Future of the Rutherford Conservatory

November 2024

UNIVERSITY of GUELPH

Content

Historical Context

Cycle of Rebuilds Since First Construction

- **Cycle 1: 1930 – Late 1960s** The Conservatory originally served as an entrance into a greenhouse complex that was constructed to support teaching and learning in the study of floriculture.
    - In the late 1960s, the building was renovated and restored to make way for the UC's service ramp and loading dock and was re-oriented to face south.

- **Cycle 2: Late 1960s – 1998** The structure continued a similar use and function until the late 1980s when its associated greenhouse were decommissioned and demolished.
    - **By 1998, the condition of the building had deteriorated to the point where a full restoration project was completed**. The restoration project was funded by the generous philanthropy of the Rutherford Family.

- **Cycle 3: 1998 to Fall 2022** – Following restoration, the building gradually shifted from educational and research use to an ornamental structure for public enjoyment.
    - The site was then further readapted and became an ornamental plantings display for public access and enjoyment.
    - For the past 15 years, the Conservatory has served no academic or research function.

- **Current status: Fall 2022 to present** – The building began showing signs of another cycle of rot, forcing closure for the safety of the public in 2023.
    - Two independent structural engineering assessments found **the rot of the wooden elements was significant and widespread to the point where a full rebuild of the replica structure was required**.
    - In November 2023, the second structural engineer recommended the Conservatory be closed to the public as a safety precaution.
    - Following closure, U of G commissioned a third and final structural and building code assessment; the Grinham/Tacoma Report, that confirmed previous findings.

Structural Challenges

Three independent assessments showed an extensive restoration effort is needed to rebuild the structure.

Wood

- Estimated that 10% or less of the wood is original due to previous rebuilds and limited life cycle
- Even with a full restoration effort, the use of wood in a greenhouse structure will limit the life cycle of the building due to moisture, rot and decay.
- **This will be a constant problem for any version of the building going forward.**

Steel

- The steel framework must be significantly reinforced to bring the building up to code and ensure it can withstand winter weather conditions.
- Structural engineers recommend adding **three times more steel** than currently exists, which could impact the look of the building.

Glass

- The current glass panes are too brittle and not current best practice.
- All glass would have to change to wired or tempered glass, **removing any original panes that may still remain.**

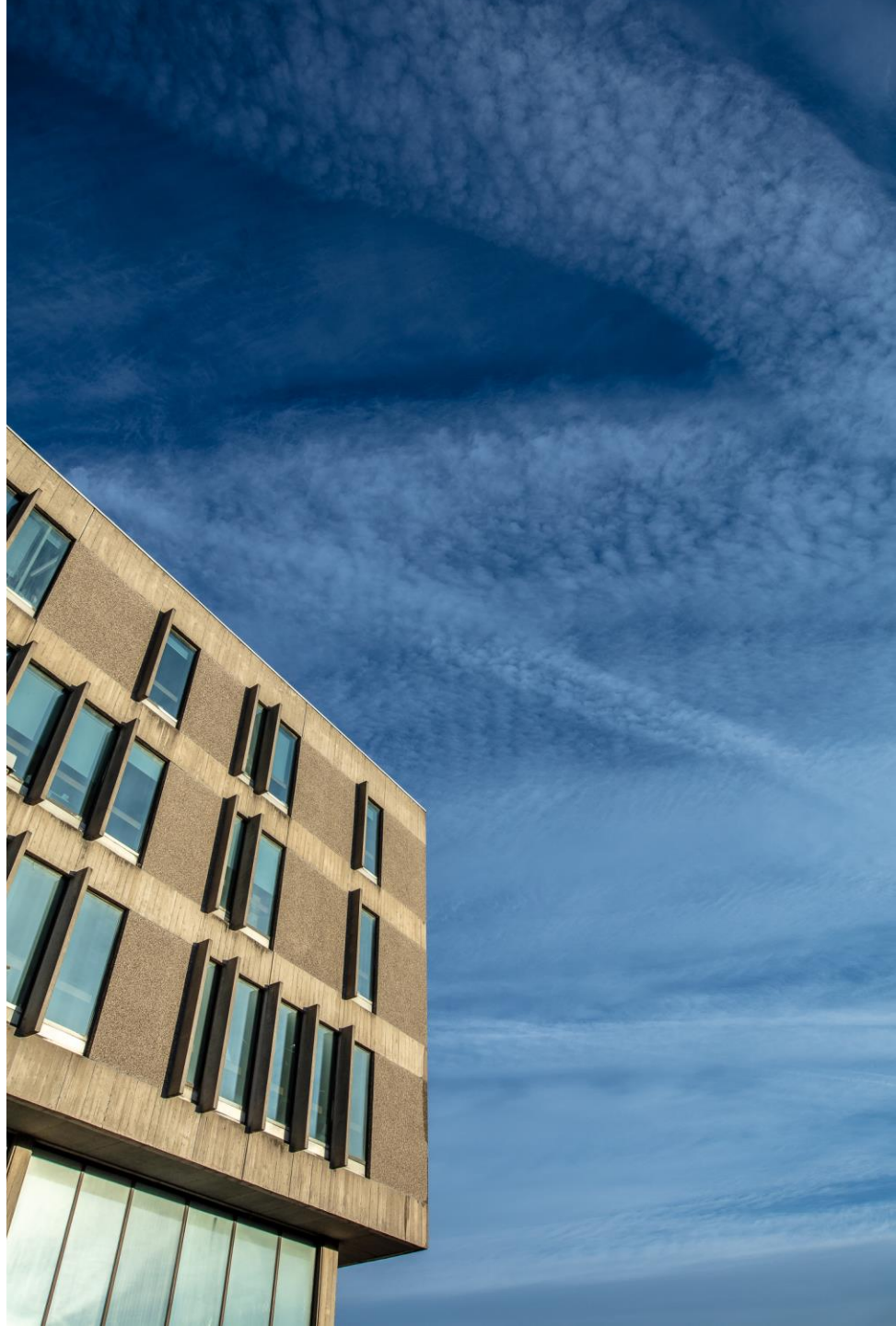
Financial Constraints

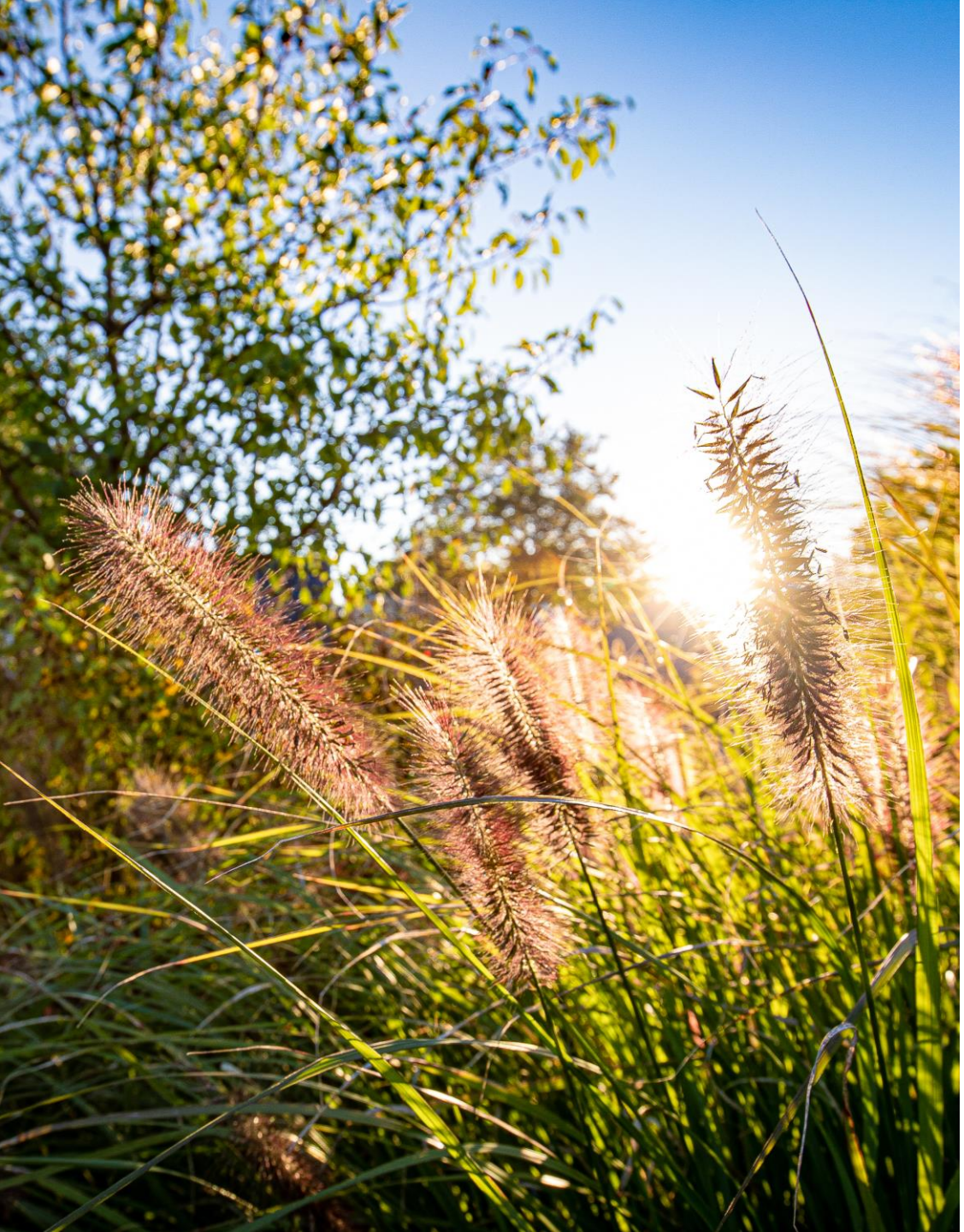
- U of G has **limited financial resources and cannot invest in projects that do not serve our academic or research mission**

- **U of G is projecting our 5th consecutive operating budget deficit**
  - Due to increased expenses with limited tools to generate revenue

- Additionally, U of G currently has **$430 million** in **deferred capital renewal & (major) maintenance requirements** across its campus consisting of **150+ buildings** totaling more than 6 million square feet.
  - Includes required investments in **academic teaching & learning spaces, research spaces, student housing, and other spaces vital to our core mission.**
  - To return campus to a state of 'good condition' would require in excess of $120 million annually, for the next 10 years

- Given our current financial situation, **strategic investments** must support our key priorities
  - **Academic and research facilities**
  - **Support for student mental health**
  - **Student housing**





The Next Life Cycle

The University of Guelph
Commemorative Garden

Goals of the Garden:

- Tell the story of the University's agricultural beginnings
- Support a gathering place for U of G students and the community
- Generate student and community engagement
- Honour the history of the conservatory and U of G's agricultural heritage

Our Path Forward

Designed by the Guelph Community – For the Community

We will consult with U of G students, faculty, and staff to make sure that the space meets the needs of our community.

January 2025: launch a design competition for students in the landscape architecture program to submit their plans for the commemorative garden

Celebrating the Past

Where possible we will explore opportunities to use materials from the existing structure and incorporate them into the design

Will honour the original donors who contributed to the refurbishment of the conservatory in the garden so that their contribution to the University is preserved as well

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Our Ask: Support the Garden

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Support the University and allow for the space to continue to evolve in a way that meet campus needs now and serves the next generation – **Vote against a heritage designation for the Conservatory**

The Grinham/Tacoma Report:
Structural Condition

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- Tacoma Engineers completed an assessment in July 2024
- The 40’ x 40’ building is steel framed with primary steel frames (vertical), secondary frames (horizontal) and wood mullions and rafters supporting float glass
- **Conditions:**
  - 75% of wood framing was in poor condition
  - Steel framing was in good to fair condition with localized areas of steel corrosion with up 10% section loss
  - Float glass was broken or displaced in several locations
- **Recommendations:**
  - **Restrict access to the building to mitigate against the risk of falling material.**
  - Replace all deteriorated wood framing and review the replacement of glass with a material of increase fracture resistance prior to the onset of winter
  - Clean, prepare and paint steel framing to mitigate against further section loss in addition to structural capacity recommendations for a proposed change of use.

TACOMA ENGINEERS

The Grinham/Tacoma Report:
Change of Use Assessment: Structural Feasibility

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- A proposed change of use would constitute a significant increase in loads (2.7x snow load); therefore, justification of structural adequacy of the building is required.
- Tacoma Engineers completed a structural model of the steel frame to review the structural capacity as part of this scope of work.
- Reinforcing of steel frames would be required to support the increase in load.
- Although possible, reinforcing the structure by enhancing existing member properties (strength, stiffness) is likely not feasible.
- Modern standards would necessitate the use of glass with an increase fracture resistance (tempered, annealed, laminated) which should be reviewed in a reinforcing campaign.

TACOMA ENGINEERS

The Grinham/Tacoma Report:
Change of Use Assessment: Architectural Feasibility –

- Recent and potential future use of the Conservatory for public access and enjoyment could not be deemed “farm use” under the definitions of the National Farm Building Code and would therefore be subject to compliance with the Ontario Building Code.
- Continued future use would need to be assessed in the context of a “Change of Use” per O.B.C. and in particular with respect to regulations applicable to an Assembly (A2) Occupancy.
- Part 11. of the O.B.C. is applied to the renovation of existing buildings; and is first categorized as a “Basic” or “Extensive” renovation. The *decrease in Performance Level* resulting from the *increased Occupant Load* points to an “Extensive” assessment.
- Specific O.B.C. requirements are further informed by the project’s assessment as either a Small or Large renovation as determined by the extent of the work beyond any minimum structural repairs.

**Low human occupancy* (as applying to farm buildings): “means and occupancy having an occupant load of not more than one person per 40m^2 of floor area during normal use”

**Farm building*: “a building or part thereof which does not contain a residential occupancy, and which is associated with and located on land devoted to the practice of farming and used essentially for the housing of equipment or livestock, or the production, storage or processing of agricultural and horticultural produce or feeds.”

GRINHAM ARCHITECTS

Heritage Attributes

The University’s position on some of the City-identified heritage attributes

The location of the Conservatory within the designed landscape of the botanical gardens

- The Conservatory is not in the same orientation it was when first built. It was re-oriented in the late 1960s to make way for the University Centre service ramp.
- The surrounding gardens and designed landscape have only existed in its current form since the 1990s when the complex of working greenhouses, once connected to the Conservatory, were removed to facilitate their installation.

The steel framing

- The recent structural and building code assessment identifies that the Conservatory's steel framework needs to be significantly reinforced to satisfy required snow loading. Historic steel, such as that used to fabricate the Conservatory in the 1930s, generally has a higher carbon content than steel used in modern structures making it difficult to weld. It should be assumed that bolted connections will be required for any reinforcing work and that this would add complexity to a reinforcing campaign.

The walls, including wood, steel, and glass material

- Wood should not be used in greenhouse construction. Wood does not last when exposed to the extreme interior/exterior temperature differentials and constant high humidity levels. These conditions have caused widespread rot of the Conservatory's wooden elements. This same widespread rot was the catalyst for the previous two Conservatory rebuilds in the late 1960s and 1990s. The wooden elements limit the Conservatory's service life to 25 to 30 years.
- Given the brittleness of the existing float glass and in the interest of meeting best practice as well as considering the ongoing (public) assembly occupancy, it would be prudent to upgrade to a more fracture resistant glass; laminated or wired, when reworking the rafters and mullions.

Heritage Attributes

The cyprus wood mullions and rafters

- The current cyprus wood mullions and rafters are likely not original having been replaced in previous rebuilds due to the shortened lifespan given building interior environmental conditioning and moisture content.

The fenestration, with wood-framed windows, and transoms

- Should a restoration effort be considered, the fenestration of the window areas and transoms will mostly like change with the introduction of new steel members needed to satisfy the structural reinforcing requirements.
- The fenestration is also created by the wooden elements which history has shown are destined to fail. It is not practical from a maintenance and financial standpoint for the University to continue to restore the structure with wood.

The iconic 4-sided glazed dome with curved trusses

- The glazed dome may need change because of the potential need to reduce the Conservatory's total glazing area to achieve current energy efficiency requirements.

It is important to note that the required structural reinforcing will create a much heavier structure. The introduction of significantly (3+ times) more steel added to the interior will alter views from both the interior and the exterior of the Conservatory.