DIALOG®

CANADIAN CONSULTING ENGINEERING AWARDS 2024

Arthur J.E Child Comprehensive Cancer Centre | Calgary, AB

centre of hope

The Arthur J.E. Child Comprehensive Cancer Centre, opening in fall 2024, will be Canada's largest cancer treatment and research facility, second largest in North America. Its innovative design focuses on a Heart courtyard, fostering trust, comfort, resilience, and hope. The Arthur Child, designed and built by the PCL | DIALOG + Stantec team, integrates communities for treatment, education, and research. This innovative facility features cutting-edge engineering design, showcasing advancements in healthcare design and public infrastructure.

PROJECT TEAM

DESIGN BUILD TEAM
PCL | DIALOG + STANTEC

DIALOG
Structural Engineering, Mechanical Engineering, Electrical Engineering, Architecture, Interior Design, Landscape Architecture

STANTEC
Civil Engineering, Structural Engineering, Mechanical Engineering, Electrical Engineering, Architecture, Interior Design

SMITH + ANDERSEN
Mechanical Engineering

innovative solutions

The team behind the Arthur J.E. Child Comprehensive Cancer Centre has introduced several innovative solutions that align with the facility's vision and guiding principles of delivering world-class healthcare while working within the constraints of the project site, schedule, and surrounding medical campus and its community. These innovations serve to enhance the experience of patients, staff and guests as well as contribute to operational efficiency and sustainability. Each of the following innovations was incorporated in direct response to addressing a specific project challenge and advancing healthcare design.

Interior Courtyard Views + Dynamic Glass

Views to Outdoors
Important for wellbeing, wayfinding, and sustainable energy use, views to outdoors were incorporated throughout the facility. Above grade the team incorporated high-efficiency glazing and space planning that reduced the typical floor plate depths, providing each space with views to outside. Lightwells were incorporated for each of the below-grade radiation vault reception spaces, providing natural lighting, a more welcoming space, and accommodating future lift-in/lift-out of treatment equipment.

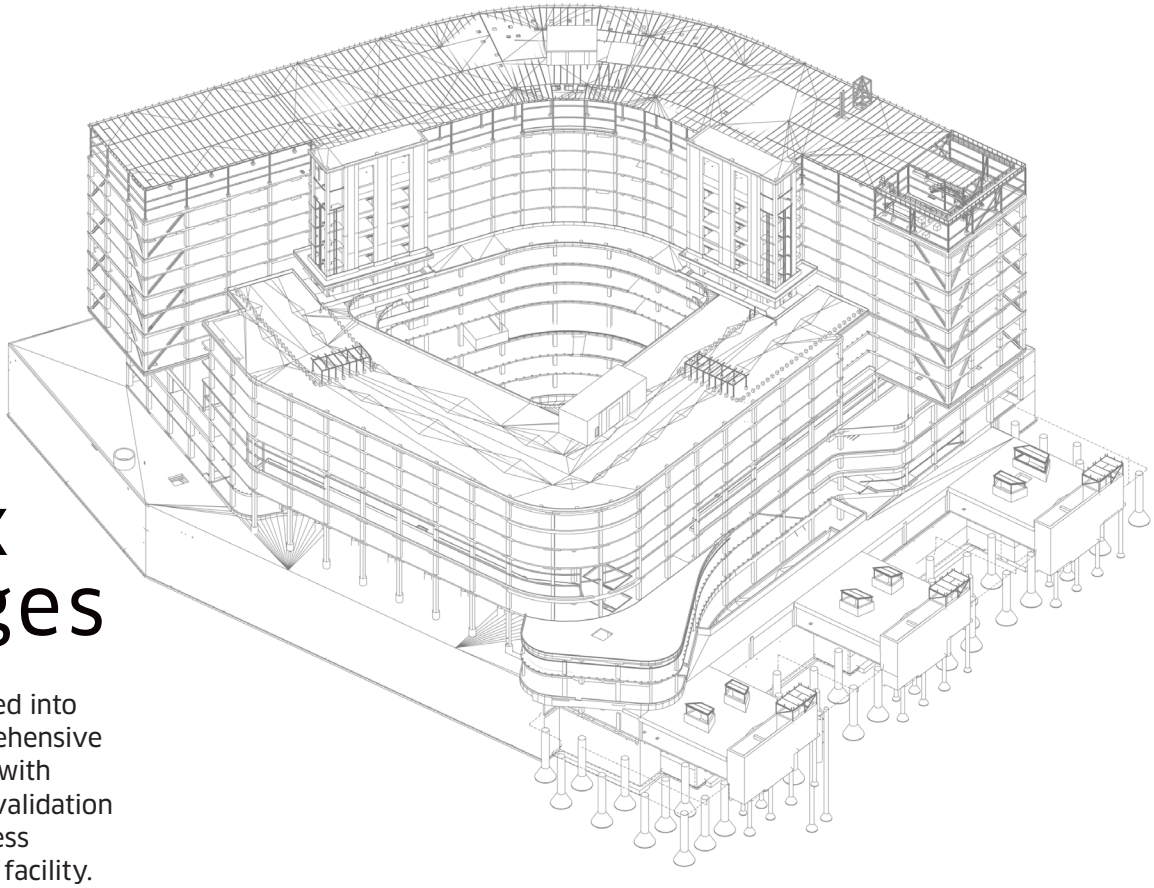
Dynamic Glazing
Integrating all of the electrochromic tinting present within the building's exterior glazing into the Building Automation System (BAS), enables the Arthur Child to operate more efficiently and with greater occupant comfort year-round. The glazing works with the BAS to adjust transmitted light levels in coordination with the building services, providing consistent lighting levels within the building and reducing both the peak cooling loads as well as the total annual energy consumption. This approach has reduced the building space required for the HVAC equipment and also empowers patients through individual occupant adjustment, eliminating the need for manual blinds and the sanitization challenges they can present.

Elevator Destination Dispatch
Borrowing from high-rise office design, destination dispatch was included in the facility's elevator design to address the building size and number of occupants. This approach optimizes elevator usage by grouping passengers with similar destinations into the same elevator, reducing waiting and travel times compared to traditional elevator systems. Integrated with wayfinding kiosks and mobile apps, this system provides detailed directions to patients and visitors, enhancing their overall experience and reducing stress associated with navigating the facility.

Enhanced Emergency Generation
A proactive approach to ensuring uninterrupted service during power outages, the team's innovation introduced four generators, seamlessly integrated with the main power supply and located within the below-grade portion of the facility to address both site constraints and minimize noise disruption to the surrounding medical campus. This redundancy ensures the facility's full functionality during power interruptions, maintaining critical systems such as ventilation and cooling, and allowing treatment to continue without disruption. The generators are supported by an isolated structural slab to mitigate noise and vibration transfer to the rest of the facility.

Cantilevered Floor Plates
An important part of addressing the site constraints for the project, an innovative combination of structural steel and cast-in-place concrete was employed to cantilever the outer bays of levels 7-13 of the building, achieving the required programming space needs while minimizing the ground level footprint of the building. Precise design and construction were required to construct the cantilevers while accommodating changing deflection and alignment with each added floor above.

Cantilevered Floor Plates



complex challenges

Each innovation incorporated into the Arthur J.E. Child Comprehensive Cancer Centre was done so with deliberate exploration and validation by the design team to address complexities specific to this facility.

The site selection within the northeast corner of Foothills Medical Campus presented the largest of these complexities, being remote from the main building and directly fronting onto the adjacent community retail and residential areas.

Connection to the rest of the campus was achieved by means of a two-storey, elevated and enclosed pedway, extending more than 200m and with multiple hubs connections to existing buildings. The pedway was also designed to accommodate electric trolleys to assist in moving people and equipment efficiently between buildings.

A new underground duct bank was also provided from the basement level of the main building to the basement level of the Cancer Centre, provisioned with dual chamber pull boxes intermittently spaced along its run to accommodate cable installation and to access the spare ducts in the future.

The design of such a large building along the perimeter of the medical campus also required careful consideration of its effects on adjacent spaces and buildings, extending beyond the property line of the campus. This included the housing of the emergency generators on isolation slabs within the below grade portion of the facility to mitigate noise and vibration to the surrounding area and developing a building form that minimized the ground level footprint while achieving the required programming areas. Cantilevering of the upper levels of the building created a less imposing ground form, and burying the radiation treatment vaults below grade enabled the incorporation of public tranquility gardens along the perimeter of the building while still meeting safe radiation shielding requirements.

social and economic benefits

The new Arthur J.E. Child Comprehensive Cancer Centre will provide a world class facility to help in the fight against cancer. The new facility provides enhanced treatment, research, and ongoing support for all those affected by cancer and will help to attract, retain, and create the best medical staff to assist in a fight that more than 40% of Canadians will face during their lifetime.

The Arthur Child will be a beacon of HOPE for those affected by cancer, providing more equitable access to leading treatment and support, minimizing both the travel and expense currently incurred or prohibiting some from seeking the treatment they require.

The benefits of the new facility stretch beyond social and inclusivity, to the economic benefit of attracting the best and brightest from around the world to help with treatment, research, and training. Already the facility is fostering additional adjacent development for complementary research, manufacturing, and outpatient services.

environmentally responsible

The new Arthur J.E. Child Comprehensive Cancer Centre embraces sustainable design that Benefits the Facility throughout its usable life. Being cognizant of the scarcity of natural resources and impacts of indoor environmental conditions on building occupants, the Cancer Centre was designed as a high performance, environmentally responsible building that operates efficiently and provides a comfortable indoor environment for the occupants promoting patient, visitor, and staff wellness.

In alignment with the Project goals, the Cancer Centre achieved LEED Gold Certification under the Leadership in Environmental and Energy Design® (“LEED”) US Green Building Council (“USGBC”) Version 4 Healthcare rating system.. To provide the most value to the Project, the PCL | DIALOG + STANTEC team focused on an integrated design approach. The integrated design process began early in the RFP stage and continued through Design Development and into the Construction phase encouraging cross-pollination of ideas and optimization of the sustainable design.

The Arthur J.E. Child Comprehensive Cancer Centre design is in line with the general standards as outlined in the Project Statement of Requirements (SOR) and complies with the following standards for sustainability objectives:

- USGBC LEED Version 4 Building Design and Construction for Healthcare
- ASHRAE 90.1-2010 Energy Standard for Buildings Except Low Rise Residential
- Technical Design Requirements for Alberta Infrastructure Facilities

While the SOR only required the facility to achieve LEED Silver, the design team created opportunities that pushed sustainability targets and exceed the stated sustainability goals – Achieving LEED Gold Certification.

exceeding expectations

The new Arthur J.E. Child Comprehensive Cancer Centre was designed to provide world class cancer treatment, education and research upon its opening but also be adaptable over the lifetime of the facility, to incorporate continual change and improvements in care and research. The PCL | DIALOG + Stantec team designed and constructed the facility with that core requirement in mind at all times, creating a facility that delivers beyond the Owners Statement of Requirements.

Working closely with Alberta Infrastructure and Alberta Health Services, the facility was designed to incorporate the latest treatment and research equipment throughout.

Programming adjacencies were carefully considered to maximize efficiency of operations, and building systems include redundancy and spare capacity throughout to accommodate planned and future growth. Floor plates and services throughout the building have been designed to accommodate equipment replacement over the lifetime of the building with minimal disruption, including allowances for new major equipment to be fully installed prior to removal of outgoing equipment.

The project was delivered on-time and on-budget and represents a major advancement in design and delivery of healthcare facilities.