CIMA+

Engineering for **people**

Toronto Data Centre

Nomination for:

Canadian Consulting Engineer Awards

BUILDINGS CATEGORY

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30 YEARS

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Summary

CIMA+ was retained by Computer Rooms Services Corporation (CRSC) as the prime consultant to convert a 60-year-old 215,000 sq.ft toy warehouse into a state-of-the-art data centre with a full capacity of 50mW in less than 8 months. The renovation is designed to a LEED Gold standard, and measures in the design will work to minimize the building's carbon footprint using advanced technologies.

Innovation

Our solution to convert a 60-year-old building into a state-of-the-art data center involved innovations in design and constructability to maintain the required fast pace of the project to completely retrofit the building for the new function.

We made extensive use of BIM/REVIT and augmented visual reality software to design the complex arrangement of power and data cable infrastructure both interior and exterior to the building. CFD modelling was also critically utilized to assist in the design of dynamic airflow elements.

The key challenge to the project was schedule. Due to complicated tenancy commitments, the new data halls and all key supporting spaces needed to be completed in under 4 months. This required a fast-tracked approach to the delivery of CIMA+ services. We worked very closely with the builder to reduce timeframes for design and to minimize delays in approving approaches to the complex design requirements. The project also required a major commitment from Toronto Hydro in terms of the power requirements, which we accomplished and will see the project receiving one of the largest single power supplies on the entire Toronto power grid. We worked with the client and Toronto Hydro to coordinate this unique arrangement.


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Complexity

The delivery of the project was complicated primarily by the sudden onset of COVID-19. The effects of this included a shut-down of the City of Toronto who were amid issuing permits, and for the construction industry as a whole that went into lockdown.

Careful negotiations were carried out with the province and the City to allow the project to proceed due to its essential services nature. However, the trickle-down effects included issues related to manpower on site and extensive COVID protocols to protect the large-scale workforce; supply-chain issues with materials coming from the US and abroad; and direct client staffing needs since the majority of their workforce was located in Texas. The project provided an immediate influx of construction jobs for approximately 500 skilled trade during the COVID-19 lockdown, and when fully built will create new jobs.

Social and/or Economic Benefits

The most immediate social and economic benefits have to do with the provision of approximately 500 jobs to build the facility over the span of 6 months.

For most of that period the construction was running 24 hours a day, 7 days a week. Economically, the new facility provides a significant expansion to the Data Centre capacities offered by the client. This is even more significant with the residual effects on our cloud-based lifestyles for both work and personal realms with the pandemic.

Environmental Benefits

The benefits environmentally, included on site power generation as needed using generators, a thermally improved existing building envelope, new reflective roofing, free-cooling for the high voltage equipment installed indoors, and state-of-the-art cooling units for the server halls, and re-use of waste heat.

The building is efficiently designed to maximize the floor areas, which results in fewer staff needed to manage the facility. The facility design used elements to target a LEED Gold standard.

Key design elements such as the upgraded building envelope helps in minimizing the environmental footprint in terms of lessened energy demand. The general reuse of material from the demolition site and use of fewer resources for the project compared to traditional methods was central to major design decisions.

Meeting Client's Needs

The primary project objective was to provide a state-of-the-art data centre from the bones of the existing 60-year-old warehouse in under nine months' time from start of design to occupancy.

We put together a well experienced team of over 30 professionals and technicians in offices in Ontario, Québec and Alberta who were fully dedicated to delivering the project within the tight timeframes This also included extensive time spent on site during construction. To meet the complicated and demanding design needs, CIMA+ employed its BIM team to work closely with the client on the very complicated design of the infrastructure within the building needed to service approximately 60,000sf of server halls. The resultant REVIT model was instrumental in relaying key design and technical information to the trades during construction. To meet the timeframes needed for permitting, we worked with the client and the City of Toronto with the City's Gold Service initiative to fast track permits – particularly important as the City went into lockdown shortly after the permit applications were formalized.