# UNIVERSITY OF TORONTO SCARBOROUGH ACCESSIBLE VALLEY LAND TRAIL

1265 Military Trail

## KEY MAP


## PROJECT DESCRIPTION

The Highland Creek valley is a defining feature of the University of Toronto Scarborough Campus (UTSC), affording opportunities for passive recreation and an experience of nature for students, faculty and the wider community and serving as a "living laboratory" for teaching and research. Schollen & Company Inc. was retained by UTSC to design and oversee the implementation of a fully-accessible trail to provide people of all ages and abilities with the opportunity to access the Highland Creek valley from the core of the campus. The 600m long serpentine trail was designed with cantilevered boardwalks that "float" above the forest floor, resulting in an experience of the tree canopy that is fully accessible to all. The trail and boardwalk segments descend from the UTSC into the natural ravine environment, providing a critical connection between the campus and a vast expanse of parkland and the Highland Creek trail system.

The project included habitat enhancements to benefit the diversity of species that are native to the area. Portions of the trail required technically innovative solutions, including three boardwalks that are elevated to match the height of the canopy of the existing mature trees in response to the geological and physiological nature of the ravine system.

The project resulted in the creation of a state-of-the-art, fully- accessible trail connection between the campus and valley that the media has described as "breathtaking" and a "new landmark" within the City of Toronto.

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## CORE VALUES

**Culture and Cultural Heritage**
Respond to the cultural heritage features of the site and enhance campus culture.

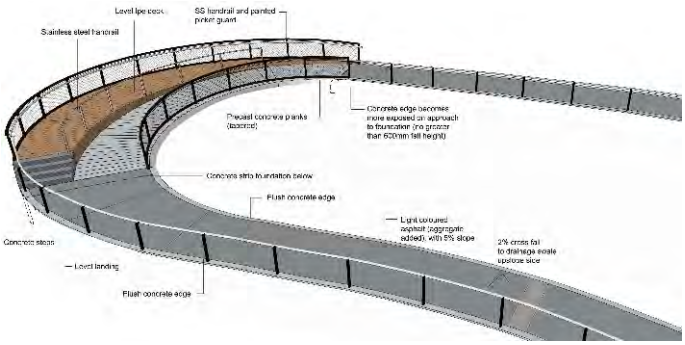
**Natural Heritage**
Respect and respond to the natural environment in design and materials.

**Experience**
Celebrate and interpret the unique qualities of the site and heighten the experience of the ravine.

**Accessibility**
Provide full accessibility for students, faculty and visitors of all ages and abilities.

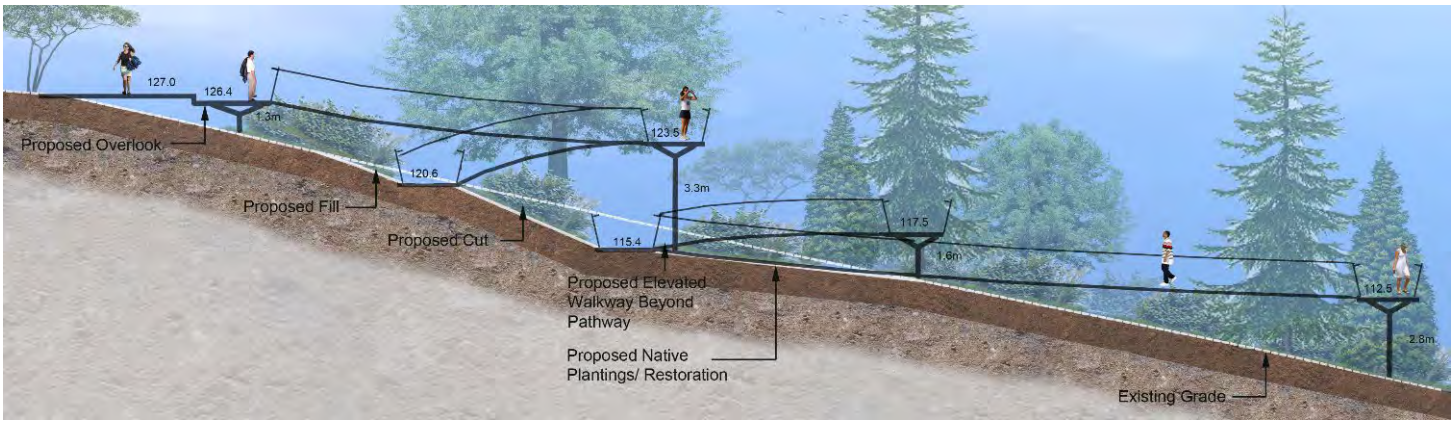
## DESIGN ADVISORS

- University of Toronto Design Review Committee UTSC Faculty & Students
- UTSC Director of Accessibility UTSC Indigenous Elder
- City of Toronto - Urban Forestry
- City of Toronto - Ravine and Natural Features Protection Toronto and Region Conservation Authority (TRCA)
- TRCA Archaeology




## DESIGN GOALS

- Create a safe and accessible connection to the broader regional trail system within the Highland Creek watershed.
- Conserve, protect, regenerate and celebrate the natural, historical and cultural heritage of the ravine environment.
- Promote nature-based recreation and education and capitalize on opportunities for learning and research related to ecology, biology and the culture and the heritage of Indigenous peoples.
- Utilize innovative construction methods to minimize disturbance to the sensitive ravine environment.
- Optimize ecological and social benefits and enhance resilience in response to climate change and enable wildlife movement to occur unencumbered beneath/across the trail.
- Afford a unique experience of nature that celebrates the relationships between UTSC and the valley.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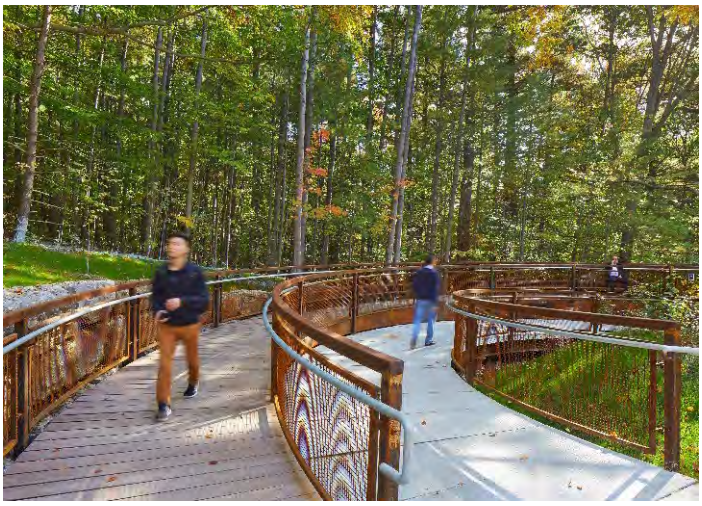
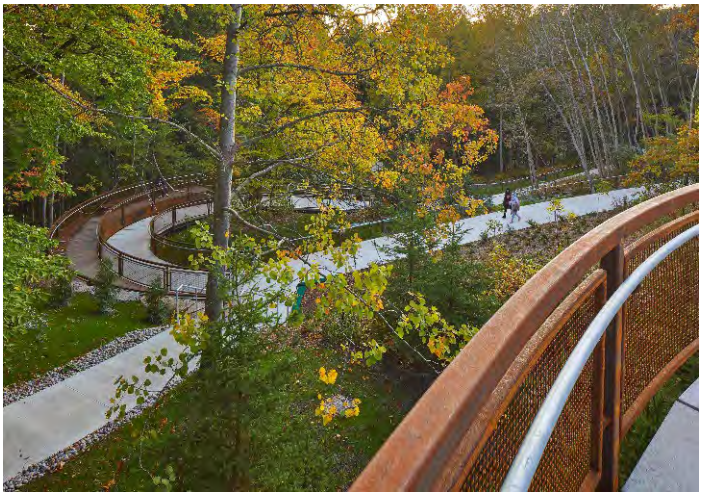
## THOUGHT PROCESS

The ambition to create a fully-accessible trail that descends 22m down into the valley posed a number of unique challenges. To achieve the maximum 5% gradient, the trail would need to extend for a length of over 600m. In response, the serpentine switchback configuration was required. However, in order to implement the prefabricated modular construction method effectively, it was essential that the various components be standardized in shape and dimension, while still achieving an organic and natural trail configuration. In order to minimize construction disturbance, the trail was designed to "float" above grade rather than being carved into the slope.





## FEATURES

The design of the trail was crafted to balance several key objectives:

- Addressing fundamental slope stabilization requirements, since the trail traverses 22m in vertical height;
- Achieving conformity with the Accessibility for Ontarians with Disabilities Act (AODA);
- Mitigating impacts to the Environmentally Significant Area (ESA); and,
- Providing an all-season link between the campus and the Highland Creek Valley trail system which connects to the Lake Ontario Waterfront Trail.

Three bi-level cantilevered boardwalks which are elevated up to nearly 6m above the ground are the most unique aspect of the project, providing impressive views of one of the most biodiverse and mature forest environments in Toronto.

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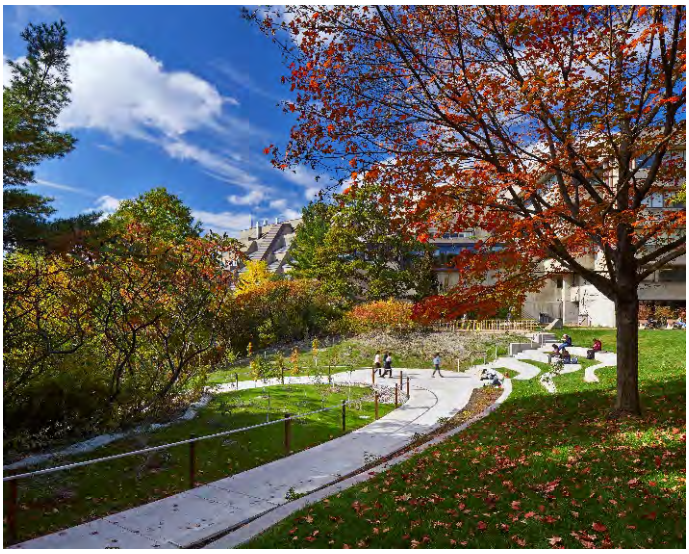
## ENVIRONMENTAL CONSIDERATIONS

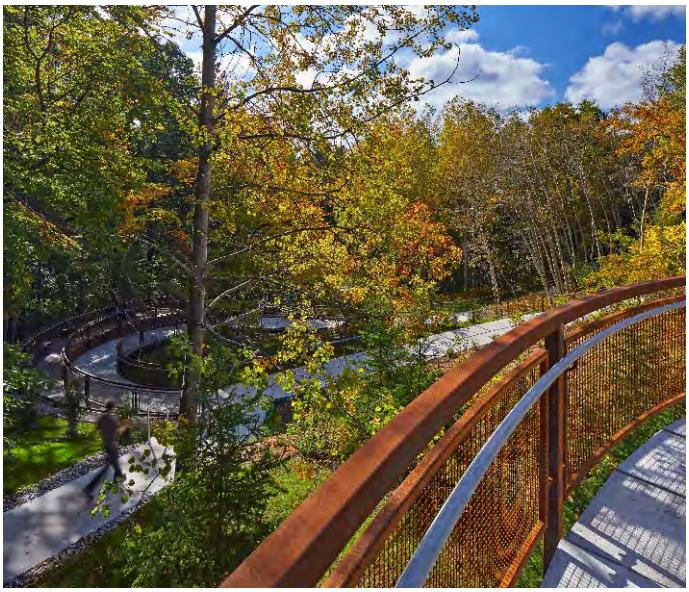
Located adjacent to an Environmentally Significant Area (ESA), the UTSC Valley Land Trail contributes to the protection of the surrounding natural areas by providing a safe and defined path of travel for users to traverse the steep valley wall. Specific studies and initiatives were implemented as part of the project to preserve habitat for bats and a rare variety of sedge that was discovered during the field inventory stage.

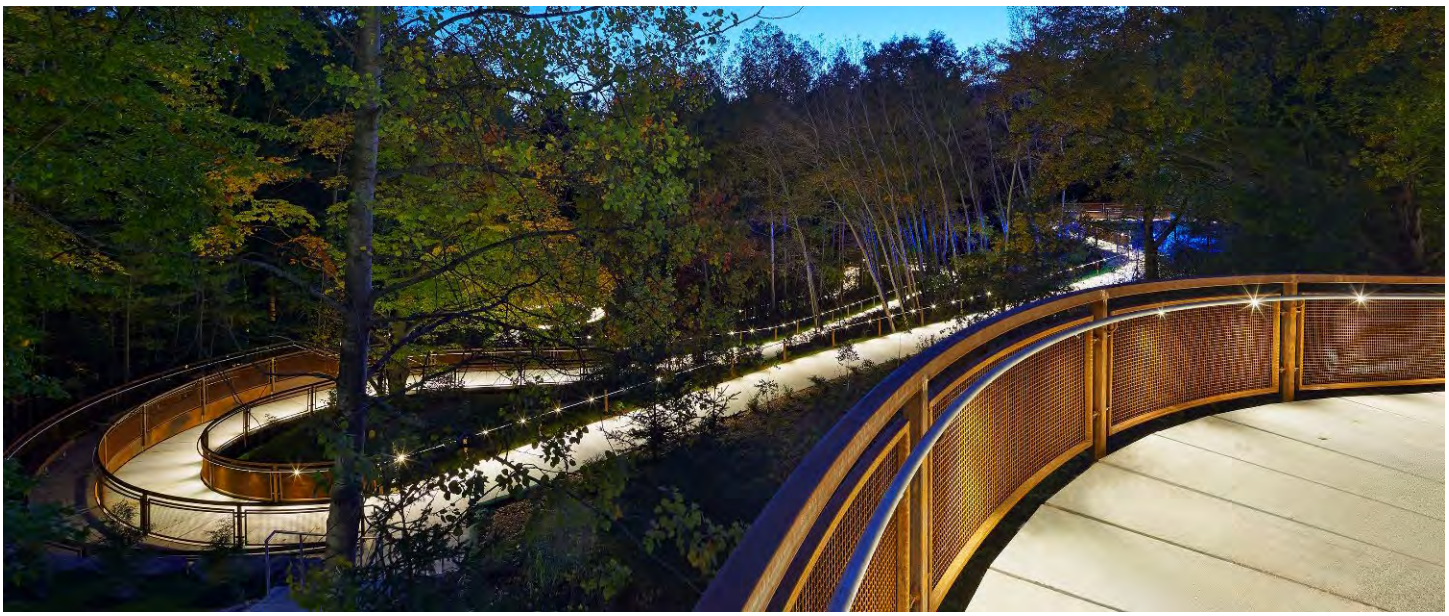
The design the trail of was informed by a comprehensive inventory of existing natural heritage features and habitats. The alignment of the trail was configured to protect significant trees and sensitive features. For example, several 80+ year old American Beech trees were preserved to provide habitat for rare bats and are a key focal point of the trail.

A number of natural habitat enhancement initiatives were implemented in conjunction with the construction of the trail, including the following:

- The removal of invasive species;
- The planting of native trees, shrubs and ground covers that are indigenous to the Highland Creek Ravine; and,
- The installation of habitat features and plants to support wildlife.







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## ACCESSIBILITY

To achieve the goal of creating a trail-link that can be utilized by all persons in an equitable manner, the UTSC Valley Land Trail exceeds the requirements of the AODA. The design of the trail was guided by input from the UTSC Accessibility Committee. The project is one of the largest and most important initiatives to be undertaken by UTSC to improve accessibility on campus. To optimize accessibility, the trail encompasses the following features:

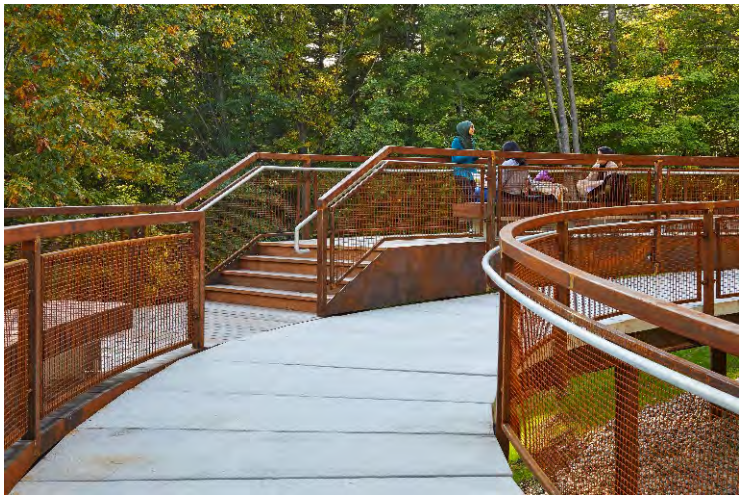
- A charging station for electric mobility devices;
- Resting areas at key locations;
- A maximum longitudinal slope of 5%;
- Continuous handrails;
- Illumination along the length of the trail; and,
- Seating areas to accommodate mobility devices that are integrated to social gathering spaces.

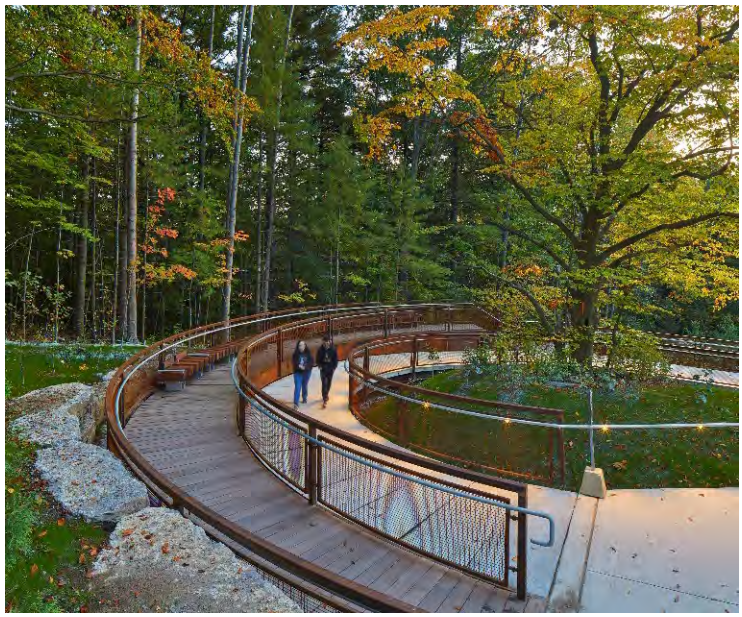
## MATERIALS

**Boardwalk** - The "Permatrak" concrete boardwalk plank system was selected for its modularity and simplicity in installation. Permatrak contains recycled concrete content and has a 50-75 year life span, which will result in a reduction in maintenance costs for the University.

**Corten Steel** - A corten steel substructure was designed to support the complex cantilevered boardwalk system. The natural appearance of the material creates a cohesive transition between the built form and ravine setting.

**Illumination** - A low voltage LED lighting system was embedded in the handrail along the entire length of the trail. This unique low voltage lighting system illuminates the surface of the trail without impacting the natural ravine environment, affording full access from dusk until dawn and tracing the trail with a ribbon of light.





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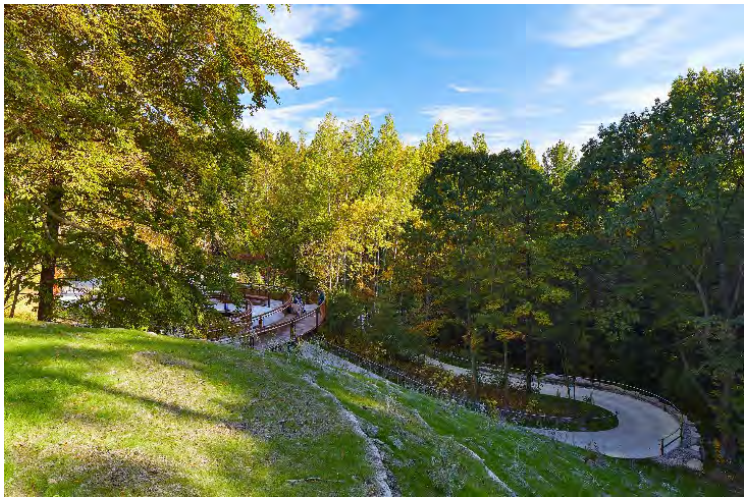
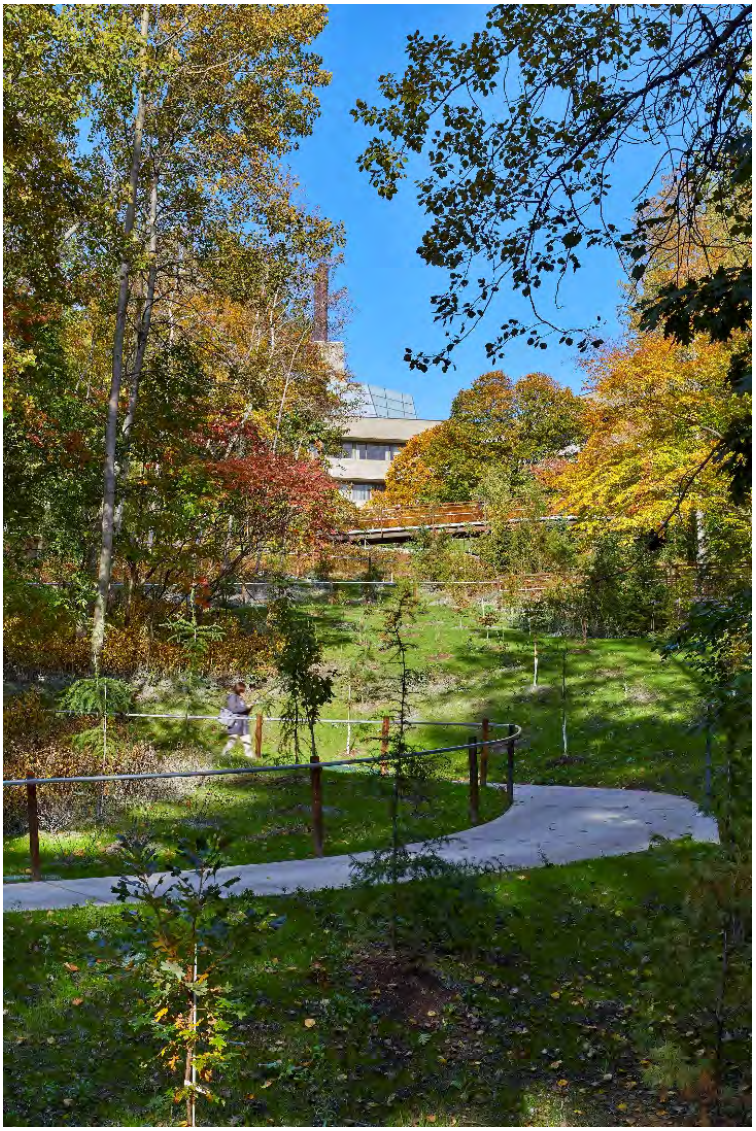
## RESTORATION AND SLOPE STABILIZATION

A comprehensive valley restoration plan was implemented in conjunction with the trail. This restoration plan included enhancement of terrestrial habitat, planting of locally-appropriate trees and shrubs and the installation of native seed mixes to establish herbaceous vegetation to enhance slope stability. To ensure slope stability over the long-term, soil erosion protection initiatives were implemented to reinforce the steep slope upon which the trail rests, including the installation of over 150 soil screws. To enhance the natural heritage system, vegetation was restored by planting over 600 native trees and 5000 native shrubs. The restoration effort was focused on the Oak-Pine forest, which is dependent on high light levels. This vegetation community is dominant on the upper slopes of Toronto's ravines, but it is becoming more rare in the City of Toronto since native understory is being overtaken by mesic species, such as Beech and Maple.





## EDIBLE LANDSCAPE

Native plants are located along the trail to create an "edible landscape." The species that were planted also contribute to slope stabilization, provide food for wildlife and contribute to the natural aesthetic of the trail. The concept of incorporating an edible landscape was proposed to bring awareness to the need for food security in the City and to support the UTSC Culinary program. Over 200 edible shrubs and 500 edible perennials were planted along the trail. The edible landscape is the first of its kind in Toronto that is fully accessible.

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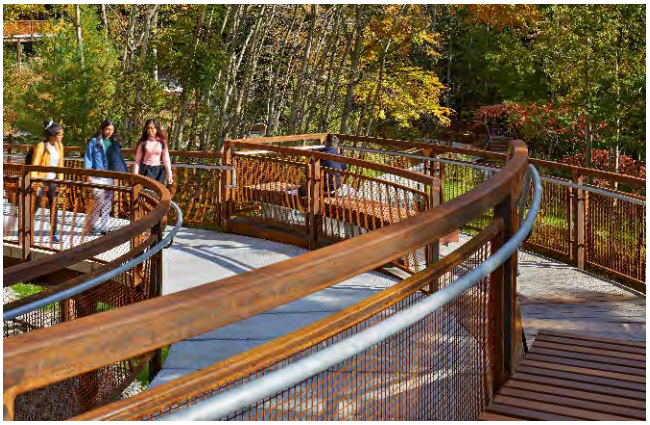
## COMMUNITY INVOLVEMENT

The process of designing the trail involved UTSC faculty, students and members of the community. The stakeholder group included UTSC Accessibility Committee and representatives from First Nations who informed the initial design vision and provided input throughout the design and construction processes. UTSC faculty, management staff, campus police and representatives from various departments, including environmental studies and biology, were consulted throughout the design process. Restoration plantings were implemented by student volunteers as a component of the construction process.

Over 100 students that are involved with the Regenesis Community Environmental Organization (RCEO) participated in campus community-driven volunteer events. RCEO continues to be involved with the planting, restoration and harvesting initiatives associated with the trail that are undertaken by UTSC.



## CONSTRUCTION INNOVATION

The site of the trail is both sensitive and complex. In response, the design incorporated innovative construction solutions to enhance slope stability and minimize disturbance to the valley. These innovative construction methods included the following:

- Modular construction using prefabricated components that could be constructed off site and assembled in place;
- The use of “Permatrek” precast concrete panels that were cast in the required shapes and configurations and installed with a crane to create the elevated walkway segments.
- Low voltage, in-railing lighting to illuminate the trail while minimizing light stray into the adjacent wooded areas; and,
- The use of “soil screws” to reinforce an existing unstable slope and achieve the required factor of safety to support the installation of the trail.

The implementation of these methods enabled the construction of the trail with a minimum of disturbance to the adjacent ESA.

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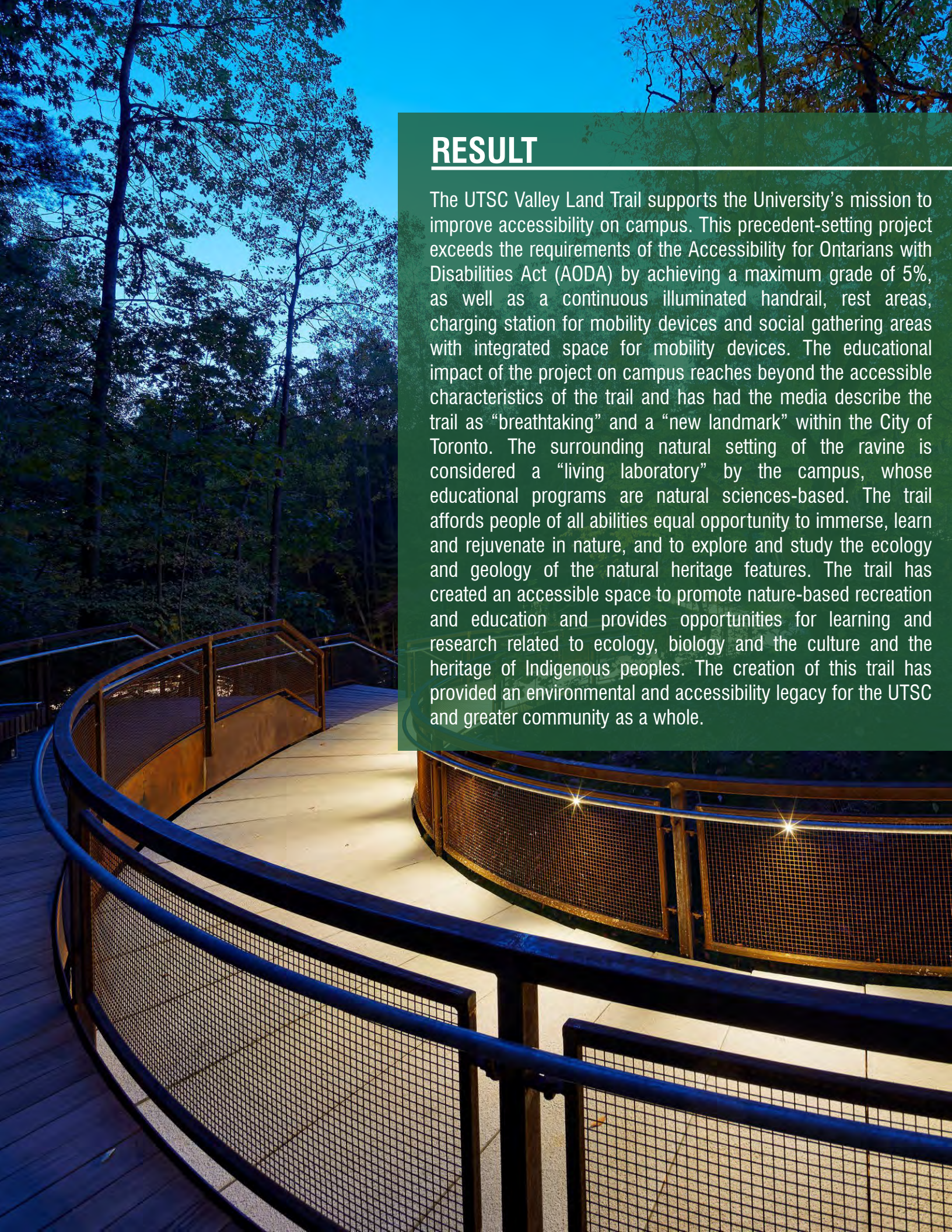

## RESULT

The UTSC Valley Land Trail supports the University's mission to improve accessibility on campus. This precedent-setting project exceeds the requirements of the Accessibility for Ontarians with Disabilities Act (AODA) by achieving a maximum grade of 5%, as well as a continuous illuminated handrail, rest areas, charging station for mobility devices and social gathering areas with integrated space for mobility devices. The educational impact of the project on campus reaches beyond the accessible characteristics of the trail and has had the media describe the trail as "breathtaking" and a "new landmark" within the City of Toronto. The surrounding natural setting of the ravine is considered a "living laboratory" by the campus, whose educational programs are natural sciences-based. The trail affords people of all abilities equal opportunity to immerse, learn and rejuvenate in nature, and to explore and study the ecology and geology of the natural heritage features. The trail has created an accessible space to promote nature-based recreation and education and provides opportunities for learning and research related to ecology, biology and the culture and the heritage of Indigenous peoples. The creation of this trail has provided an environmental and accessibility legacy for the UTSC and greater community as a whole.