manufacture, market, exhibit and sell objects and displays and to provide consulting services.” To fulfill this mandate, the Ontario Science Centre has developed expertise in designing and fabricating exhibits that are rented out or sold to

clients around the world, and expertise in consulting services for the development of exhibits. It is unclear how the proposed redeveloped science centre would be able to fully meet this legislated objective without hosting exhibit fabrication services. It is also unclear if there is a possibility for the existing site to continue with this fabrication facility. At the time of our audit, the science centre informed us that it was exploring options on how to continue or evolve these services.

4.4 Waterfront Location Deemed Better for Tourists

The 2021 Ministry of Heritage, Sport, Tourism and Culture Stage 1 planning documents for the relocation of the Ontario Science Centre to Ontario Place acknowledged that, “given a greater distance for most residents and school groups in suburban areas, these two market segments may witness a decline in percentage terms.” It was noted that, by comparison, the Ontario Place location and venue was more likely to provide the centre with access to a larger slice of the tourist and events rental markets.

Similarly, a December 2022 qualitative analysis of Ontario Science Centre attendance, completed by a consultant hired by Infrastructure Ontario, observed that suburban families would have, on average, a longer travel distance to Ontario Place than to the current site at Don Mills and Eglinton. (In 2020, 1.54 million people lived within a 10-kilometre radius of the existing science centre compared to about 1.10 million people living within a 10-kilometre radius of Ontario Place.) However, the new location was described as easier to access for tourists staying in downtown hotels or driving in for day trips. The analysis thus projected total attendance to increase to about one million at the Ontario Place location.

4.4.1 Proposal to Government Decision-Makers Did Not Include Concerns Raised About Expected Attendance, Travel Times and Car Access to the Ontario Place Location, Especially for Suburban Families and Certain School Groups

Transportation to the Ontario Place location was assessed as problematic in Infrastructure Ontario's 2022 attendance study. It noted that car access and parking were limiting factors, meaning that, until the implementation of subway or light rail links to Ontario Place, driver/road access to the site would limit attendance. The Ontario Line subway, connecting the existing Don Mills site to Ontario Place, has a projected completion date of 2031, at least three years after the projected opening of the relocated Ontario Science Centre.

Despite the evidence gathered in the attendance analysis, the March 2023 business case assumed that "school group attendance would remain consistent with current levels" based on the idea that school visits from the west and northwest of the Greater Toronto Area would balance any decrease in school visits from the east and northeast. There was no market assessment provided to support this assumption, however, and neither were the schools in these regions asked to provide input. Indeed, none of the concerns raised in the attendance analysis about suburban families, travel times or car access as a limiting factor were included in the proposal to government decision-makers in April 2023.

A key legislated objective of the Ontario Science Centre is "to depict to the public and to conduct a program of education in the origins, development and progress of science and technology, and their relationship to society." To fulfill this mandate, the Ontario Science Centre currently offers a variety of educational programs to schools, students, and teachers, as shown in **Appendix 2**. In 2022/23, schools from 36 of the 72 public school boards in Ontario visited the current Ontario Science Centre location. For the seven-year period from 2012/13 to 2018/19 (the last

complete fiscal year before COVID-19 impacted attendance), school groups made up about 25% of Ontario's Science Centre's attendance on average. Fewer schools were located in the area of the new Science Centre at Ontario Place than the current site. According to an analysis prepared by the Ontario Science Centre in 2019, 135 elementary and 26 secondary schools were in the vicinity of the current site of the science centre, compared to 74 elementary and 19 secondary schools (a total of 93 schools) near Ontario Place.

We spoke to school boards in the Greater Toronto Area (Toronto District School Board, Toronto Catholic District School Board, Durham District School Board, Peel District School Board and Halton District School Board) about the potential relocation of the Ontario Science Centre to Ontario Place. We asked whether the change in location would impact their schools' attendance at the centre. The Toronto Catholic District School Board and Durham District School Board noted that relocation would negatively impact their schools' attendance due to longer distances and higher transportation costs.

The Toronto District School Board told us the impact of the relocation on its schools was unknown, stating that there may be some shifts in the students who go from different areas but overall, schools would continue to go. The Peel District School Board did not view the new location as more or less convenient, it said, because it might be more convenient for Mississauga schools but less convenient for schools in the northern part of the district. The Halton District School Board indicated that since the new location was closer to a GO Transit station it would be more accessible and convenient for their students.

The Science Teachers' Association of Ontario told us the educators they had spoken with had expressed concerns about the relocation because of the traffic in the Ontario Place area, which was already difficult to access. Some school boards and the association noted that school buses have a limited run time for field trips, and increased traffic would decrease the window of time spent at the destination.

Further, we surveyed members of the Science Teachers' Association of Ontario and received responses from over 300 teachers from 53 school boards. We asked how the new location would impact the likelihood of their attending the Ontario Science Centre with their classes. Of the respondents:

- 46% indicated they were less likely to attend the new location due to distance and transportation concerns;
- 18% indicated that the existing and/or new location are too far or not affordable for them to attend;
- 17% indicated that the relocation would have no impact on their attendance;

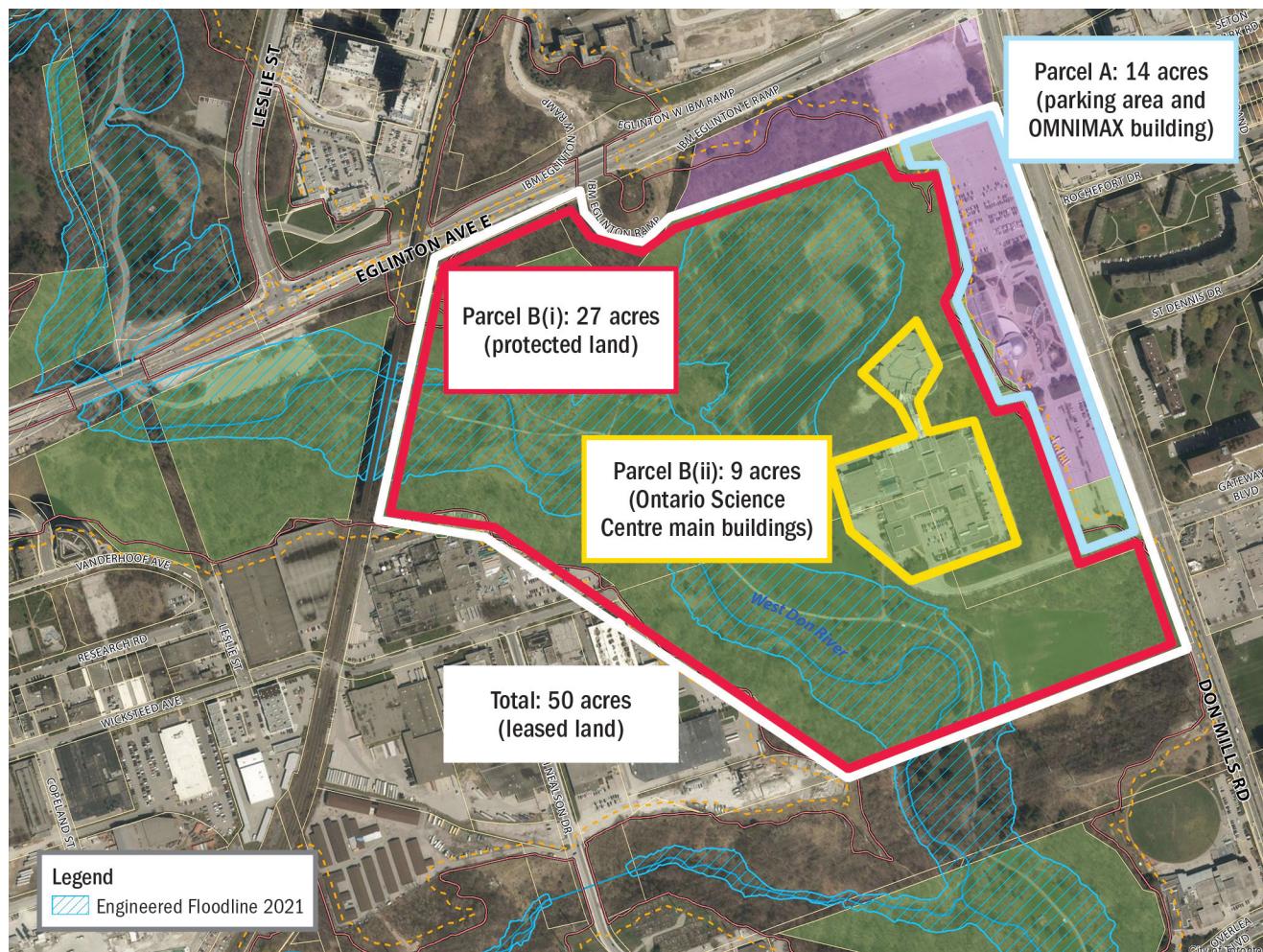
- 14% indicated that they were more likely to attend at the new location; and
- 5% indicated they were indifferent, unsure or did not provide an opinion.

4.5 Redevelopment Plans for Existing Don Mills Site Unclear

The Toronto and Region Conservation Authority (TRCA) and the City of Toronto (City) each own portions of the land on which the Ontario Science Centre currently sits, and lease it to the Province for a nominal amount. **Figure 5** offers an aerial view of the land owned by the City and the TRCA. Parcel A on this map,

Figure 5: Map of Lands Owned by City of Toronto and the Toronto and Region Conservation Authority

Source of data: Toronto and Region Conservation Authority



Note: Toronto and Region Conservation Authority owns 81 acres of land, under management with the City of Toronto, at the southwest corner of Don Mills Road and Eglinton Avenue, including the lands referenced above.

approximately 14 acres, is owned by the City. Parcels B (i) and B (ii), approximately 36 acres in total, are owned by the TRCA.

The Ontario Science Centre building itself, at 770 Don Mills Road, is owned by the Province and managed by Infrastructure Ontario. It charges an annual occupancy cost of \$4.8 million to the Ontario Science Centre. The occupancy cost covers maintenance, taxes, operating and management fees, utilities and leasehold improvements. Infrastructure Ontario outsources the management of the property and facilities to a property management company.

Infrastructure Ontario's March 2023 business case for relocation cited a 2023 Economic Impact Assessment commissioned from a consulting firm, which noted that "relocating the [Ontario Science Centre] to Ontario Place would enable OSC land at Don Mills to be redeveloped into mixed-use residential and commercial space and provide approximately 2,500 to 3,000 new dwellings." The economic assessment also noted that, based on land valuation and property tax revenue estimates, the present value of future tax revenue accruing to the City of Toronto over a 50-year period would range from \$601 million to \$785 million if a range of 30- to 45-storey mixed-use buildings were built along Don Mills Road.

The Ontario Science Centre leases the land for \$1 per year. The rental agreement is for a 99-year term expiring on June 30, 2064 with an option to extend for another 99 years if conditions are met. Under the lease, the Province is only allowed to operate and maintain a museum and related facilities and the site cannot be used for other purposes. The lease has two components: the parking lot lands (Parcel A) and the main site lands (Parcel B). (These are visible in **Figure 5**.) There are no termination rights for either the landlord or the tenant for the site unless the majority of the centre is destroyed by fire, lightning or any other cause, which allows the landlord to end the lease. Therefore, the Province would first have to enter into negotiations with the City as well as the TRCA for an early

termination of the lease. According to the agreement, when the lease ends, at the discretion of the City or the TRCA, all buildings or installations on the site become the property of the City or the TRCA or will be demolished and the site restored to its original condition at the expense of the Province.

Development is likely possible only on Parcel A because much of Parcel B is located within a ravine and includes a floodplain, a low-lying area next to a waterbody where flooding is a risk. The Toronto and Region Conservation Authority has publicly noted that the floodplain, watercourses, wetlands and steep ravine slopes make construction impractical and potentially inadvisable around the Don River ravine lands and sensitive habitats (for multiple bird and mammal species, turtles and amphibians) at the Ontario Science Centre's current location.

4.5.1 Transit-Oriented Community First Considered on Ontario Science Centre Land in 2020

A May 2020 proposal for the redevelopment of Ontario Place, submitted to government decision-makers by the then Ministry of Heritage, Sport, Tourism and Culture Industries, noted that the Ministry would ensure that the potential relocation of the Ontario Science Centre is consistent with the government's Transit-Oriented Communities program. For Transit-Oriented Communities, the Province works with developers to build mixed-use communities (higher density housing, retail, public amenities and entertainment) connected to or within a short distance of transit stations. The proposal further noted that the relocation of the Ontario Science Centre would unlock the site at Don Mills Road and Eglinton Avenue for Transit-Oriented Community-related development.

The Ministry of Infrastructure informed us that planning for the Transit-Oriented Community at the Ontario Science Centre site is premature until the transit needs in the area are finalized by Metrolinx,

an agency of the Province responsible for all modes of transportation in the Greater Toronto and Hamilton Area. Infrastructure Ontario also informed us that it would be years before the project goes to market for the competitive selection of a developer.

4.5.2 Heritage Status of the Ontario Science Centre's Current Property May Require Exemption to Allow Alternative-Use Development

The Ontario Science Centre was built in 1969 and designed by renowned Canadian architect Raymond Moriyama.

At the time of our audit, the cultural heritage status of the Ontario Science Centre's Don Mills property was under review by Infrastructure Ontario and the Ministry of Infrastructure. In August 2022, Infrastructure Ontario retained an architecture firm to provide a Cultural Heritage Evaluation Report for the Ontario Science Centre. In June 2023, the draft report concluded that the Ontario Science Centre property met the criteria for both "cultural heritage value or interest" under O. Reg. 9/06 and "cultural heritage value or interest of provincial significance" under O. Reg. 10/06 of the *Ontario Heritage Act*. The report recommended ongoing engagement with the City of Toronto and the Toronto and Region Conservation Authority to ensure careful conservation of the setting and the property's three buildings. However, at the time of our audit, the government was still determining next steps and associated timelines with respect to the heritage status of the property.

The City of Toronto has also listed the Ontario Science Centre as a heritage property since April 2006. However, being listed does not in itself offer heritage protection. Rather, a heritage evaluation by a qualified person needs to be performed to determine whether the criteria to determine "cultural heritage value or interest" are met so that the property can be designated under the *Ontario Heritage Act*. An evaluation of the

Ontario Science Centre was in process at the time of our audit, to be completed in the first quarter of 2024. If, based on the evaluation, the City designates the Ontario Science Centre under the *Ontario Heritage Act*, any changes to the "heritage attributes" of the centre that are inconsistent with the reasons for the heritage designation would require approval from the City.

However, in January 2023, the Province amended the *Ontario Heritage Act*, adding section 25.2 (7), which allows the Lieutenant Governor in Council to make Orders that exempt provincial heritage properties (owned or occupied by the Crown or a prescribed public body) from having to comply with heritage standards and guidelines. This would have to be done by Order in Council, and the Cabinet would have to be of the opinion that the exemption could potentially advance a provincial priority (specifically, transit, housing, health and long-term care), other infrastructure, or other priorities as may be prescribed. As the Province has an ownership interest in the Ontario Science Centre building, the Province could exempt the buildings, even if the property has been designated by the City, from complying with provincial heritage standards and guidelines.

RECOMMENDATION 1

To ensure that all decisions going forward on a relocation of the Ontario Science Centre and future use of the existing site are based on complete information, we recommend that the Ministry of Infrastructure, in conjunction with Infrastructure Ontario and the Ministry of Tourism, Culture and Sport:

- consult all key stakeholders (including the City of Toronto, Toronto and Region Conservation Authority and impacted school boards) on potential options for the existing Ontario Science Centre site and to inform decisions on exhibits and programming for the new Ontario Science Centre at Ontario Place;

- conduct a detailed study on the impact that relocating the Ontario Science Centre might have on access to educational programming by school groups and suburban families with young children, and devise strategies to maintain and increase attendance of these groups at a new Ontario Place location; and
- include all relevant costs in the cost/benefit analysis with respect to the options to relocate and rehabilitate the existing site.

MINISTRY OF INFRASTRUCTURE AND MINISTRY OF TOURISM, CULTURE AND SPORT RESPONSE

While decisions around the future of the existing Ontario Science Centre site have not been made, the ministries will look to identify and consult with key stakeholders as appropriate.

The Ministry of Tourism, Culture and Sport (Ministry) will continue to work closely with the Ontario Science Centre and key stakeholders as it moves forward with this opportunity. The Ministry would note that no decisions with respect to specific exhibits or programming at Ontario Place have been made. The Ministry will work with the Ontario Science Centre to engage stakeholders to ensure program offerings at the new science centre are topical, engaging and of interest to its current and future users. This will include developing strategies to maintain and increase attendance of these groups at the new location.

The ministries will work together as appropriate to continue to bring forward business cases that are robust, well informed, and bring together all relevant costs in a cost/benefit analysis with respect to options for the Ontario Science Centre.

RECOMMENDATION 2

To ensure that the selection of the developers for any future Transit-Oriented Community on the

existing Ontario Science Centre site is fair and transparent, we recommend that Infrastructure Ontario conduct an open and competitive selection process when this project is ready to go to market.

INFRASTRUCTURE ONTARIO RESPONSE

Infrastructure Ontario will conduct open and competitive selection process for any future Transit-Oriented Community site on the existing Ontario Science Centre site. This is consistent with Infrastructure Ontario's advice already provided to government. Presently, the agency is conducting open and competitive selection processes for the first two such sites that have been publicly announced.

5.0 Detailed Audit Observations—Ontario Science Centre

5.1 Financial Sustainability of the Ontario Science Centre

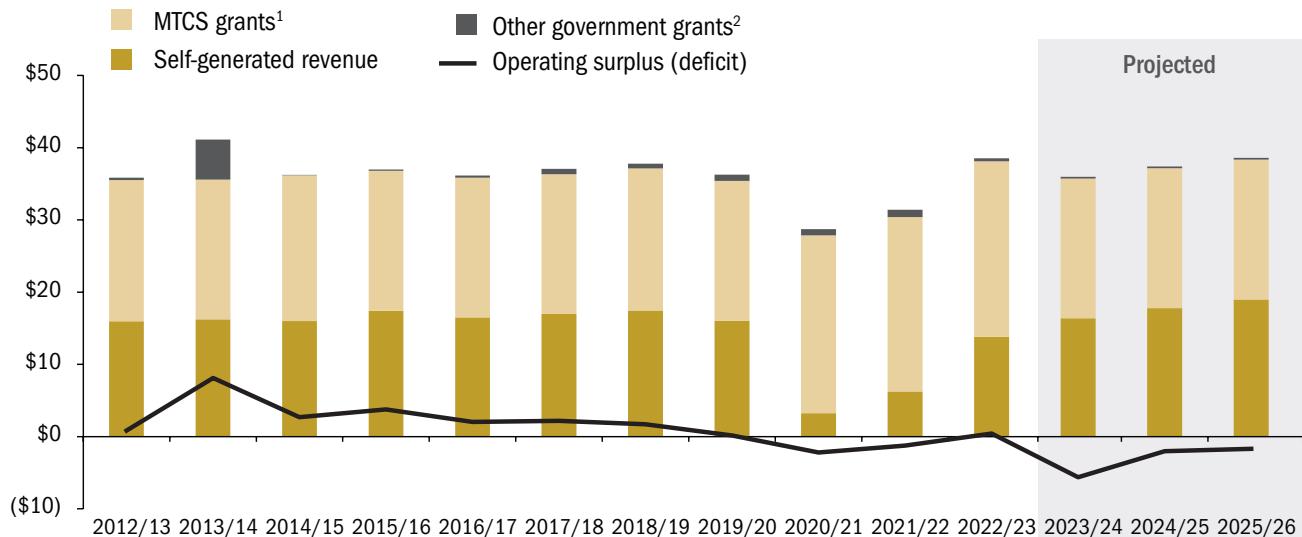
The Ministry of Tourism, Culture and Sport (Ministry) provides an annual operating grant of \$19.4 million to the Ontario Science Centre. The centre periodically receives grants from various provincial ministries for specific projects. The rest of its revenue is self-generated, through admission fares and other lines of business.

As shown in **Figure 6**, government funding accounted for an average of 55% of the Ontario Science Centre's total revenues between 2012/13 and 2018/19 (the last complete fiscal year where operations were not impacted by the COVID-19 pandemic). In 2022/23, the Ontario Science Centre received \$24.7 million in government funding, accounting for 64% of its overall revenue.

Figure 7 shows the operating expenses of the Ontario Science Centre, which remained stable from

Figure 6: Ontario Science Centre Self-Generated Revenue, Government Grants and Operating Surplus/Deficit, 2012/13-2025/26 (\$ million)

Source of data: Ontario Science Centre

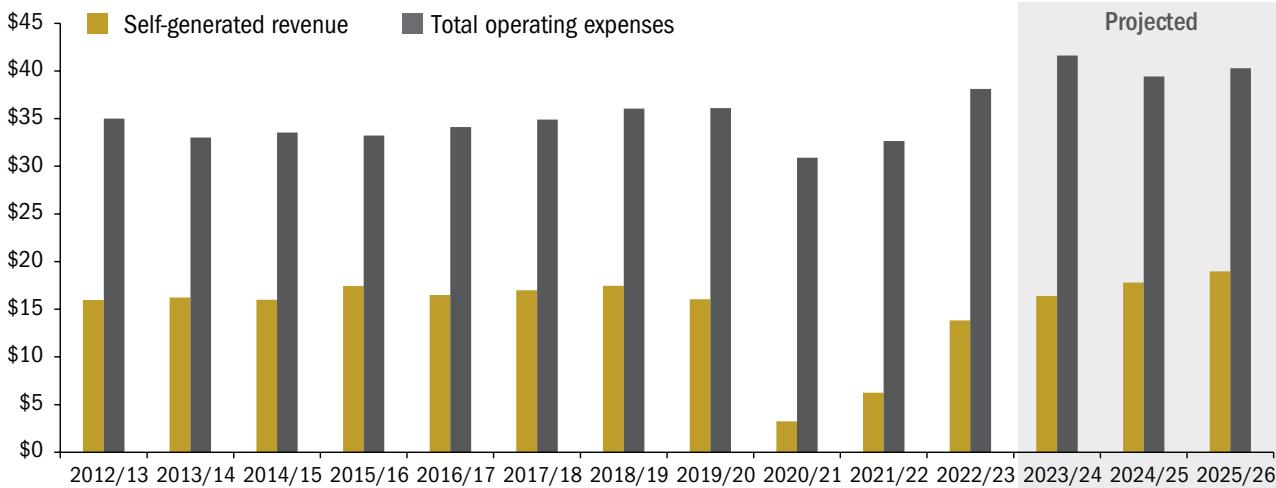


1. Ministry of Tourism, Culture and Sport (MTCS) grant revenue includes operating grant, Emergency Stabilization Fund received in 2020/21 and 2021/22 and funding for the pedestrian bridge closure received in 2022/23.

2. Other government grants include funding from the Ministry of Education to support educational school programs and from the Ministry of Tourism, Culture and Sport for special initiatives and the forgiveness of the OMNIMAX theatre construction loan of \$5.3 million in 2013/14.

Figure 7: Ontario Science Centre Self-Generated Revenue and Total Operating Expenses, 2012/13-2025/26 (\$ million)

Source of data: Ontario Science Centre



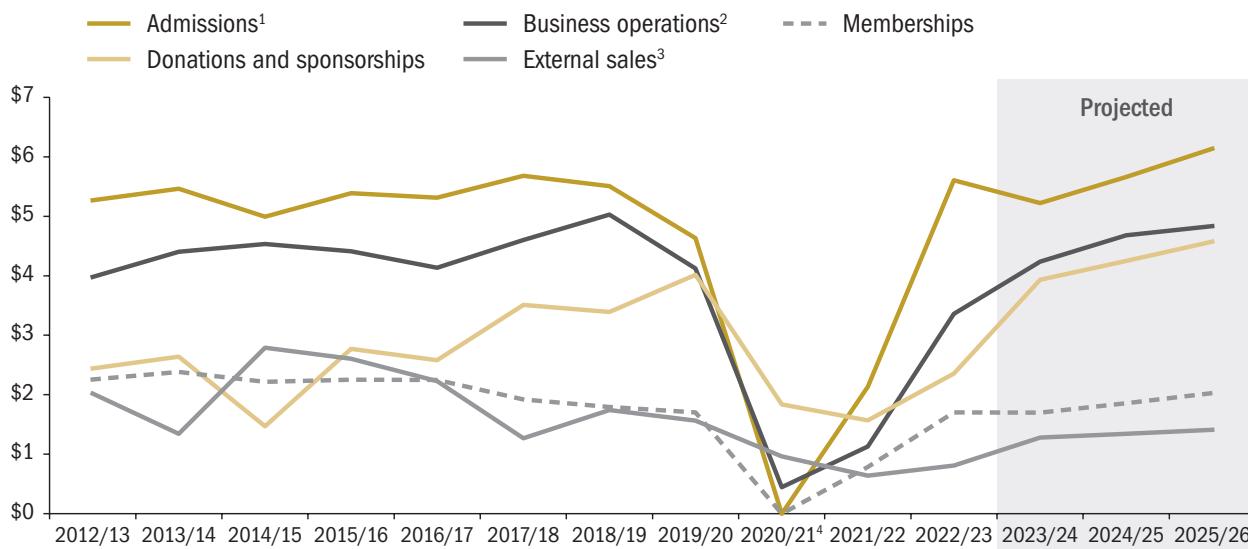
2012/13 to 2018/19. Over this same period, revenue from memberships declined steadily, whereas donations and sponsorship money increased. **Figure 8** offers a breakdown of the self-generated revenue streams of the Ontario Science Centre by line of business.

5.1.1 Higher Operating Costs Added Pressure to Generate Revenue

Our audit found that the Ontario Science Centre's pedestrian bridge closure in June 2022 (see **Section 5.2.1**), was creating additional operational pressures for the

Figure 8: Ontario Science Centre Self-Generated Revenue by Lines of Business, 2012/13–2025/26 (\$ million)

Source of data: Ontario Science Centre



1. Admissions revenue includes general admission to the Ontario Science Centre exhibits and OMNIMAX theatre.

2. Business operations include revenue from concessions (food and retail), facility rentals, parking, programming (educational and recreational), interest, and other income.

3. External sales include the sale and rental of exhibits to Canadian and international clients.

4. No admission and membership revenue was recorded in 2020/21 because the Ontario Science Centre was closed for the entire fiscal year due to the COVID-19 pandemic.

centre. To address these unexpected pressures, the centre applied for additional funding. The Ministry approved \$3.7 million and another \$3.9 million in operating funding in June 2022 and November 2022 to address the incremental operating costs and revenue losses. After the 2022/23 fiscal year, the Centre was able to return \$2.7 million to the Ministry primarily due to its cost saving measures and increase in self-generated revenues.

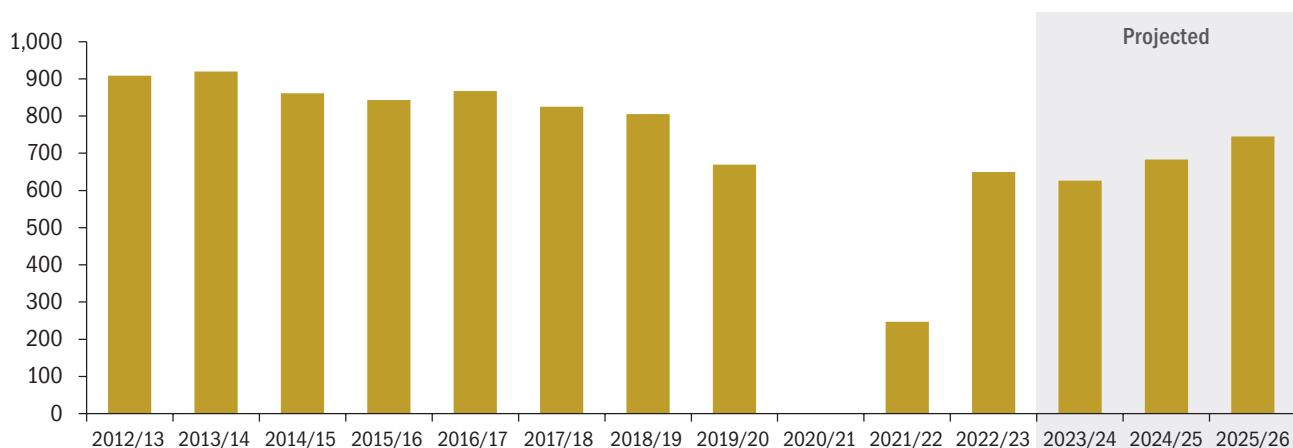
In November 2022, the Ministry requested that the Ontario Science Centre submit a Pressure Management Plan for the remainder of 2022/23. The Ministry's expectation was that the centre tackle its fiscal challenges by diversifying revenue streams, increasing self-generated revenue and identifying strategies to ensure the continued viability of its operations and facilities. The Ontario Science Centre submitted a Pressure Management Plan to the Ministry in December 2022. It identified ways to diversify its revenue streams along with increasing self-generated revenues, while limiting cost increases by freezing all discretionary spending and imposing hiring restrictions.

Measures from this plan resulted in a temporary dip in operating expenses and an increase in self-generated revenues for 2022/23. However, as shown in Figure 7, the Ontario Science Centre projected even higher operating expenses for 2023/24 to 2025/26 than in the past 10 years. The projected cost increases were based on the incremental costs associated with the bridge closure, primarily of providing shuttle buses to visitors and additional staffing needed to direct pedestrian traffic as a result of the bridge closure.

The Ministry's operating grant has stayed at \$19.4 million for more than 10 years, since 2012/13. If the Ontario Science Centre is unable to effectively reduce operating expenses or even maintain the current operating expenses, there is likely to be greater pressure to increase self-generated revenue to cover expenses. Even though self-generated revenue is projected to increase from 2023/24 to 2025/26 and the Ontario Science Centre was exploring other revenue-generation opportunities, there were no known detailed cost management plans in its 2023/24 business plan aside from continuing its efforts to reduce discretionary spending and scrutinizing recruitment activities.

Figure 9: Ontario Science Centre Admissions Attendance, 2012/13-2025/26 (000)

Source of data: Ontario Science Centre



Note: Admissions attendance includes general visitors, school groups and members who visited the Ontario Science Centre exhibits and OMNIMAX theatre. A visitor who purchased a bundle ticket to visit the Ontario Science Centre exhibits and the OMNIMAX theatre is considered as one visitor in the total admissions attendance.

The Ontario Science Centre did not allocate its indirect general operating costs to its various lines of business. When we asked its finance department about allocation of costs, the group told us it did not see value in the exercise. Without allocating all of its costs to its lines of business, it is difficult to assess which lines of businesses are profitable and which need to manage costs more effectively.

5.1.2 Decline in Admissions and Membership

Admission revenues (including general admissions and OMNIMAX theatre sales) were the highest source of self-generated income for the Ontario Science Centre, accounting for about 32% of its self-generated revenues from 2012/13 to 2018/19, the last fiscal year where operations were not impacted by the COVID-19 pandemic. As shown in **Figure 9**, total attendance for the Ontario Science Centre peaked in 2013/14, with 920,000 visitors. Overall, attendance had dropped to 805,000 visitors in 2018/19 (last complete year not impacted by the COVID-19 pandemic). This reflected an overall decrease of 12.5%. The COVID-19 pandemic and provincial response measures severely impacted the centre during the final month of 2019/20, and in 2020/21 and 2021/22. Attendance recovered to

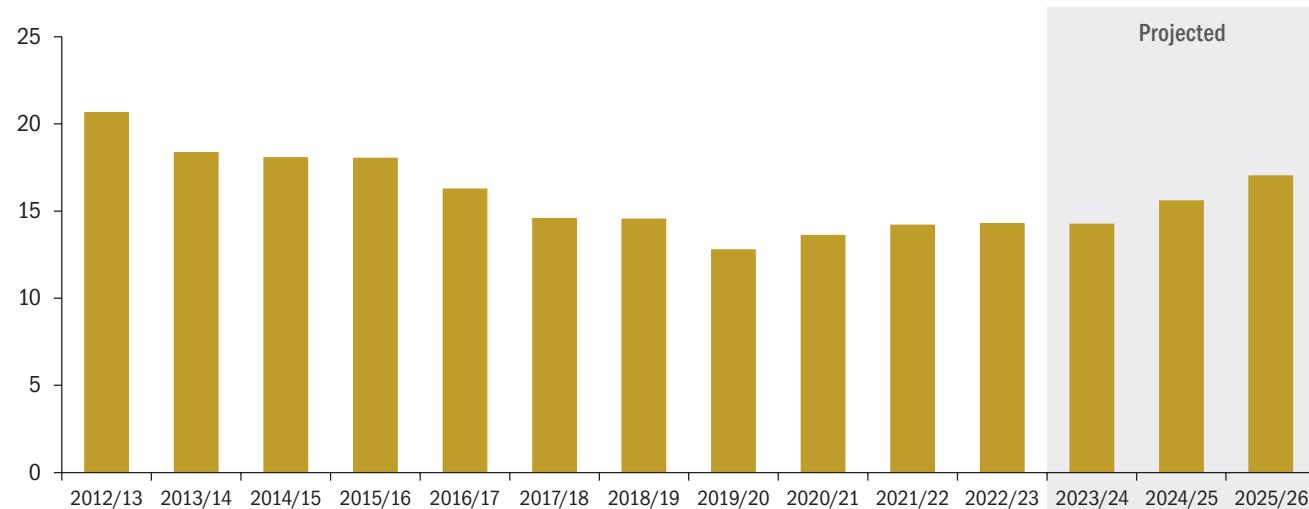
about 80% of pre-pandemic levels in 2022/23, and the Ontario Science Centre is projecting moderate increases in attendance for 2023/24 to 2025/26. Admission revenue has remained relatively steady at \$5.5 million, excluding the fiscal years impacted by the COVID-19 pandemic. This is because there was a shift to more full-price regular admission tickets versus discounted and group tickets and memberships.

Further, the total number of Ontario Science Centre members has decreased 31% in the past decade, from 20,677 at its peak in 2012/13 to 14,312 in 2022/23, as shown in **Figure 10**. Membership revenue has decreased 25% during the same period, from \$2.3 million in 2012/13 to \$1.7 million in 2022/23.

The Ontario Science Centre noted changing demographics, the uncertain economic climate and increased competition from other attractions in the City (for example, Ripley's Aquarium, the Royal Ontario Museum, the Art Gallery of Ontario) as factors contributing to lower attendance and membership levels. The science centre also noted that reduced lanes and closures from the construction of the Eglinton LRT at the corner of Don Mills Road and Eglinton Avenue impacted traffic flow and, hence, attendance (including school visits).

Figure 10: Ontario Science Centre Memberships, 2012/13-2025/26 (000)

Source of data: Ontario Science Centre



Note: One membership may include up to six household members (two adults and four children).

We noted that the Ontario Science Centre had not changed its general admission ticket prices since 2010. We reviewed the general admission ticket prices and IMAX ticket prices for science centres across Canada and saw that the Ontario Science Centre had the lowest tickets prices for each category compared to other large Canadian science centres, where adult prices ranged from \$23.95 to \$34.50. As shown in **Figure 11**, the Ontario Science Centre charged \$22 for general adult admission in 2022/23.

Ontario Science Centre management told us they had not requested any general admission ticket price changes from the Ministry in order to continue to be affordable to visitors.

5.1.3 Retail Sales Remained Steady but Venue Rental Decreased 16%

The Ontario Science Centre's revenue from its concessions (gift shops and restaurants) averaged approximately \$420,000 from 2012/13 to 2018/19, the last complete fiscal year not impacted by the COVID-19 pandemic. In contrast, the retail operations revenue of Science North (Sudbury), Science World (Vancouver, British Columbia), TELUS Spark Science

Centre (Calgary, Alberta) and TELUS World of Science (Edmonton, Alberta) ranged from approximately \$1.2 million to \$1.7 million in their 2018 or 2019 fiscal years, with numbers of visitors similar to or lower than the Ontario Science Centre. For example, Science North had 65% lower attendance than the Ontario Science Centre in 2018/19 (the last fiscal year when operations were not impacted by the COVID-19 pandemic), but generated about three times more revenue from its gift shops and restaurants than the Ontario Science Centre. Science North had permanent gift shops at both of its locations, totalling over 3,000 square feet. In comparison, the Ontario Science Centre had a kiosk that functioned as a gift shop and had additional retail sales at its membership desks.

There was also a declining trend in Ontario Science Centre facility rental revenue, which decreased from \$524,000 in 2012/13 to \$441,000 in 2022/23—a 16% decrease—despite having 568,000 square feet of facility space with 183,000 square feet available for rent. In contrast, TELUS Spark in Calgary has a facility size of 153,000 square feet but was able to generate \$1.5 million of revenue from facility rentals during its 2019 fiscal year.

Figure 11: General Admission Fees for Canadian Science Centres, as of July 2023

Prepared by the Office of the Auditor General of Ontario

	Ontario Science Centre (Toronto)	Science North (Sudbury)	Science World (Vancouver)	Telus Spark (Calgary)	Telus World of Science (Edmonton)	Montreal Science Centre— Domestic	Montreal Science Centre— International ¹
General Admission							
Child ²	13.00	21.00	22.50	19.00	18.95	17.50	22.00
Youth/Student ³	16.00	23.00	26.75	22.00	21.95	18.00	23.00
Adult ⁴	22.00	25.00	33.20	26.00	23.95	27.00	34.50
Senior ⁵	16.00	23.00	26.75	24.00	21.95	24.50	31.50
OMNIMAX/IMAX Film							
Child ²	9.00	7.00	n/a ⁶	n/a ⁷	10.50	9.25	9.25
Youth/Student ³	9.00	8.00	n/a ⁶	n/a ⁷	12.95	11.25	11.25
Adult ⁴	12.00	9.00	n/a ⁶	n/a ⁷	14.95	12.75	12.75
Senior ⁵	9.00	8.00	n/a ⁶	n/a ⁷	12.95	11.25	11.25

[Grey box] - lowest price in the category.

1. Montreal Science Centre has separate pricing for international visitors during the peak season, from May to September.
2. Child admission age ranges vary slightly for each centre. At Ontario Science Centre, Science World (Vancouver) and Telus World of Science (Edmonton), child admission is for ages 3 to 12. At Montreal Science Centre, child admission is for ages 2 to 12 years. At Telus Spark (Calgary), child admission is for ages 3 to 17 years. At Science North child admission is for ages 4 to 12 years. At all of these venues, children below the minimum admission age attend for free.
3. Youth/Student admission is for ages 13 to 17 at Ontario Science Centre, Science North, Telus World of Science (Edmonton) and Montreal Science Centre, and ages 13 to 18 at Science World (Vancouver).
4. Adult admission is for ages 18 to 64 at Ontario Science Centre, Science North, Telus Spark (Calgary), Telus World of Science (Edmonton) and Montreal Science Centre, and ages 19 to 64 at Science World (Vancouver).
5. Senior admission is for ages 65 and over at the above noted science centres.
6. OMNIMAX Theatre is temporarily closed at Science World in Vancouver.
7. IMAX (Infinity Dome) is included with general admission or membership at Telus Spark Science Centre in Calgary.

RECOMMENDATION 3

To increase self-generated revenue and improve the financial sustainability of educational programming that promotes science and technology to Ontarians, we recommend that the Ontario Science Centre:

- determine the root causes of declines in attendance and membership;
- analyze ways to increase attendance and membership, through visitor feedback and by contacting former members, and take necessary corrective actions;
- allocate costs to each line of business to effectively measure financial returns from each line of business and focus resources on maximizing self-generated revenues from businesses with the greatest financial return;

- compare its self-generated revenue initiatives (such as retail operations and facility rentals) with peers in other jurisdictions to identify and implement favourable self-generated revenue initiatives;
- research and assess options for admission pricing (including variable pricing models for domestic and international visitors) that would maximize admission revenue while maintaining or increasing attendance levels, especially for domestic visitors and students; and
- make recommendations to the Ministry of Tourism, Culture and Sport on any changes to admission pricing based on the research above, noting the potential impacts of price changes on attendance.

ONTARIO SCIENCE CENTRE RESPONSE

The Ontario Science Centre is committed to transparency and data-driven decision-making. Management will broaden its efforts to collect information and conduct research to improve attendance and membership results.

Management will review general operations and administration to determine if any indirect costs can be allocated to the lines of business. Changes to the chart of accounts will be considered as part of the future state planning efforts.

Management will compare its self-generating revenue initiatives with science centres in other jurisdictions, where appropriate.

Management will conduct research and assess options for admission pricing before seeking any approvals for changes.

5.2 Operations of the Ontario Science Centre

5.2.1 Closure of Pedestrian Bridge Has Increased Operating Costs and Detracted from Visitor Experience

At the time of our audit, Ontario Science Centre's pedestrian bridge, which connects the main entrance building to the building with exhibition halls, was closed to the public. An expected reopening timeline was unknown. See **Figure 12** for a photograph of the bridge and the ravine that it spans.

During a routine building condition assessment in September 2021, a consultant hired by Infrastructure Ontario discovered a problem with the bridge. After spotting visible cracks in the bridge, Infrastructure Ontario advised further investigation. A thorough examination and detailed review commenced in

Figure 12: Ontario Science Centre Pedestrian Bridge and Ravine, June 2023

Prepared by the Office of the Auditor General of Ontario

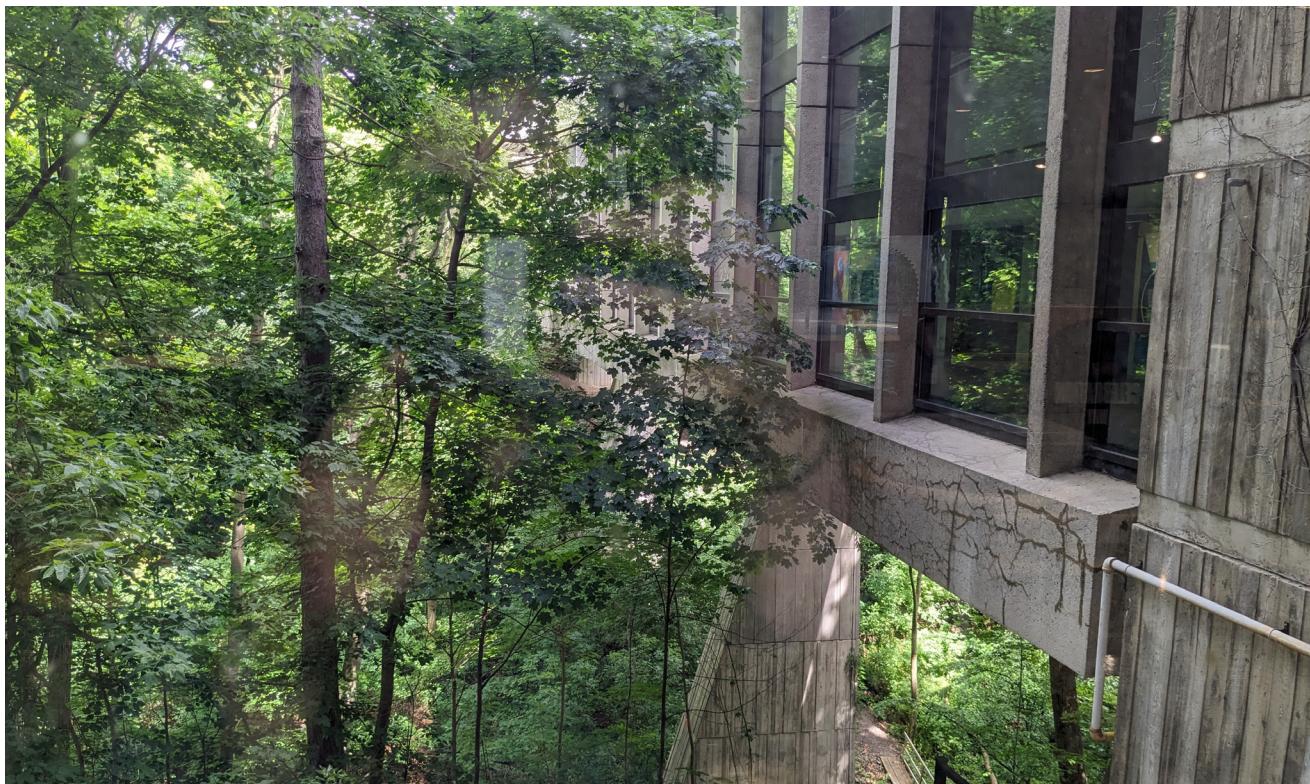
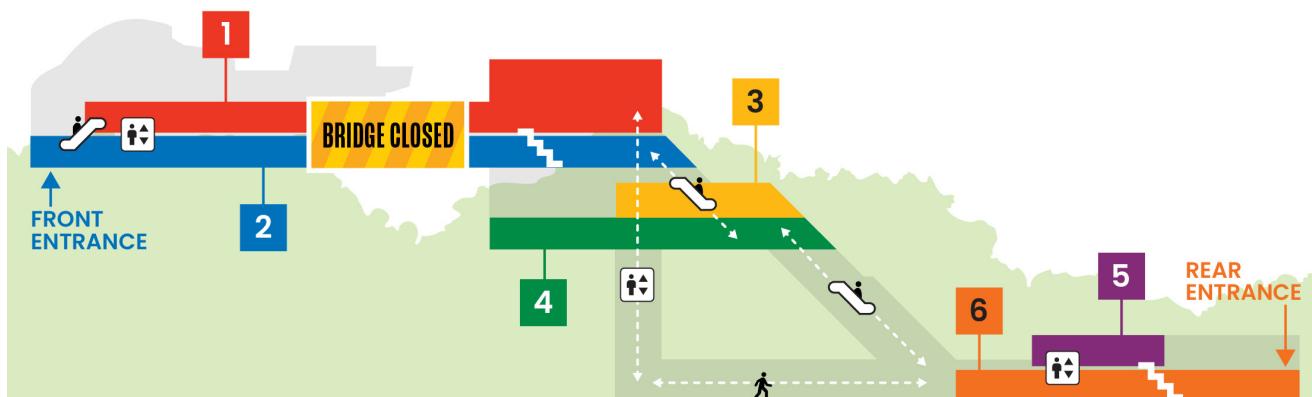


Figure 13: Map of Ontario Science Centre's Six Levels, Showing Entrances and Bridge

Source: Ontario Science Centre



February 2022. The bridge was closed on June 3, 2022, after the review by structural specialists hired by Infrastructure Ontario concluded there was a significant risk of structural failure.

An engineering consultant hired by Infrastructure Ontario started the preliminary work to move forward with stabilizing the bridge. This included requesting permission from the City of Toronto to build an access road. However, Infrastructure Ontario terminated its contract with the company in December 2022, and the permission application was put on hold. The contract was terminated because Infrastructure Ontario had underestimated the amount of funding needed to stabilize the bridge (\$16 million). This amount of funding required that an open procurement process be conducted, according to the government's procurement directive. The request for proposal (RFP) for this work closed on February 7, 2023. On February 13, Infrastructure Ontario granted the contract to another engineering firm to conduct a feasibility study to evaluate the options for bridge repair and stabilization. In June 2023, the Toronto and Region Conservation Authority (TRCA) received a request from the firm, on behalf of Infrastructure Ontario, for permission to install scaffolding at the bridge while it completed bridge investigations. At the time of our audit, discussions were ongoing between the firm and the TRCA with respect to the structural condition of the bridge.

Infrastructure Ontario informed Ontario Science Centre management that “the bridge repair is going to take a while because further investigation is needed and it may be necessary to cut trees or impact the environment to get equipment to the site.”

Infrastructure Ontario told us that the \$16 million contract was to provide a temporary solution to stabilize the bridge. The cost to actually fix the bridge was unknown and would require further investigation. Infrastructure Ontario also told us that, although the lease with the City of Toronto and the Toronto and Region Conservation Authority does not specify any obligation for the Province to fix the bridge, the Province will likely need to stabilize the bridge for safety reasons.

The closure of the pedestrian bridge has impacted operations at the Ontario Science Centre, not to mention the visitor experience. The Ontario Science Centre relocated the public entrance to the rear entrance and is shuttling visitors by bus from the main front entrance to this new rear entrance (see **Figure 13**). The shuttle bus services have increased operating expenditures by \$2.4 million for the 10-month period in 2022/23 and is expected to increase by \$2.7 million in 2023/24. In addition, the Ontario Science Centre is now unable to host certain events, impacting its self-generated revenues.

Figure 14: Summary of Ontario Science Centre Capital Maintenance Projects, 2016/17-2022/23

Source of data: Infrastructure Ontario

Fiscal Year	# of Funded Projects	Value of Funded Projects (\$ 000)	# of Deferred Projects	Value of Deferred Projects (\$ 000)*
2016/17	14	2,496	6	694
2017/18	9	8,475	8	1,347
2018/19	2	60	1	73
2019/20	1	65	7	1,489
2020/21	5	851	9	5,398
2021/22	0	0	4	1,510
2022/23	3	59	7	5,779
Total	34	12,006	42	16,290

* For projects with repeated funding requests, deferred value is included at the initial requested cost.

5.2.2 Deferred Maintenance Projects at Risk of Critical Failure Were Repeatedly Denied Funding

Based on the most recent engineering assessment conducted in April 2022, the overall amount of deferred maintenance and critical repairs needed for the Ontario Science Centre building is about \$370 million. The planetarium at the Ontario Science Centre has been closed to the public since September 2022 because of outstanding capital repairs and ongoing technical issues with equipment that was at the end of its useful life. At the time of our audit, Ontario Science Centre was in the process of purchasing equipment to reopen the planetarium in early 2024 using funding from its exhibit renewals.

Since 2017, some Ontario Science Centre maintenance projects have been deferred by Infrastructure Ontario, resulting in further deterioration of the building. **Figure 14** lists the funded and deferred projects identified as critical in the annual base building condition assessments completed by the property manager. Since 2017, 34 projects with a total cost of \$12 million have been approved for funding, while 42 projects totalling over \$16 million were deferred due to insufficient funds.

Of these 42 deferred projects, seven projects had been put forward in at least three of the past five

years and did not meet the prioritization criteria for funding from the portfolio managed by Infrastructure Ontario on behalf of government. One major request for \$4 million related to renewing the water distribution of regular plumbing systems (for example, in kitchens, restaurants, labs, workshops, washbasins and washrooms). This asset has been categorized as at risk of critical failure in each of the last three years. Infrastructure Ontario did not approve the project for funding, citing overall funding limitations for deferred maintenance.

Infrastructure Ontario periodically reviews the building condition audits and base building assessment reports prepared by its third-party property and land management service providers in order to gather information on the condition of the Province's buildings that it manages. Applicable government organizations also develop business cases to justify funding requests for their respective projects. Infrastructure Ontario uses this information to decide whether to approve or deny the requests. Based on the funds available, it selected the highest-priority repairs at the Ontario Science Centre.

RECOMMENDATION 4

We recommend that the Ministry of Infrastructure and the Ministry of Tourism, Culture and Sport, with Infrastructure Ontario, determine the extent

of critical repairs, including repairs to the pedestrian bridge, that need to be undertaken to enable the Ontario Science Centre to operate efficiently and improve the visitor experience during the transition period.

MINISTRY OF INFRASTRUCTURE AND MINISTRY OF TOURISM, CULTURE AND SPORT RESPONSE

While government determines the planned usage of the current Ontario Science Centre site, Infrastructure Ontario will continue to ensure the health and safety of operating the Ontario Science Centre and employ its asset management prioritization for projects that are necessary prior to Ontario Science Centre relocation. During the transition period the Ministries and Infrastructure Ontario will ensure that areas open to the public and staff continue to remain safe and will explore ways to ensure that the Ontario Science Centre can continue to operate efficiently and prioritize visitor experience.

5.2.3 IT Infrastructure Is Inadequate at Ontario Science Centre

The Ontario Science Centre's information technology (IT) team identified areas of improvement and submitted funding requests to the Ministry for eight projects between 2022/23 and 2023/24, totalling approximately \$3.4 million.

Only two projects, totalling \$0.63 million, which relate to the migration to Microsoft Office 365 and on-site server updates, were approved for funding. The projects that were denied funding by the Ministry relate to updates to the financial system, ticketing system, telecommunication system, and the replacement of network cables and printers. These projects address areas that are critical to business or address asset integrity risks. According to the Ontario Science Centre, all point-of-sale (POS) machines and connected printers reached the end of their useful life in 2017 and some technology used for exhibits has been outdated for years.

If the existing systems and physical IT assets are not updated as needed and are continually used after their end-of-life, operations—such as ticketing, admissions, program delivery and exhibits—could be at risk. According to Ontario Science Centre management, the science centre's ability to collect data for research and development is also limited by outdated IT systems.

RECOMMENDATION 5

We recommend that the Ministry of Tourism, Culture and Sport (Ministry), based on planned usage of the current Ontario Science Centre site, prioritize funding and implementation of information technology projects that are critical to the Ontario Science Centre's business operations during the transition period.

MINISTRY OF TOURISM, CULTURE AND SPORT RESPONSE

The Ministry administers a Capital Repair and Rehabilitation program to support the capital repair needs of its diverse group of entities. The Ministry will continue to assess the Ontario Science Centre's critical capital projects through the risk-based prioritization framework of this program and to support the agency as it embarks on this opportunity.

5.2.4 Environmental Sustainability Commitments Were Vague, Except for Exhibit Fabrication Enterprise

We reviewed the Ontario Science Centre's 2023/24 business plan and noted that it outlines its commitment to the environment “through the use and conservation of natural resources … and [by] supporting the Province’s initiatives to conserve energy and water and wisely use air and land resources to benefit the environment, the health of our community and the health of our economy for present and future generations.” However, we noted that the Ontario Science Centre did not have a comprehensive environmental strategy.

In contrast, the business plan for Science North highlights environmental sustainability through implementation of a net-zero strategy (net-zero emissions by 2050), removal of all single-use plastics, offering sustainable and healthy food options, and engaging youth in climate action through programming that focuses on climate change, including hands-on experiments and exhibits.

We found that the exhibit-making department at the Ontario Science Centre (see **Section 2.2.4**) was more progressive in its sustainability commitments. Since 2011, the design, graphic production and fabrication department has been implementing environmentally sustainable practices such as using locally sourced materials; conducting research into new sustainable materials and their performance in exhibitions; eliminating the use of solvent-based paints; using biodegradable substrate; replacing plastic laminate products with recyclable laminates; eliminating the use of paints with volatile organic compounds; recycling scrap; using energy-efficient exhibit lights; and shutting down exhibits during non-operating hours. In addition, the Ontario Science Centre offers free electrical vehicle charging stations to visitors and staff; has worked with a vendor to implement changes in food services such as the use of recyclable containers and utensils, and elimination of plastic straws; and is committed to the use of LED lighting and sustainable materials on new flooring.

RECOMMENDATION 6

To minimize the environmental impact of its operations, we recommend that the Ontario Science Centre:

- develop and implement a strategy to continually improve the environmental sustainability of its operations; and
- collaborate with Science North to explore environmental best practices that can be implemented at both science centres.

ONTARIO SCIENCE CENTRE RESPONSE

The Ontario Science Centre is implementing a comprehensive environmental strategy that improves our current and future operations and leverages our platform to engage our core audiences in climate-focused initiatives.

As an early step, the Ontario Science Centre has joined the Association of Science and Technology Centres (ASTC) Seeding Action Network, which is a network of institutions committed to prioritizing planetary health through content, exhibits, and programming; community relationships and partnerships; and operational decisions. The three components of membership are an annual self-assessment to identify achievements and areas for growth and set goals for future; knowledge-sharing in forums such as working groups, communities of practice; and strengthening public programming, partnerships and institutional impact through proactively seeking out opportunities to enhance planetary health-focused decisions.

5.3 Exhibits and Programs

A 2019/20 survey (the latest year with full survey feedback) asked visitors to rate their overall satisfaction. Of the 1,988 respondents, 49% were “satisfied,” 41% were “moderately satisfied” and 10% were “not satisfied.”

We surveyed members of the Science Teachers’ Association of Ontario. Of the 314 teachers who responded, 184 teachers indicated that they had visited the Ontario Science Centre in the last 10 years. Of the respondents, 78% of the teachers said they were “very satisfied” with their overall experience while 21% said they were “somewhat satisfied” with their visit. Also, 82% of the teachers who responded said the Ontario Science Centre’s school programming was effective in engaging students and supporting Ontario’s science curriculum, while 17% said the programming was

“somewhat effective.” In addition, 67% of the teachers that responded said the Ontario Science Centre’s exhibits were effective in supporting hands-on learning outlined in Ontario’s science curriculum while 29% said the exhibits were somewhat effective.

While overall visitor satisfaction has been positive, based on the above surveys, we found that there was still room to improve the visitor experience.

5.3.1 Many Science Exhibits Have Not Been Changed for Over Eight Years

Exhibits are integral to carrying out the science centres’ key objective to stimulate public interest in science and technology. **Appendix 6** shows the number of exhibits in the various exhibition halls at each level of the

Ontario Science Centre. We noted that many of the permanent exhibits at the Ontario Science Centre have not changed since 2015—that is, for over eight years. As shown in **Figure 15**, the average age of exhibits at the time of our audit was about 14 years. Only the Science Arcade, KidSpark, HotZone, Community Reef and Weston Family Innovation Centre exhibitions have been changed significantly since 2018.

We reviewed the comments of the 734 respondents of the 2019/20 survey who were moderately satisfied or not satisfied with their visit to the Ontario Science Centre and noted that over two-thirds (517) of these respondents noted the following:

- exhibits were out-of-service or closed due to aging technology;
- exhibits or science content was outdated; or

Figure 15: Average Age of Permanent Exhibits at Ontario Science Centre as of March 2023

Source of data: Ontario Science Centre

Name of Exhibition Hall	Opening Year	Significant Renewal Year	Age of Exhibit/Exhibition Hall
Great Hall	1969	-	n/a*
Mindworks Corridor	1991	-	32
Space Hall	1969	1992	31
Bruce Poon Tip Living Earth Hall and TELUS Rain Forest	1993	-	30
OMNIMAX	1996	-	27
A Question of Truth	1996	-	27
Unilever Science Plaza	1998	-	25
Outdoor Experience Area (formerly known as Teluscape)	2006	-	17
Amateur Radio	2014	-	9
Stairwell Artifacts	2014	-	9
AstraZeneca Human Edge	2014	-	9
Forest Lane	2014	-	9
Rock Paper Science	2014	-	9
Cohon Family Nature Escape	2015	-	8
Science Arcade	1969	2018	5
Geo Bridge (Celebration Way)	1999	2019	4
HotZone and Community Reef	2005	2021	2
KidSpark	2003	2021	2
Weston Family Innovation Centre	2006	2022	1
Average Age			14

* Great Hall hosts travelling exhibits and has no permanent exhibits.

- other factors were to blame, such as overcrowding and exhibits not geared toward adults.

5.3.2 Not All Exhibits Were Always Evaluated for Effectiveness

In order to maintain its relevance in science and technology and assure attendance levels, the Ontario Science Centre exhibits must generate public interest. If the science content of the exhibits is not updated and the exhibits are not modernized regularly to reflect innovations in science and technology, this may impact the public's interest.

Our audit found that the Ontario Science Centre used visitor satisfaction surveys to evaluate the effectiveness of its exhibits. We noted, though, that the data collected in the surveys was either inconsistent or incomplete. In our review of the centre's visitor satisfaction surveys from 2012/13 to 2021/22, we found that the survey questions from 2012/13 to 2016/17 did not ask the visitors to rate permanent or temporary (travelling) exhibits. Also, although the survey questions from 2017/18 to 2021/22 did ask the visitors to rate some permanent and temporary (travelling) exhibits, not all exhibits at the Ontario Science Centre were identified to be rated, with the exception of 2018/19, when all temporary (travelling) exhibits were identified to be rated. In 2022/23, the Ontario Science Centre did not conduct visitor satisfaction surveys because the individual responsible for surveys was on leave.

We also noted that there was limited assessment of the feedback received from surveys by the Ontario Science Centre, resulting in little improvement to its existing exhibits. Further, the science centre did not have a comprehensive strategy for the regular renewal of exhibits and the introduction of new exhibits that took visitor feedback into consideration.

The effectiveness of exhibits is most commonly evaluated through visitor satisfaction surveys. However, we noted that Science North has been using

other forms of evaluation, such as observational behavioural analysis through video recording, focus groups and interviews. Collecting visitor feedback in a range of ways could help the Ontario Science Centre to understand visitors' perceptions and gauge interest in its exhibits. Although the Ontario Science Centre attempted to measure the effectiveness of a few of its exhibits over the years, it did not have a way to track the number of visitors to specific exhibits, or the length of their stay at each exhibit. Such information could enhance the ability of the centre to determine the public's interest and the relative effectiveness of exhibits.

RECOMMENDATION 7

To ensure exhibits are up to date with current trends in science and technology, and to improve visitor experience, public interest and understanding, we recommend that the Ontario Science Centre:

- work with the Ministry of Tourism, Culture and Sport to develop a comprehensive plan for the regular renewal of exhibits and the introduction of new exhibits, taking visitor feedback into consideration; and
- conduct research on how other science centres and cultural attractions, such as museums, track visitors' perception and interest in exhibits.

ONTARIO SCIENCE CENTRE RESPONSE

Management is planning to implement a new multi-year renewal strategy and plan for exhibits and experiences beginning in 2024/25 that takes into consideration visitor feedback and asset condition. Management will use the rolling multi-year plan to present incoming exhibitions and films that supplement and complement the permanent offerings.

Management agrees to enhance its research through various methodologies and collaborating with others.

5.3.3 Many Exhibits Did Not Depict Ontario's Role in Science and Technology

We determined that 371 (92% of the exhibits we reviewed) did not depict Ontario's role in furthering science and technology. A legislated objective for the Ontario Science Centre is "to depict the role of Ontario in the furtherance of science and technology." It would be impactful and inspiring for students and the public to learn more about Ontario's role. The Ontario Science Centre could reach out to provincial ministries that are conducting and funding science and technology research (such as the Ministry of Environment, Conservation and Parks; Ministry of Natural Resources and Forestry; Ministry of Economic Development, Job Creation and Trade; and the Ontario Centre of Innovation) to showcase their interesting and impactful research and development.

RECOMMENDATION 8

To stimulate public interest in science and technology, and in Ontario's role in furthering these fields, we recommend that the Ontario Science Centre research the key Ontario contributions that can be used as exhibits to show Ontario's role in furthering science and technology.

ONTARIO SCIENCE CENTRE RESPONSE

Management will broaden its current relationships and seek new partnerships that advance the Ontario Science Centre's ability to showcase Ontario's role in furthering science and technology.

5.4 Performance Measures Did Not Include Key Mandate Items

We reviewed the performance measures in the Ontario Science Centre's 2019/20–2023/24 business plans and compared them to the centre's legislated mandate and key priorities in the minister's mandate letter that

aligned with its mandate. From our review, we noted that some key items of the legislated mandate and key priorities were not being measured. For example, there were no measures for delivering programming that provides young people with skills for education and careers in science, technology, engineering and mathematics (STEM). Further, there were no measures concerning collaboration; data collection; depicting the role of Ontario in science and technology; or collecting, manufacturing and selling exhibits. In addition, there were no performance measures to assess how well exhibits, educational programs or travelling exhibits improved science literacy. None of the measures listed in [Appendix 7](#) for the Ontario Science Centre (using 2022/23 as an example) applied performance targets to the exhibits or the programming that was being delivered.

We also compared the performance measures in the Ontario Science Centre's 2019/20–2023/24 business plans to the 2022/23 performance measures of the Canada Agriculture and Food Museum, the Canada Aviation and the Space Museum, and Canada Science and Technology Museum (collectively known as "Ingenium"). In our review, we noted that some relevant performance measures used by Ingenium were not used by the Ontario Science Centre. For example, the Ontario Science Centre did not measure annual active memberships; general and tourism market share among the national museums and science centres; and percentage of budget spent on exhibition renewals.

We reviewed the Ontario Science Centre's annual reports from 2017/18 to 2021/22 (most recent available) and noted that when targets were not achieved for performance measures such as physical attendance, social media reach and virtual event engagement, there was no evidence of any remediating action to address the underachievement. We reviewed the Ontario Science Centre's 2019/20–2023/24 business plans and noted that there was also no benchmarking against other science centres to assess how its performance compares with other centres.

RECOMMENDATION 9

To improve performance measurement, transparency and accountability of its organizational activities, we recommend that the Ontario Science Centre:

- develop performance measures to assess progress against all legislated mandates;
- publicly report on its performance against its established measures and targets;
- document in annual reports any planned actions to be taken when established targets are not met; and
- include a discussion of peer benchmarking with other science centres in its business plans.

ONTARIO SCIENCE CENTRE RESPONSE

Management reports its performance against established measures and strategic priorities in the annual report, which is a public document. It will review the measures and priorities to assess whether any key legislated mandates are not addressed.

Management will include planned actions to be taken when targets are not met and explore opportunities to include a discussion on peer benchmarking in its business plans.

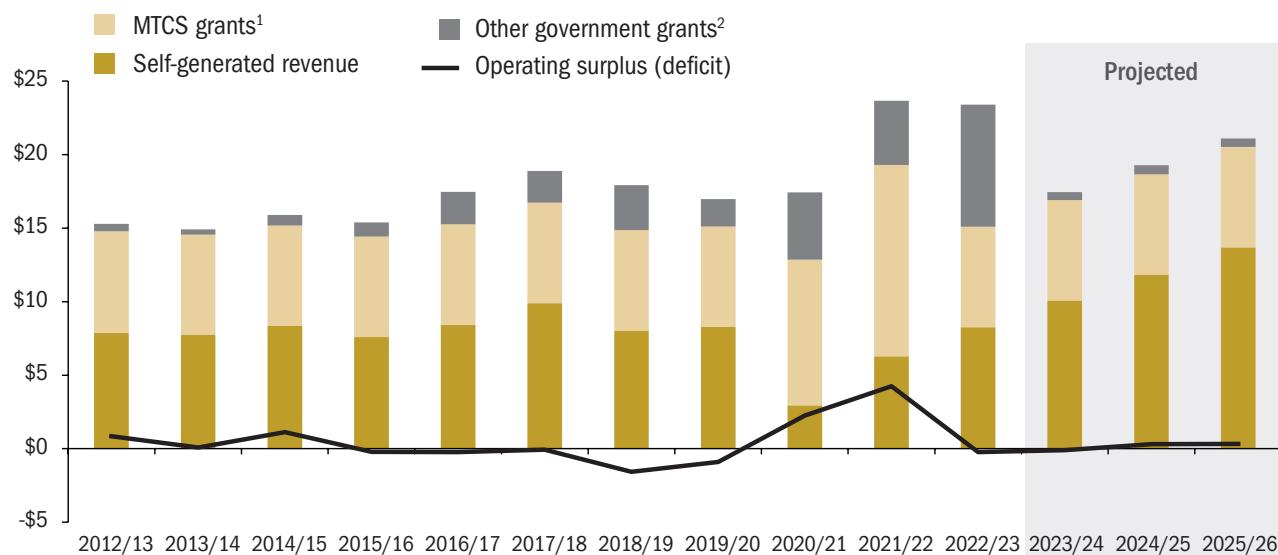
6.0 Detailed Audit Observations— Science North

6.1 Financial Sustainability of Science North

The Ministry of Tourism, Culture and Sport (Ministry) provides an annual operating grant of \$6.83 million to Science North, which accounted for 36% to 46% of its total revenue between 2012/13 and 2018/19 (the last complete fiscal year not impacted by the COVID-19 pandemic). See **Figure 16** for details. The centre also receives other grants for specific initiatives from various provincial ministries, the federal government and the municipal government. Science North's revenue also comes from self-generated activities such as admission and membership, external sales of

Figure 16: Science North Self-Generated Revenue, Government Grants and Operating Surplus/Deficit, 2012/13-2025/26 (\$ million)

Source of data: Science North

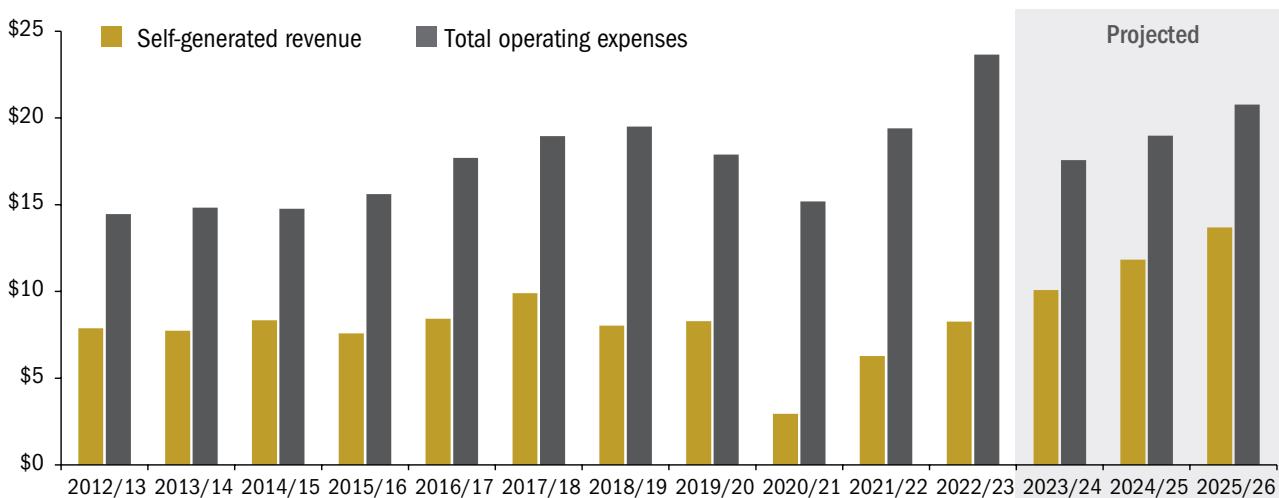


1. Ministry of Tourism, Culture and Sport (MTCS) grants revenue includes operating grant and the Pandemic Relief Fund received in 2020/21 and 2021/22.

2. Other government grants include funding from the Ministry of Education to support educational school programs and funding from the Ministry of Tourism, Culture and Sport, Government of Canada, City of Greater Sudbury, and City of Kenora for special initiatives.

Figure 17: Science North Self-Generated Revenue and Total Operating Expenses, 2012/13–2025/26 (\$ million)

Source of data: Science North



exhibits, educational programs, facility rentals, donations and sales from concessions.

In 2018/19, total provincial government funding accounted for 46% of Science North’s total operating revenue of \$18 million. Science North’s reliance on government funding was largely due to its revenues from self-generated activities not being sufficient to fully sustain its operations. **Figure 17** compares the total revenue from self-generated activities to the total operating expenses of Science North from 2012/13 to 2025/26. Science North’s self-generated revenues have recovered to pre-pandemic levels.

Science North projected its operating expenses to drop from \$23.6 million in 2022/23 to \$17.6 million in 2023/24. The \$6 million decrease was from anticipated lower costs for school programs, fundraising expenses, and overall expenses related to general operations. For example, Science North projected a decrease in educational program delivery expenses from \$6.5 million in 2022/23 to \$2.3 million in 2023/24. According to Science North, over \$4 million of expenses related to educational programming in 2022/23 were associated with grant funding specific for that year, which the centre did not receive in 2023/24.

Similarly to the Ontario Science Centre, Science North does not allocate its indirect operating costs to its various lines of business. Consequently, it was difficult for us to assess which business lines were profitable and could help provide greater funding flexibility to

the agency, and in which areas costs could be managed more effectively. **Figure 18** delineates the self-generated revenue at Science North by line of business. We noted that its projected external sales for the years 2023/24–2025/26 may be unrealistic; revenue from external sales for 2022/23 was \$1.65 million and was projected to reach \$5.72 million by 2025/26, a 247% increase. To increase external sales, Science North plans to conduct extensive research into target markets for turnkey exhibits and travelling exhibitions, and develop focused marketing strategies for its export products and services, as noted in its 2023/24 business plan.

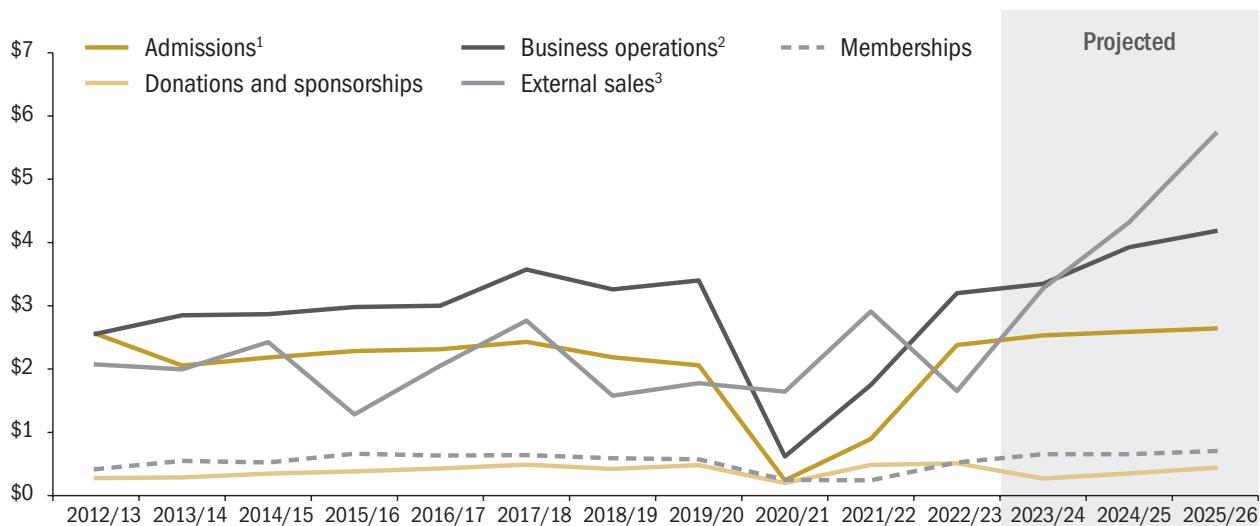
Attendance and Membership Have Declined

Admission revenue was, generally, the highest source of self-generated revenue for Science North, accounting for about 28% of its self-generated revenue between 2012/13 and 2018/19 (the last fiscal year when operations were not impacted by the COVID-19 pandemic).

In 2018/19, total attendance for Science North was 268,000. As shown in **Figure 19**, total attendance for Science North declined by 8% from a peak of 292,000 visitors in 2016/17. In 2022/23, attendance increased by 3% from pre-pandemic levels. Science North projected attendance to remain at this level from 2023/24 to 2025/26. The COVID-19 pandemic and provincial response measures severely impacted the centre in 2019/20, 2020/21 and 2021/22. Science North was

Figure 18: Science North Self-Generated Revenue by Lines of Business, 2012/13–2025/26 (\$ million)

Source of data: Science North



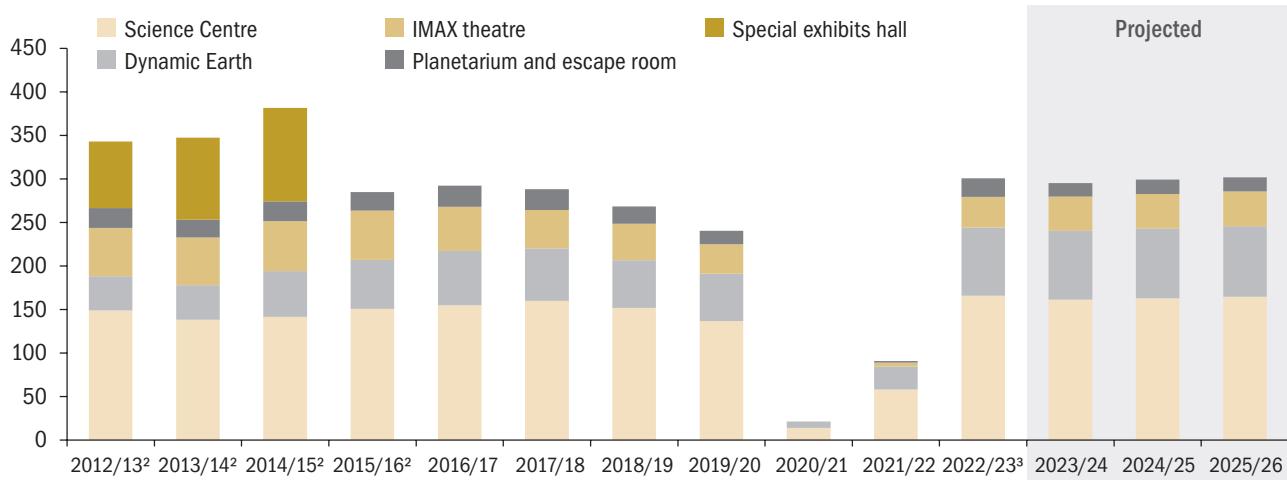
1. Admissions revenue includes general admission to Science North, Dynamic Earth, IMAX theatre, planetarium, special exhibit halls, and the escape room.

2. Business operations include revenue from concessions (food and retail), facility rentals, film production services, parking, programming (educational and recreational), interest, and other income.

3. External sales include exhibit and theatre production sales and rentals to Canadian and international clients.

Figure 19: Science North Admissions Attendance,¹ 2012/13–2025/26 (000)

Source of data: Science North



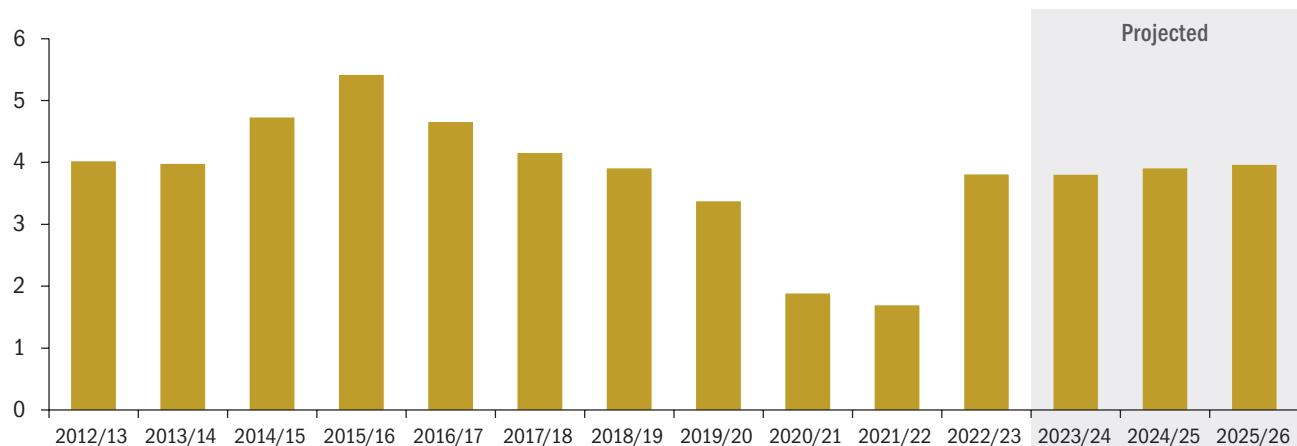
1. Admissions attendance includes general visitors, school groups and members that visited Science North, Dynamic Earth, IMAX theatre, planetarium, special exhibit halls, and the escape room. A visitor who attended multiple attractions using a bundle ticket is counted separately in the attendance for each attraction visited.

2. Beginning in 2015/16, Science North changed its ticketing practices by requiring only one ticket for the permanent exhibits at the science centre and special exhibitions. Previously, two separate tickets were required, inflating attendance numbers.

3. In 2022/23, Science North changed its ticketing practices at Dynamic Earth by requiring two separate tickets for the exhibits and underground mine tour. Previously, only one ticket was required, inflating attendance numbers in 2022/23. The estimated total admissions attendance in 2022/23 is 276,000 if only one ticket was required for the exhibits and underground mine tour at Dynamic Earth.

Figure 20: Science North Memberships, 2012/13–2025/26 (000)

Source of data: Science North



initially closed from March 13, 2020 to July 11, 2020 due to public health restrictions associated with the COVID-19 pandemic. Science North closed again on December 23, 2020 due to further restrictions, and reopened on July 2, 2021. These closures had substantial impacts on Science North's attendance and associated revenues during this period.

According to Science North, the decrease in attendance is also attributable to a decrease in visitors to the IMAX theatre, where attendance fell by 26% from 2015/16 to 2018/19. A 2019 assessment commissioned by Science North on the decline in attendance for the IMAX theatre noted one or more potential causes for the decline: less desire from the Northern Ontario market to view films at the theatre; film content being perceived as unappealing; and fewer show times, resulting in fewer viewing opportunities. At the time of our audit, Science North was showing more mainstream movies in its IMAX theatre.

From 2011/12 to 2018/19, Science North kept its general admission ticket prices stable (with \$1 increases). Then, in response to the pandemic, it decreased ticket prices for all categories from 2019/20 to 2021/22. For example, adult tickets were lowered to \$18 from \$26. In 2022/23, admission prices were returned to their pre-pandemic levels, as shown in Figure 2 (cited in Section 2.2).

Membership revenue accounted for about 7% of Science North's self-generated revenue between 2012/13 and 2018/19 (the last complete fiscal year where operations were not impacted by the COVID-19 pandemic). As shown in Figure 20, memberships peaked in 2015/16, at 5,413. The number of members in 2022/23 was 3,805, a 30% decline. Revenue from memberships has mirrored membership levels, peaking in 2015/16 at \$660,000.

RECOMMENDATION 10

To increase self-generated revenue and improve the financial sustainability of educational programming that promotes science and technology to Ontarians, we recommend that Science North:

- allocate costs to each line of business to effectively measure financial returns from each line of business and maximize self-generating businesses with the greatest financial return;
- determine the root causes of declines in attendance and membership;
- analyze ways to increase attendance and membership, through visitor feedback and by contacting former members, and take necessary corrective actions;

- research and assess options for ticket prices (including variable pricing models for domestic and international visitors) that would maximize admission revenue while maintaining or increasing attendance levels, especially for domestic visitors and students; and
- compare its attendance and membership revenue-generating initiatives with its peers in other jurisdictions to identify and implement best practices in such initiatives.

SCIENCE NORTH RESPONSE

Science North agrees with the recommendations and, in leveraging new technology, will improve its current process for allocating appropriate costs to lines of business where able.

Science North will regularly assess and analyze results for continuous learning and improvement. Resource dependent, we agree to review declines in attendance and membership and analyze ways to subsequently improve attendance and membership.

Science North will conduct a survey of its membership and assess how their responses correlate to membership acquisition and retention. We will set a process in place to annually survey members who do not renew to determine the reasons for their non-renewal.

Science North will review its ticketing options by building off the successes of strategies to date, including variable ticket pricing for our signature Halloween event (Pumpkinferno), revised dual ticketing options implemented at Dynamic Earth, and the dual Kivi Park promotion for local memberships.

We will review our strategies in order to implement changes that can help increase our admission and membership revenue, including comparing our initiatives to others. Comparisons will take into consideration Science North's location within the Northern Ontario market, differentiating its selling proposition from peers in other jurisdictions who may be in a metropolitan/downtown location. We

will further leverage our memberships with the Canadian Association of Science Centres and the Association of Science and Technology Centers to research best practices.

6.2 Capital Planning and Analysis for Major Expansion Initiatives

6.2.1 COVID-19 Pandemic and Planning Failures in the Go Deeper Project Led to Significant Cost Overruns and Delays

“Go Deeper” is an expansion project at Dynamic Earth, Science North’s model mine. The objective for the Go Deeper expansion is to showcase modern mining and the future of mining. There are two major components of the expansion:

- a new 2,583-square-foot underground multi-purpose theatre for shows, programming, special events and functions; and
- a display of drifts (openings made in the mine), which would exhibit modern mining equipment.

We observed that the Go Deeper expansion project has run into significant delays and cost overages. In 2019, Science North management received Board approval to proceed with the expansion project, setting an initial completion date of February 2023. A first cycle of underground construction was planned to start in fall 2021, followed by a second cycle of construction in 2022—to install mining equipment, the multi-purpose theatre space, mining shows in the theatre space, and exhibits. However, the new underground multi-purpose space has been delayed and is now expected to be completed by winter 2024. As of September 2023, the excavation was completed to open a new area of the mine.

The delay was mostly due to the COVID-19 pandemic, the City of Greater Sudbury identifying additional requirements for site remediation, which delayed municipal permit approvals, and a lack of funding available. The permit application was submitted on March 29, 2022 and approved in July 2022.

As of October 2023, Science North had spent about \$5 million on the Go Deeper project. The initial capital budget for the Go Deeper project was \$5 million, set in October 2020. As of October 2023, the budget had increased to \$15 million—triple the initial cost projections. **Figure 21** shows a timeline of the revisions in the capital budget.

The cost increase has occurred despite a reduction in the project's scope. The amount of seating, size of the catering area and washrooms in the theatre have all been scaled back. **Figure 22** summarizes the various components of the capital budget for the Go Deeper project and their status as of October 2023.

The capital budget increases were largely due to increases in excavation and construction costs—from \$2.3 million in 2020 to \$11.2 million as of October 2023. Based on our review, the excavation and construction costs were higher than initially estimated because some costs were not included in the initial budget, such as waste rock and waste water removal, winter excavation costs, site remediation, as well as legacy issues such as fixing roadways to meet the requirements of the City of Greater Sudbury.

Our review determined that the Go Deeper project lacked appropriate capital planning when it was initiated. For example, no reliable third-party estimate, such as a “Class C” estimate, was completed during the planning phase to assess the reasonableness of the cost projections. A “Class C” estimate is a conceptual cost estimate based on the square-foot costs of similar construction and is expected to be accurate within 30% of actual costs.

Science North had not completed a major construction project since 2003, when the existing building for Dynamic Earth was constructed. Despite this, before initiating the Go Deeper project, Science North management did not consult with any construction experts. Management told us that a more reliable cost estimate would have been produced if a consultant with an engineering and construction background was engaged during the planning phase.

During the planning phase of the project, Science North failed to involve its project management team. While the project management team is responsible for

managing projects, including co-ordination with internal and external stakeholders, managing the progress and deadlines of projects, and resolving any issues that might arise during the projects, it did not have the capacity to manage a large project such as the Go Deeper project. At the time of our audit Science North was in the process of recruiting a Director with project management experience.

Even more importantly, Science North’s project team did not prepare a business case that included a detailed breakdown of cost projections for its Board to review. Instead, only a concept plan was prepared, which focused on describing potential visitor experiences and had minimal information about the capital costs. The concept plan, furthermore, did not assess the potential financial impact of the project on the revenues and profitability of Dynamic Earth. In addition, we found that Science North did not evaluate the potential risks for the project or how to mitigate those risks.

For its part, the Board approved the project based solely on the concept plan. As of September 2023, the Go Deeper project had received \$900,000 in donations from private sources and \$3.6 million in grants from different federal (\$2.3 million), provincial (\$1.0 million) and municipal (\$0.3 million) government organizations.

Contractor Was Awarded Excavation Contract After Committing to a Sponsorship Agreement for the Go Deeper Project

The excavation contract for the Go Deeper project was given to a mining company after it committed to providing \$1.5 million in conditional sponsorship funding from 2022 to 2026 toward the Go Deeper project in the form of five annual payments of \$300,000 to be received in June of each year. As of September 2023, Science North had received \$600,000 from the company with \$900,000 remaining to be paid. The funding from the mining company was received in two payments of \$300,000 in February and June 2023. The sponsorship agreement allows for the termination of the contract if the company ceases to carry on its business.

Figure 21: Timeline of Revisions to the Capital Budget for the Go Deeper Project

Source of data: Science North

Date	Capital Budget (\$ million)	Capital Budget Increase (\$ million)	Reason for Increase
October 2020*	5.0	n/a	n/a
June 2021	6.7	1.7	Two new components (Northern Outreach and Digital Game).
June 2022	7.4	0.7	Projected construction costs increased due to inflation and labour for excavation and construction phase, plus new component (Pathways Fund).
July 2022	10.2	2.8	Various costs (not previously included) for excavation and construction phase, such as allowance for waste water removal, waste rock removal, allowance for winter excavation, allowance for construction inflation and scope changes.
March 2023	11.9	1.7	Changes in construction scope and allowance for costs such as site remediation in the excavation and construction phase.
June 2023	13.9	2.0	Changes in the scope affecting the excavation and construction phase.
August 2023	14.9	1.0	Projected construction costs increased according to Class A estimates (based on completed construction drawings).
October 2023	15.0	0.1	Projected costs increased for construction, administration, Chasm Elevator Show, Digital Game and Northern Outreach components, offset by projected cost decrease for the Regreening Film component due to estimated cost savings.
Total Budget Increase		10.0	

* Initial capital budget.

Figure 22: Components of the Capital Budget for the Go Deeper Project, October 2023

Source of data: Science North

Component	Capital Budget (\$ million)	Status as of October 2023
Excavation and Construction	11.2	In progress. Estimated completion date is winter 2024.
Big Impact	1.1	In progress. Estimated completion date is winter 2024.
Digital Game	1.0	In progress. Estimated completion date is November 2023.
Innovation Gallery	0.5	Paused as of June 30, 2023. Estimated completion date is spring 2025.
Regreening Film	0.5	Paused as of June 30, 2023. Estimated completion date is summer 2024.
Administration Costs	0.3	This is an additional cost incorporated in the total capital budget. It is not a separate project component.
Northern Outreach	0.3	In progress. Estimated completion dates are March 2025 for Part 1 and August 2025 for Part 2.
Chasm Elevator Show	0.1	Complete.
Total	15.0	

The contract was single-sourced using an exemption approved by the CEO without Board input as Science North's procurement policy provides unlimited purchasing authority to the CEO. According to Science North, the company provided exceptionally advantageous conditions since the mining company was previously a partner in the design of the project and the work required was highly specialized.

According to the sponsorship agreement, the contractor gets "recognition" (such as name displayed on donor wall, logo on website, speaking opportunities at campaign launch and opening events of the Go Deeper project) and Science North is required to provide the following "benefits" to three local First Nation communities for a period of 10 years: in-community STEM path summer camps; internship opportunities; family membership to community members; and community appreciation days.

To be precise, Science North simultaneously negotiated two contracts with this mining company—one for the sponsorship itself and one for excavation work on the Go Deeper project. The sponsorship contract was executed in June 2022 while the excavation work contract was executed in May 2022.

The mining company was paid about \$2.0 million by Science North for the excavation work as of June 2023, resulting in a net payment of \$1.4 million after accounting for the sponsorship payments of \$600,000.

6.2.2 Science North Had Not Yet Prepared a Business Case or Secured Funding for the \$90 Million Northwestern Ontario Expansion Project

In 2010, Science North established a 2,500-square-foot office in Thunder Bay, from which its staff plan and deliver science-related outreach programs for people in northwestern Ontario. As discussed in **Section 6.3.2**, outreach consists of different programs, such as visits to First Nations schools; community events; school and public programs; e-workshops; and science summer camps.

In 2017, Science North hired a consultant to conduct a market analysis of establishing a permanent science centre in Thunder Bay. A key finding of the stakeholder engagement phase of the market analysis was that the establishment of a permanent science centre would draw new partners and interest to Science North.

To determine the financial implications of a potential expansion, Science North engaged an accounting firm in May 2019 to conduct a feasibility study of the proposed expansion in northwestern Ontario. The feasibility study projected attendance under three different scenarios for a science centre in Thunder Bay. Expansion of an existing location in Kenora was also included in the feasibility study. The feasibility study concluded that northwestern Ontario has numerous cultural and entertainment activities but science-based education and activities are missing, other than the outreach programs offered through Science North's satellite programming.

Based on the feasibility study Science North sought Board approval to build a permanent 34,000-square-foot science centre in Thunder Bay and double the existing 4,000-square-foot Lake of the Woods Discovery Centre owned by the City of Kenora. Science North projected the capital costs for its northwestern Ontario expansion based on preliminary estimates from a construction consulting firm: \$75 million for the Thunder Bay science centre and \$15 million for the Kenora science centre. According to Science North estimates, the annual operating budget for the new facilities would total \$5.5 million. At the time of our audit, Science North was in discussion with the Ministry to request \$4 million in annual operating funding for these facilities and projects. Management projected that self-generated revenue would cover the remaining \$1.5 million. The Ministry had not assessed the feasibility and financial sustainability of the expansion to Thunder Bay and Kenora.

At the time of our audit, Science North management had not yet prepared a business case for either of these proposed centres. Business cases lay out critical factors for project planning and management, such as a cost/

benefit analysis of all options; potential risks and mitigation plans; and projected societal and environmental impacts.

The Board provided only conditional approval for the projects. Final approval was contingent, based on: (1) the schematic designs for the projects being completed and presented to the Board; (2) Science North securing a commitment of \$3 million in operating funding from the Province; and (3) securing capital funding for the construction and development of the projects. At the time of our audit, only the schematic designs for the projects had been presented to the Board. Science North had not met the other two criteria for Board approval. It had not yet secured capital funding for the construction and development of the projects and a commitment from the Province on operating funding.

RECOMMENDATION 11

To ensure large capital projects, including the Go Deeper and northwestern expansion projects, are appropriately approved by its Board and completed without delays and cost overruns, we recommend that Science North:

- prepare comprehensive business cases that ensure key risks and mitigation strategies are identified and assessed, and present these to the Board for approval before initiating major projects;
- consult with relevant experts and stakeholders during the planning phase of construction projects;
- co-ordinate with the relevant government authorities during the planning phase to obtain regulatory approvals;
- assign the management of projects to those with knowledge of overseeing significant projects, including co-ordination with internal and external stakeholders, managing the progress and deadlines of projects, and resolving any issues that might arise during construction; and
- reassess the CEO's unlimited signing authority under the procurement policy.

SCIENCE NORTH RESPONSE

Science North agrees with the recommendation and takes its responsibility for accountability and transparency seriously and consistently follows all legislated mandates and applicable directives. Science North will seek to develop authorization thresholds for sole-sourcing and procurement on which the Board of Trustees will have final approval.

It is important to note that relevant government priorities can shift, and acts and directives are regularly changing, thereby creating an environment where delays are possible, even when prior co-ordination is in place. Science North recognizes opportunities exist to better manage capital projects and, as such, project management teams have been enhanced including the hiring of a director with capital project oversight experience.

Science North has already begun applying applicable lessons learned, including in the Northwest Expansion, which is still in its infancy, and has begun implementing the recommended actions to ensure future projects are appropriately approved and risks of delays and cost overruns are mitigated. Once all data is gathered for the Northwest Expansion, a business case will be developed and presented to the Board of Trustees for approval. This business case will include major risks, an assessment of alternative options and cost projections informed by relevant experts. An initial risk workshop for this project with external experts was held in November 2023.

6.3 Exhibits and Programs

Science North uses visitor satisfaction surveys to obtain feedback from visitors. In our review of the visitor satisfaction surveys from 2018/19 to 2022/23, we found that of the 8,923 visitors who responded in these years, 95% said that they enjoyed their visit. That is, they responded "Yes" to the question, "Did you enjoy your overall experience today?"

6.3.1 On-Site Educational Programs Received Very Positive Feedback from Teachers

Science North offers a variety of educational programs for teachers and students from kindergarten to Grade 12. For example, the overnight camp-in program lets students spend the entire night at Science North to explore the science centre, take part in different programs, and experience a movie in IMAX. This program was aimed at children in Grades 4–12 and offered a combination of education and entertainment.

The purpose of school programs is to teach scientific principles through demonstrations, and hands-on programming using inquiry-based and problem-based learning techniques with the goal to develop students' interest in science, technology, math and engineering subjects. **Appendix 2** shows the different types of school programs offered by Science North. In 2022/23, Science North offered seven school programs.

Total attendance for on-site school programs decreased 32% in the past five years, from 41,737 students in 2018/19 to 28,289 in 2022/23. Fiscal year 2022/23 was the first fiscal year since 2018/19 in which Science North did not suffer from closures since the onset of the COVID-19 pandemic. Staff at Science North told us that some schools were still hesitant to attend school programs.

From 2013/14 to 2022/23, Science North surveyed teachers to obtain feedback on the quality of the on-site programs. When teachers were asked whether the program supported their classroom's learning (on a scale of 1 to 5, where 1 is "not at all" and 5 is "exceeding expectations"), more than 90% of the teachers responded that the program met or exceeded expectations for learning support.

During our audit we met with the Rainbow District School Board and Sudbury Catholic District School Board to obtain their feedback on Science North's educational programs for their students and to discuss impact of Science North's programs on learning. The school boards told us they were satisfied with the school programs offered by Science North, the programs were aligned with the provincial curriculum, and they felt

Science North was very responsive to their needs and was working well with teachers to deliver programs to their students.

6.3.2 Outreach Program Attendance Has Dropped 62% Since 2018

Science North staff deliver outreach programs off-site, in the form of school and community visits and through the centre's satellite offices. The programs are aimed at students and members of the public who live at least 100 kilometres outside Sudbury and do not have ready access to the science centre. We spoke to the Canadian Association of Science Centres, who noted that Science North was effective in its outreach programs by going to Northern Ontario communities and schools that did not have access to a science centre due to high transportation costs.

Figure 23 shows student attendance for outreach programs from 2015/16 to 2022/23. Student attendance from public schools has declined by 62% from its peak of 53,137 in 2018/19 to 20,249 in 2022/23. As noted earlier, 2022/23 was the first fiscal year that Science North returned to in-school programs since 2019 due to the COVID-19 pandemic. In spring 2022, some schools still had COVID-19 measures in place, impacting attendance. Student attendance for public school outreach also decreased because Science North received \$1.3 million less in grants for public school outreach programs in 2019/20 than in 2018/19.

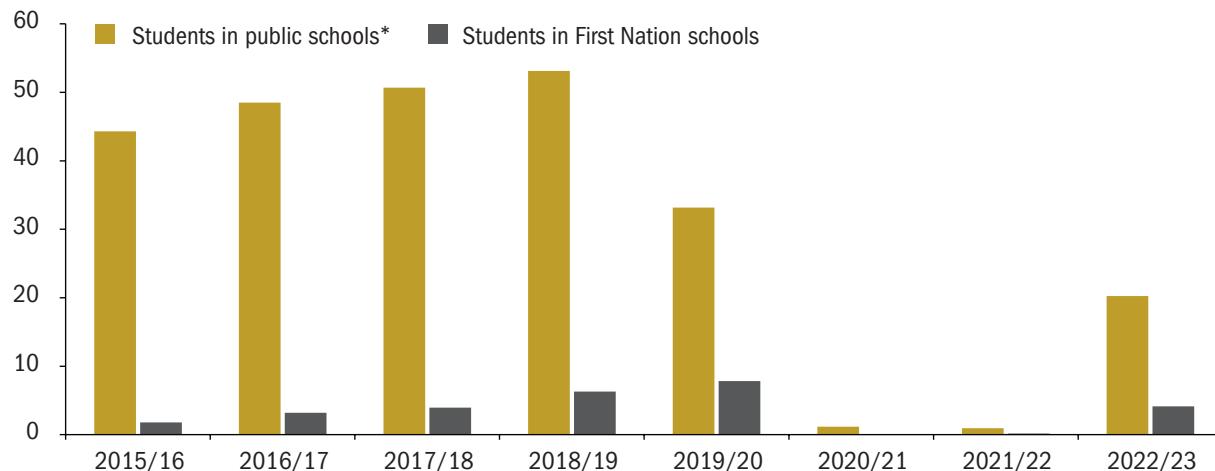
We found that Science North offered three virtual programs for students: Virtual School science shows; e-workshops for First Nation schools; and e-workshops for public schools. All virtual programs were fee-based and covered a range of topics. The popularity of virtual programming grew during the pandemic and peaked in 2021/22 at 92,664 students, up significantly from 10,421 students in 2018/19.

6.3.3 No Major Changes in Exhibits Since 2017

In our review of the permanent (floor) exhibits at Science North, we noted that 114 exhibits (51%) at

Figure 23: Student Attendance for School Outreach Programs, Science North, 2015/16–2022/23 (000)

Source of data: Science North



* Includes students in public school in Northeastern Ontario and Northwestern Ontario.

the main science centre location had not substantially changed for over seven years. The average age of the exhibits was 11 years. Only the exhibits on the centre's fourth floor had changed significantly since 2018. Appendix 8 provides a summary of the exhibits at Science North and Dynamic Earth.

Similarly, we noted that the average age of exhibits at Dynamic Earth was 11 years and no major exhibits had changed significantly since 2017. The mining technology showcased at Dynamic Earth is from early 2000; mining operations have changed significantly since. At the time of our audit, Science North was in the process of expanding its model mine at Dynamic Earth to better showcase modern mining and the future of mining. (See Section 6.2.1.)

6.3.4 Exhibits at Science North Could Be Evaluated More Robustly

We discovered that Science North evaluated some of its exhibits through a behavioural assessment tool. For a sample of visitors, science centre staff reviewed video footage to examine the learning behaviours of visitors. However, in our review of Science North's exhibit evaluations over the last 10 years, we found that only

90 out of the total 338 exhibits (27%) were evaluated in this manner.

Science North did not have a way to track the number of visitors to specific exhibits, or the length of their stay at each exhibit. Such information could enhance the ability of Science North to determine the public's interest and the relative effectiveness of exhibits. Tracking data would make it easier to proactively identify exhibits that ought to be kept on the floor, improved or replaced.

In our review of Science North's business plans from fiscal year 2013/14 to 2023/24, we found that the centre had limited documented research regarding the latest topics and trends in science and technology to use in the development of its exhibits. We did note that one of the goals in the 2021/22 business plan was to "research best practices in industry." However, we found no evidence of this research.

In addition, Science North did not carry out any benchmarking exercises to compare its exhibits with those of other science centres, nationally or internationally, in order to determine whether its exhibits should be updated to reflect the recent trends and topics in science and technology.

RECOMMENDATION 12

To ensure that exhibits are up to date with current trends in science and technology, and to improve visitor experience, public interest and understanding, we recommend that Science North:

- develop a comprehensive strategy and plan for the regular renewal of exhibits and the introduction of new exhibits, taking visitor feedback into consideration; and
- conduct research into how other science centres and cultural attractions, such as museums, track visitors' perceptions and interest in exhibits.

SCIENCE NORTH RESPONSE

Science North agrees with the recommendation and will take additional measures to ensure its exhibits align with our visitors' needs. Science North will ensure it assesses and considers visitors' interests in the selection of all major exhibits and their renewals, similarly to how feedback is received for incoming travelling exhibits. As a part of its regular environmental scanning, Science North has already identified a gap in incorporating visitor feedback to inform exhibits and is actively working on addressing this. Science North commits to better documenting the assessment process, giving appropriate weight to topic assessment to select exhibits, in order to inform and improve both the selection and ongoing evaluation of exhibit performance. Considerations will be given on how to document tactical decisions and learnings to bring them forward for future planning.

We note that developing a comprehensive exhibit strategy is a complex process that is labour, time and expertise intensive. We will take steps to implement the recommendations as resources allow. Upon development, the exhibit strategy will be presented to the Science Program Committee, a standing committee of the Board of Trustees, for ratification. We will further leverage our

memberships with the Canadian Association of Science Centres and the Association of Science and Technology Centers to streamline research on tracking visitor interaction with exhibits.

6.4 Performance Measures Did Not Address All Mandate Items

We reviewed Science North's key performance measures from 2019/20 to 2022/23 and compared them to its legislated mandate and key priorities in the Minister's 2023 mandate letter that aligned with its mandate. We noted that some key items in the legislated mandate are not measured. For example, there were no measures for diversifying self-generated revenues or for collaboration, a key provincial priority. In addition, there was no performance measure to assess the effectiveness of exhibits, educational programs or travelling exhibits.

Although Science North has met 76% of its performance measures targets, as shown in [Appendix 9](#), we noted that from 2019/20 to 2022/23, where performance targets were not achieved—such as in overall visitor satisfaction target of 95%; school outreach; student reach at Science North and Dynamic Earth; membership renewal; and leadership capacity-building sessions—there was no evidence of remediating action to improve performance.

Further, although Science North had informative measures—such as visitor satisfaction and membership renewals—not all of this information was made public, according to our review of Science North's annual reports from 2017/18 to 2022/23 (most recent available). In addition, we reviewed Science North's 2019/20–2023/24 business plans and noted that there was no benchmarking against other science centres. We compared Science North's performance measures to the 2022/23 performance measures of the Canada Agriculture and Food Museum, the Canada Aviation and Space Museum, and Canada Science and

Technology Museum (collectively known as “Ingenium”). We noted that some relevant performance measures used by Ingenium were not used by Science North. For example, Science North did not measure annual active memberships; general and tourism market share among the national museums and science centres; or percentage of budget spent on exhibition renewals.

RECOMMENDATION 13

To improve performance measurement, transparency and accountability of its organizational activities, we recommend that Science North:

- develop performance measures to assess progress against all legislated mandates;
- publicly report on its performance against all of its established measures and targets;
- document in annual reports any planned actions to be taken when targets were not met; and
- include a discussion of peer benchmarking with other science centres in its business plans.

SCIENCE NORTH RESPONSE

Science North agrees with the recommendation and as part of performance measurement will work with the Ministry of Tourism, Culture and Sport to explore opportunities so that its performance measures are aligned with other science centres to support benchmarking.

Science North commits to improving performance measures by considering metrics that include all legislated mandates, attendance figures, event and program attendance, press coverage, visitor response (comment cards, emails, online engagement/ comments, anecdotes from educators and guides, and others) and self-generated revenue.

We will amplify the inclusion of results in annual reports and business plans and commit to analyzing the results to apply the applicable lessons learned for our future planning.

7.0 Detailed Audit Observations—Ministry of Tourism, Culture and Sport

7.1 Ministry Oversight of the Science Centres

7.1.1 Lack of Action on Mandate Review and Agency Review Task Force Recommendations

The Ministry of Tourism, Culture and Sport (Ministry) reviews the annual reports and business plans of the two science centres as required under the Agencies and the Appointments Directive. The Ministry relies on annual attestations from Board Chairs and CEOs of the two science centres to ensure that the centres are complying with legislation, directives and government policies. This attestation includes compliance with Broader Public Sector Procurement Directives. Aside from a mandate review of the Ontario Science Centre and Science North in 2017 commissioned by the Ministry, the Ministry does not conduct regular reviews of the science centres’ operations for compliance with legislation or directives.

The 2017 mandate review concluded that the Ontario Science Centre’s and Science North’s mandates continued to be relevant to government goals and priorities in providing economic development, innovation, STEM education and science culture to Ontarians. In addition, the mandate review made recommendations:

- modernize the mandates to be outcome-based/purpose-driven;
- eliminate the Ontario Science Centre’s legislated requirement to manufacture exhibits;
- review and clarify the geographic scope of the centres to reduce redundancy;
- remove designation of the Ontario Science Centre as a Commission Public Body, under the *Public Service of Ontario Act, 2006*, to make its classification consistent with Science North; and

- improve the level of collaboration between the Ministry, Ontario Science Centre and Science North.

The 2019 Agency Review Task Force, established by the Province to undertake a comprehensive review of all government agencies, endorsed the mandate review's recommendations and added that the Ministry should explore opportunities for immediate efficiencies based on the findings of the review. However, at the time of our audit, the Ministry had not taken any action on many of the recommendations of the mandate review.

The review noted the following impacts of the Commission Public Body designation on the Ontario Science Centre:

- The CEO has a dual reporting relationship to the Deputy Minister and the Board. This blurs the lines of accountability.
- The requirement to follow the Ontario Public Sector HR-framework and collective bargaining agreements challenges organizational flexibility.
- A misalignment exists with peer organizations such as Science North and the Royal Ontario Museum (for example, autonomy and reporting relationships).

RECOMMENDATION 14

We recommend that the Ministry of Tourism, Culture and Sport revisit the recommendations of the 2017 mandate review and implement those recommendations that will improve the efficiency and effectiveness of the science centres.

MINISTRY OF TOURISM, CULTURE AND SPORT RESPONSE

The Ministry will review the 2017 mandate review to assess whether further actions can be taken to improve the efficiency and effectiveness of the Ontario Science Centre and Science North.

The Ministry notes that many of the recommendations from the 2017 mandate review relate to

governance of the Ontario Science Centre. As part of the work on the Ontario Science Centre relocation to Ontario Place, the Ministry and the Ontario Science Centre will work together to evaluate any potential updates to the agency's mandate, legislation and operating model that would be beneficial.

7.1.2 Ministry Did Not Provide Clear Guidelines to the Science Centres about Performance Measures

We reviewed the performance measurement and reporting requirements and the memorandums of understanding (MOUs) between the Ministry and each science centre. In our review, we noted that both science centres were required to report to the Ministry on how effectively they were delivering their mandates by submitting the results of their performance measures in their quarterly governance packages, business plans and annual reports to the Ministry.

However, our audit found that the agency directives and MOUs for both science centres did not have clear guidelines or specify the key performance measures required to be included in the science centre's annual reports. Also, the MOUs did not specify which criteria the Ministry used to assess the performance and success of the science centres.

We found, further, that the 2023/24 mandate letter from the Minister to the science centres did not specify any performance measures that were expected by the Ministry. Currently, the management of the science centres determines the performance measures to be reported publicly and to the Ministry.

RECOMMENDATION 15

To receive data on useful and meaningful performance measures that accurately assesses the science centres' performance with respect to their legislated mandate and ministerial direction, we recommend that the Ministry of Tourism, Culture and Sport:

- work with the science centres to establish measures to assess their performance;

- provide guidelines to the science centres on the performance measures, such as targeted expectations, and monitor actual results against the targets; and
- provide regular communication and feedback to help the science centres clarify expectations and refine their performance measures.

MINISTRY OF TOURISM, CULTURE AND SPORT RESPONSE

The Ministry will consult with the Ontario Science Centre and Science North to review existing performance measures and explore opportunities to strengthen measures where appropriate.

The Ministry will work with partner ministries and the two science centres to consider any improvements to the performance measures as well as the evaluation tools which can be used to assess the measures.

7.1.3 Ministry Guidance Could Ensure Collaboration between Ontario Science Centre and Science North

As the two science centres have very similar mandates within different geographical regions, there is an opportunity to pool resources and collaborate to produce innovative programming and exhibits while minimizing costs. However, we found there was almost no collaboration between the Ontario Science Centre and Science North on program development, research and evaluation, or the external sales of exhibits (within Canada and internationally). There had been only one collaborative effort to deliver virtual programs during the pandemic in 2020/21.

An expectation in the Minister's mandate letters, which also aligns with the objectives of the Ontario Science Centre and Science North and a recommendation of the 2017 mandate review noted in **Section 7.1.1**, is that the science centres continue to

seek opportunities for collaboration with each other to develop and market made-in-Ontario programming and exhibits for export. **Figure 24** shows some of the collaborations between the Ontario Science Centre and Science North during the last five fiscal years (2018/19–2022/23). From our audit we observed the Ministry was not ensuring collaboration between the Ontario Science Centre and Science North; it was left up to the science centres themselves to initiate any meaningful collaboration.

We found that the Ontario Science Centre and Science North could seek more opportunities for collaboration where they can benefit from the expertise of one another. Since the Ontario curriculum for science and technology is the same throughout the province, science centres could develop school programs jointly rather than duplicating programs at each science centre. Similarly, they could work together to identify more opportunities for external sales of exhibits (within Canada and internationally). The Ontario Science Centre could also work with Science North regarding research and evaluation of exhibits, since Science North already has an established research and evaluation unit.

RECOMMENDATION 16

To increase collaboration between the Ontario Science Centre and Science North, we recommend that the Ministry of Tourism, Culture and Sport work with the science centres to identify areas for collaboration that could benefit both science centres.

MINISTRY OF TOURISM, CULTURE AND SPORT RESPONSE

Following consultation and through the Minister of Tourism, Culture and Sport's annual letter of direction to each agency and as part of the approval of each agency's annual business plan, the Ministry will provide further direction on areas for collaboration that could benefit each agency.

Figure 24: Some Collaborations between Ontario Science Centre and Science North, 2018/19–2022/23

Source of data: Science North

Fiscal Year	Project	Type of Collaboration
2018/19	Beyond Human Limits	Travelling exhibition · Designed by Science North · Fabricated by Ontario Science Centre
2019/20	—	—
2020/21	Winter Watch: Live with the Ontario Science Centre	Livestream programming on YouTube and Facebook, co-hosted by Ontario Science Centre and Science North
	STEM curriculum resources for the Ministry of Education	Resource development · Elementary by Science North · Secondary by Ontario Science Centre
2021/22	Our Climate Quest: Small Steps to Big Change (100 m ²)	Travelling exhibitions · Initiated by Science North · Designed and fabricated by Ontario Science Centre
	Our Climate Quest: Small Steps to Big Change (600 m ²)	Travelling exhibitions · Initiated by Science North · Designed by Ontario Science Centre
	Explore the Great Outdoors	Livestream programming on YouTube and Facebook, co-hosted by Ontario Science Centre and Science North
	Spring in Ontario	Livestream programming on YouTube and Facebook, co-hosted by Ontario Science Centre and Science North
2022/23	<i>Anishinaabewin Maamnинendimowin: Pane Gii-Bite</i> (Indigenous Ingenuity: Timeless Inventions)	Travelling exhibition · Developed by Science North in consultation with Montreal Science Centre · Hosted at Ontario Science Centre

Appendix 1: Priorities and Expectations for Ontario Science Centre and Science North, 2023/24

Source of data: Ministry of Tourism, Culture and Sport

Ontario Science Centre	Science North
<ul style="list-style-type: none"> Diversify revenue streams, increase self-generated revenue and identify strategies to ensure the continued viability of your operations and facilities. 	<ul style="list-style-type: none"> Diversify revenue streams, increase self-generated revenue and identify strategies to ensure the continued viability of your operations and facilities.
<ul style="list-style-type: none"> Foster sustainable economic growth while delivering on your mandate of offering unique and educational experiences for visitors to be inspired by science and technology. 	<ul style="list-style-type: none"> Foster sustainable economic growth while delivering on your mandate of offering unique and educational experiences for visitors to be inspired by science and technology.
<ul style="list-style-type: none"> Collaborate with other agencies and ministry partners to improve all lines of business. 	<ul style="list-style-type: none"> Collaborate with other agencies, ministry partners, stakeholders and communities to drive efficient innovation across all lines of business.
<ul style="list-style-type: none"> Collaborate with the Ministry and its other agencies in enhancing long-term infrastructure planning across the portfolio through asset management. 	<ul style="list-style-type: none"> Collaborate with the Ministry and its other agencies in enhancing long-term infrastructure planning across the portfolio through asset management.
<ul style="list-style-type: none"> Demonstrate excellence in program and service delivery by pursuing a sustainable business model. 	<ul style="list-style-type: none"> Demonstrate excellence in program and service delivery by increasing engagement in innovative learning through outreach to rural and remote communities across Northern Ontario, including First Nations.
<ul style="list-style-type: none"> Focus on providing young people with experiences that will spark their interest and knowledge in STEM (science, technology, engineering and math). 	<ul style="list-style-type: none"> Focus on delivering learning programming that provides young people with skills for future education and careers, including in STEM (science, technology, engineering and math).
<ul style="list-style-type: none"> Continue collaborating with Science North to develop and market made-in-Ontario programming and exhibits for export. 	<ul style="list-style-type: none"> Seek opportunities to collaborate with the Ontario Science Centre to develop and market made-in-Ontario programming and exhibits for export.
<ul style="list-style-type: none"> Continue to support the redevelopment of Ontario Place by exploring future opportunities for science-related tourism and educational programming at the Cinesphere and pod complex. 	
<ul style="list-style-type: none"> Collaborate with other provincial agencies and attractions within the Greater Toronto Area to attract and retain out-of-province and international visitors so that they can explore all the region has to offer. 	<ul style="list-style-type: none"> Continue collaborating with other attractions operating in the North to encourage visitors to extend their stays and to explore all the region has to offer.

Appendix 2: Types of School Programs Offered by the Science Centres, March 2023

Source of data: Ontario Science Centre and Science North

Ontario Science Centre

Type		For Students	For Teachers
Fee-Based			
On-Site	Educational programs for schools	●	
Online	Educational programs for schools	●	
	Teacher workshops		●
Free			
On-Site	Access Science ¹ (for elementary and middle school students)	●	
	Science School ² (30+ Ontario students/semester)	●	
Outreach (offsite)	STEAM Residency program ³ (3 day in-class learning per participating class)	●	●
Online	Connected North ⁴ (for students in northern Canada, including Indigenous students)	●	
	Teacher resources		●

Science North

Type		For Students	For Teachers
Fee-Based			
On-Site	Educational programs for schools	●	
	Overnight camp-ins	●	
Outreach (offsite)	School outreach for public schools	●	
	School outreach for First Nation schools	●	
	Teacher workshops for public schools		●
	Teacher workshops for First Nation Schools		●
Free			
Online	Teacher resources (educator resources)		●

1. Access Science is a community-supported initiative funded by donations.
2. Science School, open to all students in Ontario, is funded by the Ministry of Tourism, Culture and Sport in partnership with school boards in the Greater Toronto Area.
3. STEAM Residency is an outreach program funded by the Ministry of Tourism, Culture and Sport for students in under-served schools and communities.
4. Virtual programs are funded and delivered in partnership with Connected North, a non-profit organization.

Appendix 3: Board Composition and Committees for Ontario Science Centre and Science North, March 2023

Source of data: Ministry of Tourism, Culture and Sport; Ontario Science Centre; and Science North

	Ontario Science Centre	Science North
Agency Type	Board-governed provincial agency	Board-governed provincial agency
Total # of Board Trustees¹	16 to 26	Maximum 15
Current # of Board Trustees¹	17	13
Quorum	A majority of the trustees constitutes a quorum	A majority of the trustees constitutes a quorum
Committees of the Board	<ul style="list-style-type: none"> · Executive · Development · Finance and Operations² · Governance and Governmental Relations · Strategic Oversight 	<ul style="list-style-type: none"> · Executive · Audit · Business Affairs · Fundraising · Governance and Nominating Committee · Science Program Committee

1. All Board trustees are provincially appointed.

2. The finance and operations committee also function as the audit committee.

Appendix 4: Audit Criteria

Prepared by the Office of the Auditor General of Ontario

- 1.** Board and Ministry oversight processes and accountability structures aligned with best practices to ensure that science centres manage their operations and facilities economically, efficiently, and effectively, with minimal environmental impact, in order to achieve their legislative mandates and complying with government requirements and guidelines. Timely corrective action is taken when necessary.
- 2.** Science centres operate cost-effectively and have diverse self-generated revenue streams to ensure long-term financial sustainability.
- 3.** Science centres deliver effective educational programs that support the Province's curriculum and provide people with experiences that will stimulate interest and further knowledge in science, technology, engineering and math (STEM).
- 4.** Science centres develop, procure and display exhibits that effectively engage and educate the public on relevant and current science and technology topics to maximize attendance and membership and to cultivate learning and interest in science.
- 5.** Science centres measure and assess the impact of exhibits and educational programs on the audience and make changes necessary to maximize the expected learning.
- 6.** Science centres identify and enter into appropriate partnerships to drive economic activity in their respective regions and innovation across all lines of business.
- 7.** A thorough cost/benefit analysis is conducted before undertaking any significant initiative, such as the relocation of the Ontario Science Centre to Ontario Place and the Northwest expansion project at Science North. Only initiatives that yield the greatest positive benefits are accepted.
- 8.** Meaningful performance indicators and targets are established, monitored and compared against actual results to ensure goals, legislative requirements and guidelines are achieved. Results are publicly reported and timely corrective action is taken when necessary.

Appendix 5: Timeline Leading to Announcement of the Relocation of Ontario Science Centre to Ontario Place

Prepared by the Office of the Auditor General of Ontario

Date	Event
2006	
Apr	The City of Toronto lists the Ontario Science Centre as a heritage property.
2009	
Feb	The Province commissions a study to develop a plan to support the growth and long-term viability of tourism in Ontario. The report notes the potential to move the Ontario Science Centre to Ontario Place as part of a revitalization project.
2012	
Jul	Minister's Advisory Panel—with a key mandate to “Provide strategic advice to the government to move forward with a full revitalization of Ontario Place”—presents a report to the Minister of Tourism, Culture and Sport on the Ontario Place Revitalization, noting that “Ontario Place should position itself as an ideal site for a research or education centre for excellence.”
2015	
Jun	Engineer’s assessment of Ontario Science Centre by a consultant of Infrastructure Ontario, recommends pedestrian bridge roof be replaced due to its age. As of September 2023, the bridge roof had not been replaced.
2016	
Apr	Minister of Tourism, Culture and Sport requests the Ministry to prepare a business case for the capital investment needed to make the Ontario Science Centre a premier culture attraction. The business case would consider the options of major repair and renovation of the existing site or moving to a new facility at Ontario Place.
Jul	An architecture firm approaches Ontario Science Centre, unsolicited, to build a 250,000-square-foot “innovation centre” free of cost and redevelop a part of the parking lot into a community centre and mixed-used housing towers of 1,000,000 square feet.
Oct	Under the instructions of the Ministry of Tourism, Culture and Sport, Infrastructure Ontario completes a business case on modernizing Ontario Science Centre. The case recommends moving Ontario Science Centre to Ontario Place, stating that would save the government \$250 million (net present value) over a 50-year period.
Nov	After reviewing the business case, the Board acknowledges in a letter to the Minister of Tourism, Culture and Sport that due to deferred maintenance, the status quo is not sustainable. While supportive of options presented in the business case, the Board puts forward a third option to build a new science centre at its current site and move it closer to the Eglinton Crosstown LRT, and to finance the project through mixed development in the remaining lands.
2018	
Jun	CreateTO, an agency of the City of Toronto, applies for an Official Plan and zoning amendment for corner of the parking lot location at Don Mills and Eglinton. The current site would become a mixed-use development of three residential towers with 1,254 residential units and a Toronto District School Board school. The development would not impact the operations of the science centre.
2019	
Apr	A private infrastructure investment firm circulates a concept document called OPX (dated March 2019) that proposes to “re-invent the [Ontario Science Centre] on the waterfront.” The document notes the existing Don Mills site, owned by the City, is of “great redevelopment value” as the flat lands can be developed as purpose-built affordable rental housing, all connected to transit via the new Eglinton Crosstown LRT (which is not expected to be operating until 2024). Ontario Science Centre’s then CEO (Maurice Bitran) presents a proposal to the Ontario Science Centre (OSC) Board for the relocation.

Date	Event
May	Province announces it is seeking to redevelop Ontario Place through a formal Call for Development, which closes in September 2019.
Jun	In a presentation to the Ministry of Tourism, Culture and Sport, the Ontario Science Centre's management states, "After 20 years of limited investment, aging exhibits and outdated infrastructure, the [Ontario Science Centre] is less able to fulfill its mission." Management and the Board are considering three options: (1) reinvest in the existing Don Mills site; (2) relocate closer to the Eglinton LRT station (corner of Don Mills Road and Eglinton Avenue); or (3) relocate to Ontario Place.
Dec	The then CEO of the Ontario Science Centre asks the Deputy Minister of Heritage, Sport, Tourism and Culture Industries to request the investments needed for the existing centre through the Ministry's multi-year planning process.
2020	
May	Government decision-makers approve the multi-partner approach to redevelop Ontario Place and ask Ministry of Heritage, Sport, Tourism and Culture Industries to report back on strategy for the potential relocation of the Ontario Science Centre.
Aug	Based on the May 2020 approval by government decision-makers, Ministry of Infrastructure, Infrastructure Ontario and Ministry of Heritage, Sport, Tourism and Culture Industries begin working together to identify order-of-magnitude and capital requirements associated with relocating Ontario Science Centre to the Ontario Place site.
2021	
May	Infrastructure Ontario starts working with the Ontario Science Centre on programming space requirements for the new science centre site at Ontario Place.
Jun	The Ministry of Heritage, Sport, Tourism and Culture Industries informs management of the Ontario Science Centre that relocating the centre to Ontario Place is a "priority project" and the Ministry plans to submit a proposal to government decision-makers in summer 2022.
Jul	The Province announces details of its plan for the Ontario Place redevelopment. Three successful participants from the 2019 "Call for Development" process, Therme Group, Live Nation and Écorecréo Group, will partner with the Province. The Province will also work with the Ontario Science Centre to explore opportunities for science-related tourism and educational programming at the Cinesphere and pod complex.
	Ministry of Heritage, Sport, Tourism and Culture Industries requests Stage 1 planning approval from government decision-makers for Ontario Science Centre relocation.
Aug	Government decision-makers approve the Ministry of Heritage, Sport, Tourism and Culture Industries' request for \$12 million in capital funding for site investigations and project planning activities related to Ontario Place redevelopment. Government decision-makers also authorize the Ministry of Heritage, Sport, Tourism and Culture Industries to work with Ministry of Government and Consumer Services and Infrastructure Ontario to proceed with preliminary planning to evaluate and develop potential relocation of Ontario Science Centre to Ontario place.
Dec	Government decision-makers approve Ministry of Heritage, Sport, Tourism and Culture Industries' request for \$2.9 million in funding for Stage 1 planning of a new Ontario Science Centre facility at Ontario Place.
2022	
Jan	Engineering consultant hired by Infrastructure Ontario identifies a crack and a leak in the pedestrian bridge and advises a more detailed structural investigation is needed.
Feb	Drawings from the structural specialist indicate that the bridge could fail. The Ontario Science Centre's property manager notifies Ontario Science Centre via email that they are initiating an emergency project on the bridge to determine the scope of repair work needed.

Date	Event
Apr 6	Minister of Infrastructure directs Infrastructure Ontario to support Ministry of Heritage, Sport, Tourism and Culture Industries in negotiations with the City of Toronto and in seeking Stage 2 (construction) approval for the relocation project (no negotiations between the City and the Province related to relocation occurred). The Minister notes potential options for the existing site as housing or long-term care.
Apr 20	Government decision-makers approve a government ground lease agreement with Therme Group Canada Inc. (Therme) toward the redevelopment of Ontario Place. The term of the lease is 95 years (75 years plus 20-year extension) with a targeted construction period of 24 months. As part of the lease, the Province commits to providing a number of dedicated parking spaces to Therme located within 650 metres of its entrance.
Apr 26	A structural investigation at the Ontario Science Centres notes that, for the pedestrian bridge's cast-in-place concrete walls, "exterior walls are showing significant signs of cracking on the north elevation below the windows."
Jun	The City of Toronto Council approves the redevelopment of the 5-acre City-owned property located at the southwest corner of Don Mills and Eglinton as part of the City's "Housing Now Initiative" to build affordable housing near transit. The development will not impact the operations of the science centre.
	Ontario Science Centre closes its pedestrian bridge connecting the entrance facility to exhibition spaces due to high risk of structural failure.
Aug	Infrastructure Ontario retains an architectural firm to provide a Cultural Heritage Evaluation Report on the Ontario Science Centre.
Sep 1	Quebec-based company Écorécréo Group, one of the three private partners involved in the Ontario Place redevelopment, exits due to "unforeseen challenges," according to the Ministry of Infrastructure. Écorécréo Group says they failed to come to an agreement on a long-term lease.
Sep 7	Infrastructure Ontario's engineering consultant reaches out to the Toronto and Region Conservation Authority to discuss accessing the pedestrian bridge at the science centre for potential repairs. However, no detailed repair plan is provided to the Toronto and Region Conservation Authority.
Sep 28	Infrastructure Ontario presents briefing to the Premier of Ontario's office on the relocation of Ontario Science Centre. The submission of the Stage 2 (construction approval) to government decision-makers for construction-related funding for the new Ontario Science Centre facility at Ontario Place is targeted by the Ministry of Infrastructure for April 2023, in order to align with Ontario Place Redevelopment planning and approvals.
Oct-Dec	Infrastructure Ontario continues to work with Ontario Science Centre to update the functional programming needs for the new science centre site at Ontario Place.
2023	
Jan	The Province amends the <i>Ontario Heritage Act</i> , adding section 25.2 (7) which allows the Lieutenant Governor in Council to make Orders that exempt provincial heritage properties owned or occupied by the Crown or a prescribed public body from having to comply with heritage standards and guidelines if properties are deemed to potentially advance provincial priorities, including transit, housing, health and long-term care and other infrastructure.
Mar 30–Apr 6	Ministry of Infrastructure submits a business case to government decision-makers for approval of construction funding for the relocation of the Ontario Science Centre and planning for a site-wide parking solution. Approval is provided in one week, which is one-third the normal time frame.
Apr 17	Ontario Science Centre Board of Trustees approves, in principle, the relocation of the Ontario Science Centre to Ontario Place.
Apr 18	Provincial government publicly announces the relocation of Ontario Science Centre to Ontario Place.
Apr 27	Environmental Assessment public consultation on Ontario Place redevelopment.

Date	Event
Jun 23	Infrastructure Ontario issues a request for proposal (RFP) for the planning, design and conformance consulting services for the new Ontario Science Centre at Ontario Place. The initial bid closing date is August 22, 2023, which is extended to October 26, 2023.
Jun	Infrastructure Ontario releases Draft Environmental Study Report on Ontario Place Redevelopment project for public feedback. The draft Cultural Heritage Evaluation Report prepared by an architectural firm retained by Infrastructure Ontario concludes that the Ontario Science Centre meets the criteria for a Provincial Heritage Property of Provincial Significance and Provincial Heritage Property under O. Reg. 10/06 and 9/06 of the <i>Ontario Heritage Act</i> , and is therefore provincially and locally significant. The Report recommends ongoing engagement with the City of Toronto and the Toronto and Region Conservation Authority to ensure careful conservation of the setting and building.
Jul	The City of Toronto Council votes 21:3 in favour of exploring the feasibility of the City of Toronto operating the science centre or other public-facing attraction at its current location.
Sept	Infrastructure Ontario re-submits Ontario Place redevelopment application (originally submitted in November 2022). Government decision-makers approve the following funding requests by Ministry of Infrastructure: <ul style="list-style-type: none">• \$5.2 million for the Ontario Science Centre relocation to support planning, third-party advisors, and IO fees to support the procurement process for construction;• \$1.4 million to advance planning and design work for the parking solution; and• \$47.7 million to secure a construction manager and make repairs to the pods, Cinesphere and bridge.
Nov	Infrastructure Ontario releases final version of the Environmental Study Report on Ontario Place redevelopment project.

Note: In November 2019, the Ministry of Tourism, Culture and Sport changed its name to the Ministry of Heritage, Sport, Tourism and Culture Industries. In August 2022, the Ministry changed its name back to the Ministry of Tourism, Culture and Sport.

Appendix 6: Summary of Permanent Exhibits at Ontario Science Centre, June 2023

Source of data: Ontario Science Centre and Office of the Auditor General of Ontario (OAGO)

Level ¹	Exhibition Hall	# of Exhibits Observed by OAGO
1 and 2	Geo Bridge: Celebration Way ²	0
2	Great Hall (open hall to display travelling exhibits or display exhibits of various science topics)	0
2	Outdoor Experience Area ³	0
2	Unilever Science Plaza (outdoor)	6
2	OMNIMAX and Entrance	4
4	Amateur Radio (exhibit and live demonstration of the radio)	1
4	Space Hall⁴ and Saturn V (exhibits related to space, physics and engineering)	46
4	KidSpark (learning-based play space of various science topics, for kids 8 and under)	61
4	Mindworks Corridor (artifacts on art and psychology)	5
5	A Question of Truth (exhibits related to psychology and perceptions)	31
5 and 6	Stairwell Artifacts (exhibits and artifacts of various science topics)	6
6	Cohon Family Nature Escape (outdoor)	4
6	AstraZeneca Human Edge (exhibits related to human biology)	69
6	Forest Lane (Exhibits related to ecology, forests and natural environment)	18
6	Rock Paper Science (open hall for live demonstrations and exhibits of various science topics)	4
6	Weston Family Innovation Centre (exhibits related to technology, physics, engineering and psychology)	36
6	Science Arcade (exhibits related to physics and engineering)	50
6	HotZone and Community Reef (open hall for live demonstrations and exhibits of various science topics)	5
6	Bruce Poon Tip Living Earth Hall and TELUS Rain Forest (exhibits related to the natural environment)	56
Total		402

1. See **Figure 13** for a map showing all six levels. Level 3 is the seasonal outdoor terrace (TD Green Terrace) and does not have any exhibits on display.

2. Located inside the Ontario Science Centre bridge but currently closed to the public.

3. Located outside of the Ontario Science Centre's front entrance and formerly known as Teluscape.

4. Space Hall includes the planetarium, which is currently closed to the public.

Appendix 7: Key Performance Indicators for Ontario Science Centre, 2022/23

Source of data: Ontario Science Centre

Strategic Priorities	Performance Measure	Target	Actual
Be a hub focused on science education and engagement	New content delivery (%) ¹	50-60%	80%
	Digital transformation strategy	Finalize strategy and implementation of Phase 1	Digital strategy developed
	Science-related ticketed events	n/a ²	n/a ²
Help build science capital	Percentage of programs with fully integrated 21st-century learning skills	n/a ²	n/a ²
	Youth Innovation programs, platforms and activities with partners—to develop, mentor and celebrate youth innovation	5+ partner-based events	7 partner-based events
Broaden our reach	New products/services for International Sales clients	n/a ²	n/a ²
	Total admissions attendance ³	727,597	649,755
	Access Programs (as a % of total attendance) ⁴	10%	8%
	Social media followers/subscribers	134,460	135,124
	Virtual event engagement ⁵	27,772	Public virtual events not offered
	Virtual event reach ⁶	123,612	Public virtual events not offered
	Website traffic	2,777,308 page views and 2,074,342 unique page views	6,160,734 page views and 4,681,234 unique page views
	Net Promoter Score (NPS)—survey measure of likelihood to recommend	41%	n/a ²
Organizational Resilience	Science Centre self-generated revenues	\$15,017,000	\$13,836,000
	Maintain or improve employee experience index ⁷	70.9	n/a ²

1. New content (delivered by partners) as a percentage of the overall content that is delivered annually.

2. For targets and actuals marked n/a, performance was not measured.

3. Total attendance (target and actual) includes visitors to the Ontario Science Centre exhibit halls and OMNIMAX theatre only and does not include visitors that attended special events and programs at the Ontario Science Centre.

4. For underserved communities, attendance is tracked as a percent of total attendance.

5. For social media events: number of interactions, likes, comments, shares.

6. For social media events: number of views and how many users had the post on their timelines.

7. Index measures four key aspects of employee experience as identified by Ontario Public Service: commitment, organizational satisfaction, job satisfaction, and motivation.

Appendix 8: Summary of Permanent Exhibits at Science North and Dynamic Earth, June 2023

Source of data: Science North

Science North		
Floor	Area	Exhibits
1–4 above ramp	Fin Whale and Beluga Whale (whale skeletons hanging from the ceiling)	5
Ramp	Environmental Stories	2
Ramp	Geological Stories	4
Between 1 and 2	TD Toddler Treehouse (educational play area dedicated to young children, newborn to age 5)	10
2	Nature Exchange (visitors can bring natural items they collected and exchange them for points or other items onsite)	26
	Lapidary Lab (visitors can learn how to cut, grind, and polish rocks by hand)	2
	Butterfly Gallery (a glass enclosure that is home to various butterflies)	19
3	Wetland Lab (an area displaying frogs, turtles and rattlesnakes)	19
3	Forest Lab (area displaying different types of trees)	26
3	Lakes and Rivers Lab (an area for animals, including beavers, snapping turtles, water snakes, and various fish species native to Northern Ontario)	10
3	Animal Habitat	22
3	Outdoor 3rd floor (display of several plant species native to Northern Ontario)	4
4	Body Zone (focused on science surrounding DNA and human bodies)	18
4	Space Place (a laboratory that includes information on Canadian space exploration and an object theatre related to dark matter)	33
4	TechLab (visitors can take apart and build electronics, create circuits, and play with a variety of gears and pulleys)	9
4	Data Base (visitors can use onsite tools to experiment and test their own innovative ideas in computer sciences, engineering, mechanics, technology, physics and optics)	8
4	Prototype and Fab Lab (visitors can learn how to use equipment such as laser cutters, t-shirt printers, 3D printers and waterjet cutters, and can participate in workshops)	8
Subtotal		225

Dynamic Earth		
Floor	Area	Exhibits
Underground	Underground Tour (model mine)	16
1	McLeod Rock Gallery (display of information related to rocks, metals)	14
1	McLeod Rock Gallery—Mine Training Centre (simulation of the interior of a mine, with chairs and controllers)	5
1	McLeod Rock Gallery—Hallway (display of information related to coins, historical mining images throughout Sudbury's history)	8
1	Explora Mine (simulation of mining processes and display of minerals)	8
2 (main)	Lobby (an area displaying different types of coins and minerals found around the world; and story of the regreening efforts in Sudbury)	9

Dynamic Earth		
Floor	Area	Exhibits
2	Earth Gallery (an area focused on geology and mining)	3
2	Earth Gallery—Rockhound Lab (an area where minerals are traded for points and different minerals can be examined using a microscope)	5
2	Earth Gallery—Mineral Identification (to identify minerals using different methods)	6
2	Earth Gallery—Canadian Diamonds (displays about diamonds, including a brief history and current locations of diamond mining in Canada, and how to evaluate the quality of a diamond)	3
2	Earth Gallery—Sudbury Impact Story (exhibits showing a satellite image of Sudbury, impact structure, and geological map of Sudbury)	5
2	Earth Gallery—Earthquakes (exhibits about earthquakes, including an interactive table in which visitors can simulate an earthquake and learn about the related tectonic processes)	4
2	McLean Engineering Gallery (temporary travelling exhibit hall with changing exhibits)	1
Stairwell	Stairwell (display of pictures related to geological processes)	1
Grounds	Outdoor Science Park (display of mining-related equipment and toys)	12
Grounds	Big Nickel (Big Nickel site and its creation story)	3
Grounds	Outdoor pathway (display of information related to Sudbury's regreening)	8
Grounds	Big Nickel Trail (display of information related to nickel)	2
Subtotal		113
Total		338

Appendix 9: Key Performance Indicators for Science North, 2022/23

Source of data: Science North

Strategic Priorities	Performance Measure	Target	Actual
The Leader in Science Engagement	Overall visitor satisfaction (%)	95%	95% for Science North 91% for Dynamic Earth 95% for outreach 95% for science camps 98% for school programs 96% for online engagement
	Science social media posts	n/a ¹	n/a ¹
Science North in all of Northern Ontario	Public outreach	a. Reach 10,000 people in 12 communities through public outreach activities, Science Festivals, and Northern Initiatives. b. Reach 60,000 participants with the Great Northern Ontario Roadshow in 30 communities	a. 53,622 people reached b. 51,949 reached in 50 communities across Northern Ontario
	Number of students in virtual education programming	100,000	86,277
	School reach	Engage 10,000 students through in-person school visits at Science North and Dynamic Earth	24,902 students reached through in-person school visits at Science North and Dynamic Earth
	Camps	Provide summer camp experiences for 2,800 students in 30 Northern communities	Provided summer camp experiences for 2,979 students in 31 Northern communities
	Number of e-workshops delivered to First Nation schools	30	69
	Distribute STEM kits to First Nations students and families in Northern Ontario	5,000	5,867
	Total admissions attendance	190,856	276,000
Ultimate Customer Journey	Digital presence	3% engagement on social media channels	6% engagement on social media channels
	New visitor or digital audience experiences	Develop and implement digital science content on all social media channels	n/a ¹

Strategic Priorities	Performance Measure	Target	Actual
Awesome Organizational Culture	Equity, Diversity and Inclusion forums ²	12	12
	Employee engagement score	n/a ¹	n/a ¹
	Leadership capacity building sessions ³	10 sessions	10 sessions
	Mentorship/coaching program session	1	1
Financial Resilience and Growth	Admissions, memberships, and associated revenues	a. Admissions and memberships revenue: \$2 million b. On-site business and parking revenue: \$598,757	a. Admissions and memberships revenue: \$2.9 million b. On-site business and parking revenue: \$1.7 million
	External sales net profit (including travelling exhibit leases and administrative expenses)	\$638,849	\$42,954
	Grants revenue	\$4 million in government-funded commitments in capital grant revenue for visitor experience renewal.	\$1.6 million in government-funded commitments in capital grant revenue for visitor experience renewal.
	Budget achievement	Reduce projected \$1 million deficit	Achieved a \$285,004 deficit
	Philanthropy	Corporate sponsorship revenue of \$825,000	Corporate sponsorship revenue of \$500,071

1. For targets and actuals marked n/a, performance was not measured.

2. Equity, Diversity and Inclusion forums: a monthly staff forum to enhance organizational and individual skills that promote an inclusive environment and provide opportunities for dialogue and conversation around sensitive topics at Science North.

3. Leadership capacity building sessions: Leadership series about strategic thinking; program management; service mindset; project management; building resiliency; leading teams; influence without authority; and mentorships.



Office of the Auditor General of Ontario

20 Dundas Street West, Suite 1530
Toronto, Ontario
M5G 2C2
www.auditor.on.ca

ISBN 978-1-4868-7539-9 (PDF)

Cover photograph credit:
top: Ontario Science Centre
bottom: Science North