

# TRANSFORMATIVE RENEWAL AND URBAN SUSTAINABILITY

Susan Spencer Lewin<sup>1</sup> and Craig Goodman<sup>2</sup>

## INTRODUCTION

*A key tenet of sustainable urban development is adaptive reuse, which is the practice of reusing existing infrastructure for a purpose other than for what it was built. Communities have much to gain from the adaptive reuse and transformative renewal of the older built fabric of the city. Retaining older buildings has environmental benefits as it bypasses complete demolition and reconstruction, and conserves the considerable embodied energy stored within the structure. Adaptive reuse is a key environmental factor in land conservation and the reduction of urban sprawl, as it promotes the reuse and revitalization of downtown and inner city sites. Existing buildings highlight the social character and identity of a community through the retention of the irreplaceable historic fabric. Existing buildings promote a strong and vibrant sense of place, leading to increased citizen engagement. Economic benefits can follow as the adaptive reuse and revitalization creates renewal, new uses, and captures the value of the existing building stock, creating a spur to the local economy. For these reasons, the adaptive reuse of existing and historic buildings is an essential component of sustainable urban development.*

*This article will review a case study of the new downtown campus for the University of Windsor and the use of three existing historic buildings as a relevant adaptive reuse strategy toward inner city regeneration and revitalization. The overall strategy for urban sustainability will be reviewed, as well as specific issues and opportunities for each of the three projects.*

## KEYWORDS

University campus renewal, city revitalization, transformative renewal, adaptive re-use, sustainable urban design, public realm design, catalyst site, heritage reuse

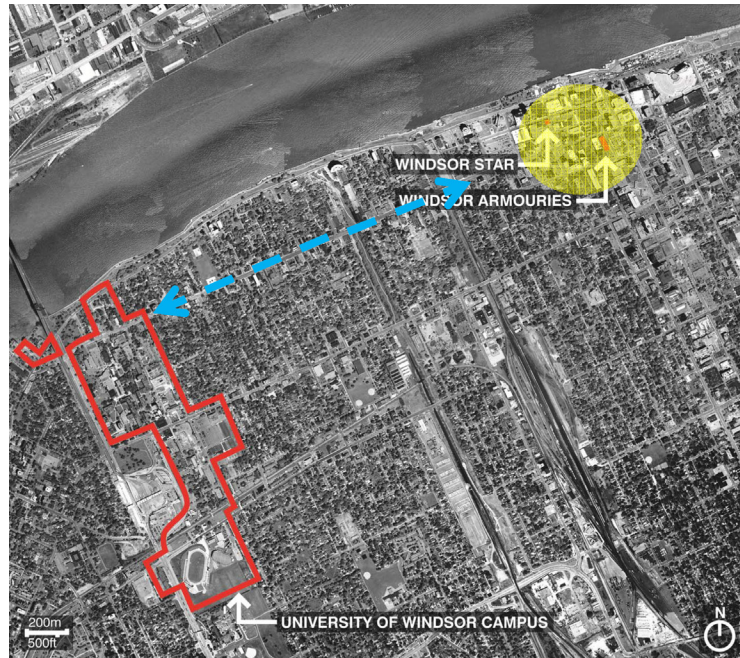
## UNIVERSITY OF WINDSOR DOWNTOWN CAMPUS

The University of Windsor has agreed to become a vibrant partner in the revitalization of Downtown Windsor by creating a new downtown campus. The proposed interdisciplinary academic and arts facilities offer vital opportunities for partnerships in advancing the city's ongoing revitalization strategies, while capitalizing on the iconic qualities of three heritage properties: the 1902 Armouries landmark historic property; the 1940 Art Deco Greyhound

<sup>1</sup>OAA, LEED BD+C, ND, Principal, CS&P Architects, <http://www.csparch.com>, [slewin@csparch.com](mailto:slewin@csparch.com)

<sup>2</sup>OAA, LEED BD+C, Principal, CS&P Architects, <http://www.csparch.com>, [cgoodman@csparch.com](mailto:cgoodman@csparch.com)

Existing Campus and new Downtown Campus.



Downtown Campus Context Map.

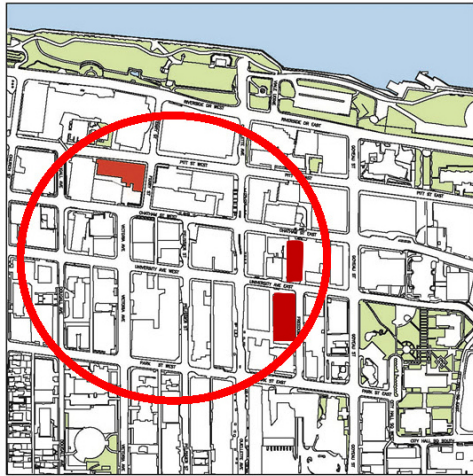


Bus Depot; and the iconic 1927 Windsor Star building. As shown in other urban centres, this downtown campus project will serve as an economic catalyst to initiate a vibrant urban centre, one that will assist in increasing activity and vitality within the downtown Windsor core, along with the other new downtown presence of St. Clair College and the new City recreation and performance facilities.

Context plans show a five minute walking radius comparison for the new downtown campus and the existing campus, revealing a significant discrepancy in green space between the two. Reclaiming and recreating open and green space within the new downtown campus is a major driver of the urban design.

A key aspect of the inherent value of these existing building components is the historic relevance to the existing downtown streetscape and its place within the community memory. Adaptive reuse of these existing heritage buildings will encourage both a refreshed outlook for the university, as well as a sense of almost immediate belonging within the downtown urban

New Downtown Campus Context Map



Existing UW Campus and Green Space



fabric. Further, the reuse of a fine older building such as the Armouries allows the interior infrastructure systems to be retrofit to current standards, while incorporating its already existing durable and finely detailed architectural elements. Retaining buildings like this follows best practices in sustainable design, and helps to reinforce Windsor's sense of place and the University's position as a pillar of the city.

The University will occupy the former Windsor Armouries and former Windsor Bus Depot for the new integrated School for Arts and Creative Innovation faculty, which combines the existing Visual Arts and the Film Studies programs into one integrated faculty. The Windsor Star building will be used for the School of Social Work and the Centre for Executive and Professional Education (CEPE). The university is moving these programs of study to the downtown core area as a first stage to the new campus location. Each of these faculties will be moving from a variety of specific facilities sprinkled across the current university campus and is expected to create a dynamic critical mass of student synergy in the downtown core. These locations will accommodate a combined total of approximately 1,000 students. Students, staff, local residents, and visitors will benefit from the increased exposure to an integrated academic and arts resource. The move is phased and construction on the Windsor Star commenced in Fall 2013, with completion of the whole project scheduled for 2016. CS&P Architects has been retained as lead architect and designer.

## EXISTING BUILDINGS ISSUES AND OPPORTUNITIES

### *Armouries*

The existing Windsor Armouries building is a composite structure on a prominent downtown corner at University Ave and Freedom Way made up of a shed building originally built in 1902, along with a multi-storied addition at the south end built in 1937. The original building is a striking two-storey red brick Richardson Romanesque building featuring a unique octagonal castellated turret at the northeast corner relating to the primary street intersection. Cut limestone features embellish the feature entrances. The existing building provides a total of approximately 46,400 sf over three levels.

North Side of the Armouries along University Avenue



West Side at Lane Looking South

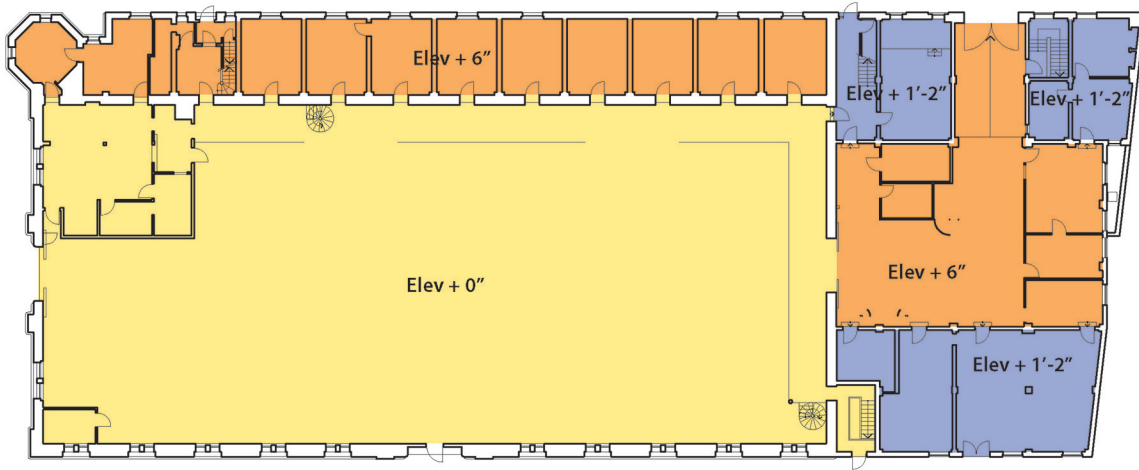


East Side at Freedom Way Looking North

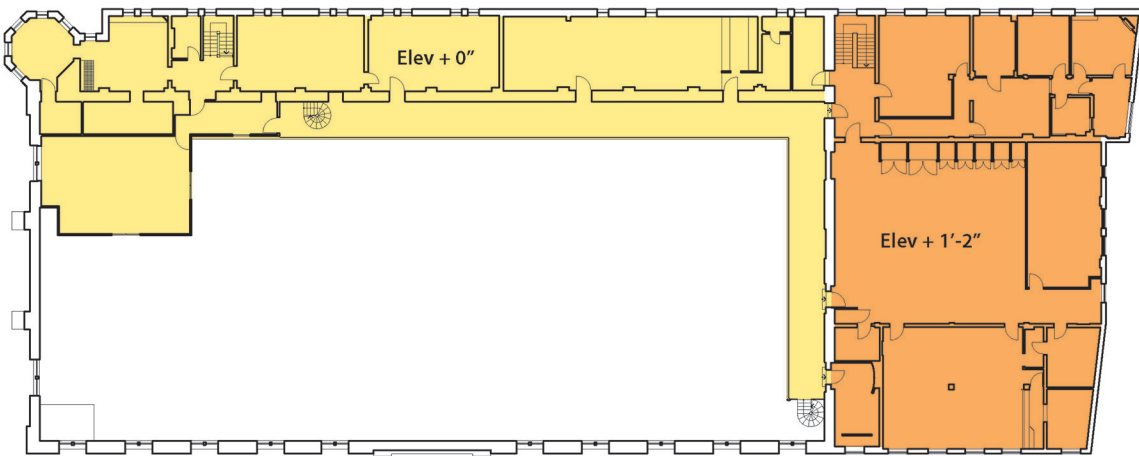


This will be a public facility that engages the academic roster of activities with an inviting and accommodating series of community access and student spaces, and will have a need for inherent universal accessibility. Aspects of the existing building offer obvious challenges to the intended new program of uses. The existing south wing of the building, constructed in 1937 as an addition, does not match the floor levels of the Armouries on any of the three levels. Many areas of the existing buildings are not aligned with grade-level access, and there are various steps at entrances around the building.

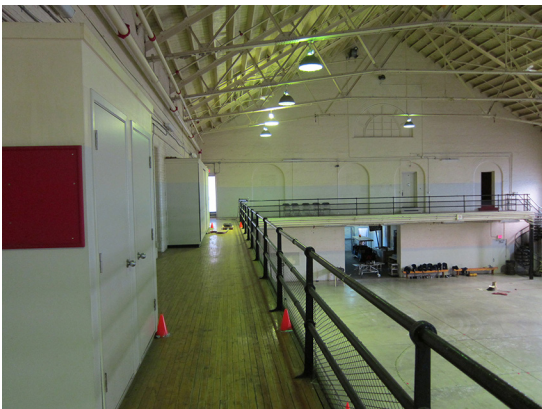
Existing Ground Floor Levels



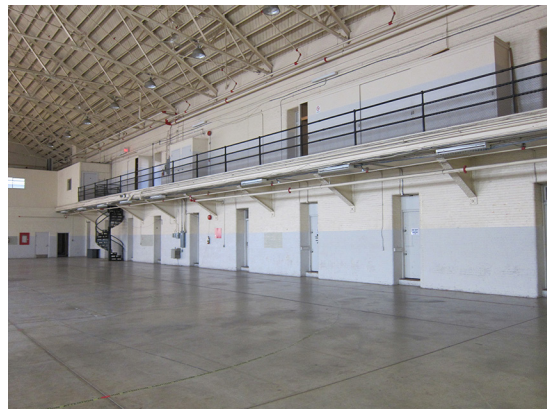
Existing Second Floor Levels



Existing Drill Hall Looking South



Existing Drill Hall Looking North



## Depot

The Windsor Bus Depot was completed in 1940 and operated by Greyhound Lines. The architectural style has been described broadly as ‘Streamline Moderne,’ a late form of Art Deco. The emphasis on the horizontal line and form, with flat roof and the circular motif applied at the corners and metal windows, are particularly emblematic of this style. Historic photographs and drawings show clean and restrained detailing of material transitions, with light stone walls. Many of these features have been obscured by the application in the 1970s of metal cladding at the second floor and a hard cement-based type of pebble-dash at the lower façade. The building has been vacant and unheated for many years.

For the downtown campus project, the bus depot site will be an integral part of the School for Arts and Creative Innovation facility, utilized for film production, studio, and related uses. The historic bus depot south facade will be retained *in situ* and restored, and the original stone facade and fenestration on University Avenue will be restored as part of this restoration project. The original iconic marquee sign of the Greyhound Bus Depot will be recreated. Just north of the Bus Depot is the Chatham Street Parkette, which was donated by the city to the Downtown Campus project to expand the public realm and open space available for the project.

Historic South Depot Façade



Existing South Depot Façade



## Windsor Star

The existing building is a composite structure on a prominent downtown corner at Pitt and Ferry Streets comprising three interconnected buildings of different ages and structural systems, which the Windsor Star newspaper facility acquired at different stages during its history. Each of the buildings is three stories with a below-grade basement. The northeast corner building, featuring the key principal entrance and administrative spaces, was constructed in 1927 specifically for the Windsor Star. It is clad in limestone with double height arched windows. Adjoining to the south along Ferry Street is the older 1918 wing. This is a red brick clad building and was originally constructed as a multi-unit residential block, locally called the ‘Apartment Building.’ Also adjoining the 1927 structure, further west along Pitt Street, is the 1953 addition, originally built as a printing press hall and warehouse. The combined area of the adjoining three buildings is equivalent to approximately 22,000 square feet per floor for a total of 66,000 sf above the basement.

1927 and 1953 Windsor Star Building



Rear of 1953 Windsor Star Building



1927 Windsor Star Building



1918 Apartment Building



The carved limestone façade with arched bronze windows uses particularly fine materials, indicating that the building was intended to be a recognized landmark in a well-established city. The corner 1927 building and the 1918 apartment building are both listed on Windsor's Heritage Properties Inventory and are protected under the City's Official Plan. These facades are the key identified features.

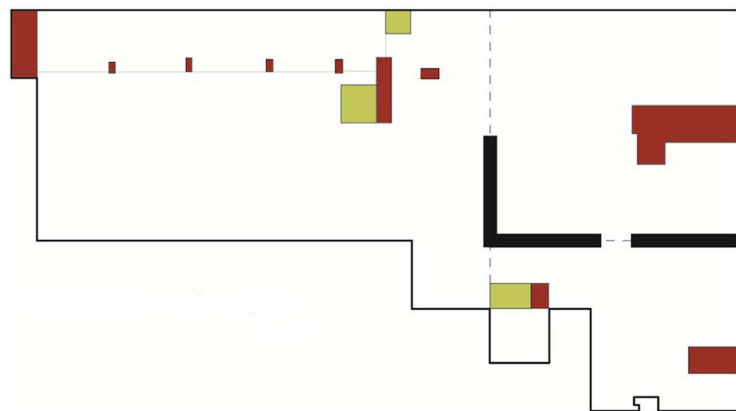
There is a desire to make this a truly public facility that engages the academic roster of activities with an inviting and accommodating series of community access spaces. The existing conditions of multiple split-floor levels with transitions only provided through the use of internal stairs is problematic for the universal accessibility required. The existing structures present considerable challenges due to limited floor-to-floor heights. These floor heights would offer little flexibility to plan and install centralized mechanical distribution systems that are appropriate for the new academic and administrative functions.

As the floor-to-floor heights were fixed, and the existing structure was quite deep, there were limited areas available for the distribution of the required new air-handling equipment, piping, and other necessary services. To offset these difficult 'found' conditions of the existing structure, new building replacement alternatives were developed that could retain the same floor-to-floor heights but achieve the spans in a more compact efficient structural assembly.

Existing Ground Floor Levels



Existing Fixed Floor Elements (Obstacles)



This design approach offered a considerable improvement to floor plate efficiency, ceiling heights, and full accessibility to grade and between levels. The final design chosen was a new building plan, which retains the heritage façades only of the 1918 and 1927 Windsor Star Buildings, and completely demolishes the 1953 building wing.

### ***Design of the New Downtown Campus***

From the analysis of the existing buildings and their urban context, as well as through a series of in-depth discussions with the stakeholders from the existing School of Visual Arts, Film Studies, School of Social Work, and the Centre for Executive and Professional Education, the CS&P Architects developed the designs through exploring key issues and design principles.

## **SCHOOL FOR CREATIVE ARTS AND INNOVATION**

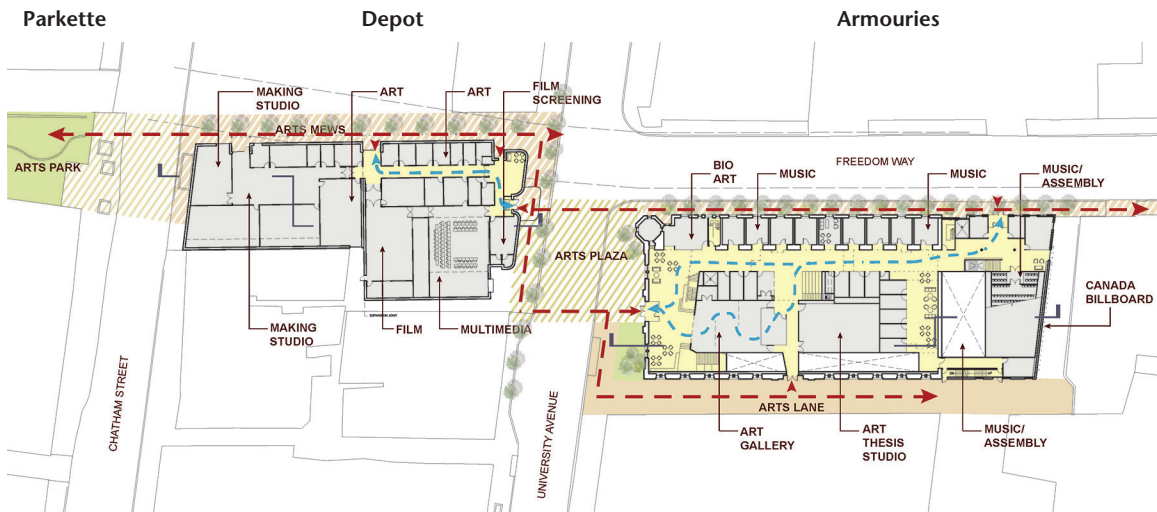
The Armouries/Depot sites, with building footprints nearly filling the sites, will not easily offer opportunities for introduction of new courtyards or green spaces. Consequently, adding street planting, plazas, and urban through-block access routes will be a critical and compelling component for success. Some modest design adjustments will help significantly in establishing a coherent sense of place, where people can meet, socialize, and actively use its amenities. Discussions with the city have resulted in a partnership to foster further improvements beyond the site boundaries.



## Arts Precinct

With its remarkable site of two adjacent heritage buildings, there is a unique opportunity to create an exciting special precinct through the redevelopment of the buildings and a new public realm. This will become a vibrant neighbourhood, connecting the students to their arts and to other arts and cultural opportunities. It is expected that the city and the campus will become increasingly intertwined, expanding the complexity of the student experience and reaching out to a larger audience. The Arts Precinct, as a new public realm, will support new

### Arts Precinct Urban Design Context and Circulation



### Aerial View of the Armouries and Depot and Arts Precinct



arts and media activities. This public realm or open space is to be configured around the buildings and supported by common elements and new amenities such as lights, banners, street furniture, and media screens. The repetitive use of some common elements at this site and the Windsor Star site will contribute to the sense of continuity, coherence, and place, helping to define the new downtown campus for the University of Windsor. The design also provides for a flexible and green Arts Precinct, one which can support large public events for many people, equally as well as the student's daily life centred on a dynamic visual arts program.

### ***Animate the Public Realm***

The raised window openings and sill heights for the Armouries ground floor are established as fixed elements of its historic façade and cannot be lowered to allow more grade level connections. Accordingly, the interior public spaces are centred on, and strongly connect with, the locations of the major existing doorway openings along University Avenue, Freedom Way, and Lane Way, to encourage the overflow of activities from the inside to the sidewalks and streets. For the Armouries and Bus Depot, a new adjoining Arts Plaza on University Avenue with the front doors of both buildings opening onto it, is proposed as a significant opportunity to create an important civic space for this new precinct. Leading from the Plaza, a second major open space, a through-block walkway, or 'mews,' is designed for the east side of the Bus Depot, where glazed openings and various interconnected doorways, similar to those proposed at the Windsor Star, allow an inviting connection between inside and out.

### ***Reinvigorate the Parkette***

To complete this new public realm, the existing Chatham Street Parkette at the north end of the site will be transformed with new design elements into an Arts Park for planned or impromptu cultural events for the city or university. New landscaping and seating are to be provided that will serve as an outdoor hub for the neighbouring community, with a performance venue incorporated.

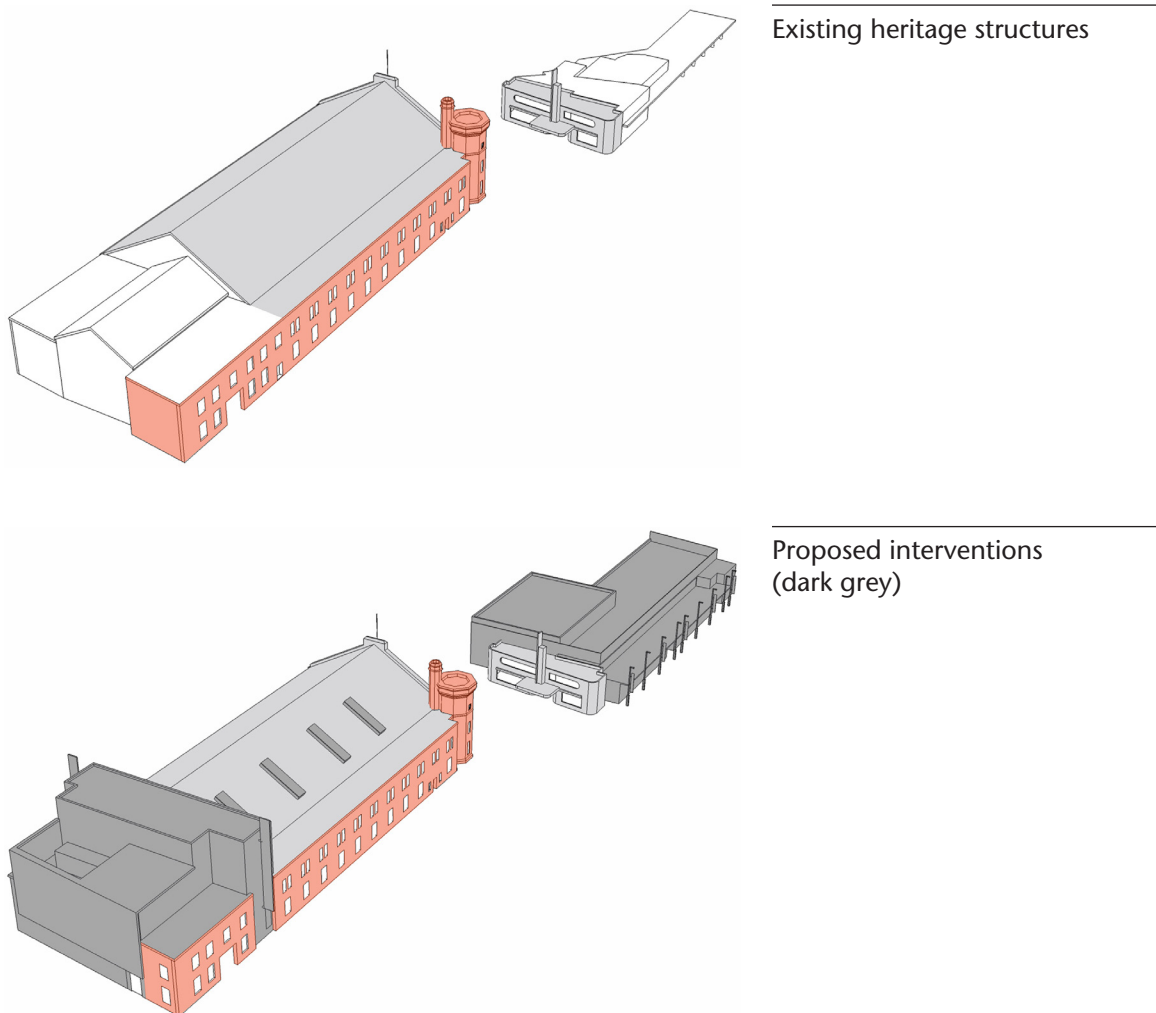
Art Park View to Depot North Façade



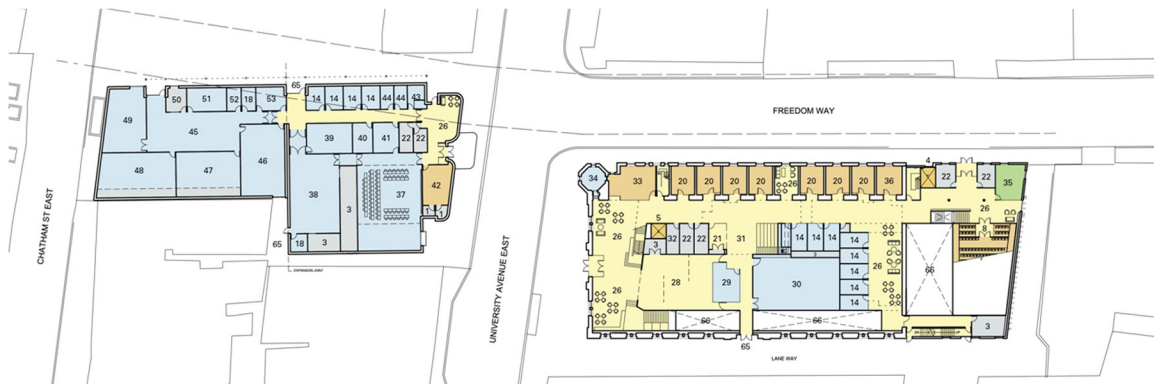
### ***Revitalize Significant Heritage Components***

Both heritage buildings can, when properly restored, offer the university and city remarkable spaces in unique building envelopes. For the Bus Depot, the predominant heritage asset is its handsome, late Art Deco façade, currently buried beneath an applied false front. The remainder of the building will be removed and replaced with a contemporary and complementary structure, in order to accommodate the larger area required. The Armouries presents a robust and dignified façade on three sides, and encloses an impressive interior space which needs to be maintained for the continuity of the spatial integrity.

Dramatic changes are needed at the south end of the Armouries building, which is a 1937 addition, in order to accommodate a new multiple height volume for a small performance hall, a new roof-level mechanical penthouse and chiller, as well as internal adjustments to improve accessibility needs. It is envisaged that the original brick street façade along the east and south side are retained, and that a new internal structure is created at the south end. The existing building will be retrofit with additional insulation in the walls and new roof to increase energy efficiency. High-efficiency windows that replicate historic appearance are to be added. Modern mechanical and electrical systems are planned, for a complete high-efficiency retrofit, to provide a comfortable environment within a high performance system.



## Depot and Armouries Ground Plan

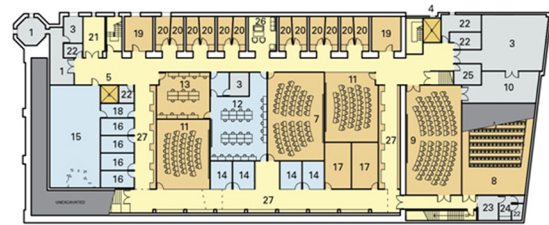


An interesting aspect to the heritage retrofit is the issue of adding insulation and air barriers to existing masonry walls. In this case, the existing triple brick walls have been relied upon for decades as a thermal regime which allowed moisture and air to freely pass through the brick, with no insulation, so that the walls at all times remained warm. Adding insulation to the inside is the only possibility, as the outer walls must retain their historic appearance. The design team commissioned hygrothermal brick testing, which showed that the historic brick in this case was dense enough to withstand possible freeze-thaw cycles associated with insulating the inner walls. The addition of localized steel pinning to better bind the wythes together was also required. Water shedding details as well are to be improved to reduce water infiltration.

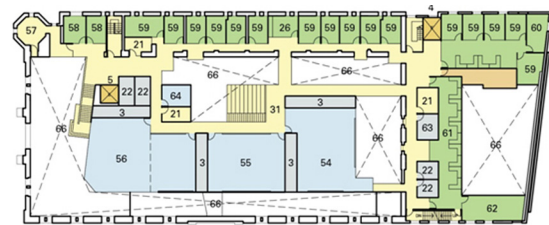
The Bus Depot's original art deco façade will be restored as the entrance lobby to this companion visual arts facility to the Armouries. A new, single-storey extension to the original building will replace the bus docking area at the rear with a low, canopy-like structure along one side, evoking the building's previous use and form.

The Depot building has been organized into large film and multimedia studios and associated support spaces that will house the film and sonic arts programmes, which can be made available and accessible for public events. The back portion of the building is comprised of a single, large, Making Studio, with its adjacent teaching studios and support spaces. The Making Studio will have a strong presence on Chatham Street and overlook the parkette to the north. A glazed clerestory along the entire length of the Bus Depot building will bring natural light to its

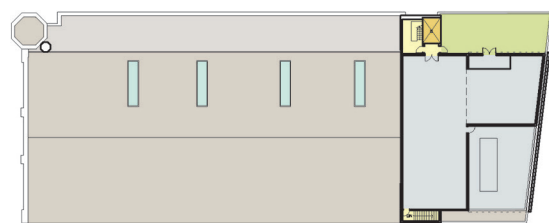
### New Lower Level



### Second Level



### Roof Level





circulation spine and the Making Studio. Glazed opening doors will allow easy access to and from the building and assist in animating the Arts Mews running parallel to the building, linking the Precinct’s proposed Arts Park and Arts Plaza as vital pieces in this urban design composition

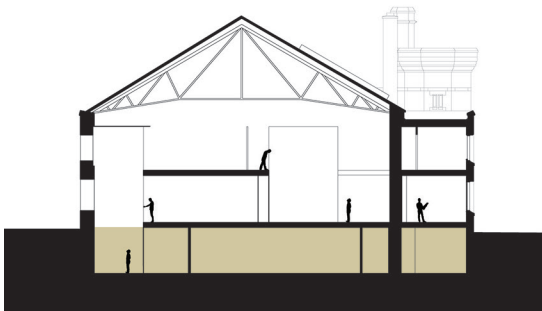
**Maximize Area, Retain the Visual Openness of Major Interior Space**

The Armouries building footprint is approximately 30,000 sq ft, and the visual arts and film studies programme required to fit within the Armouries and Depot is approximately 65,000 gross sq ft. In order to maintain the sense of openness and volume, while fulfilling the programmatic requirements and adjacencies for the building, a key design strategy is to reduce the requirement for full floors above grade by creating an additional floor area in the basement with appropriate programme assigned to that level. This in turn will allow the remainder of the programme to be distributed on the ground and second floor, employing a ‘porous’ building strategy requiring partial floors only, while ensuring a sense of openness for the main building volume.

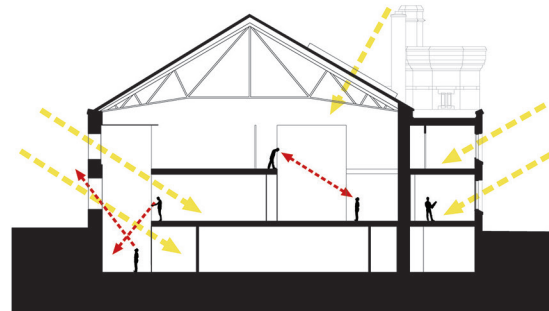
**Ensure Optimal Saylight and Visual Connectivity**

The beautiful large volume space of the Armouries is its major heritage asset and should be retained as open space, both to preserve the building’s integrity and to take best advantage of its unique spatial quality. The Visual Arts programme has spaces such as studios, which are

New Lower Floor Area Below Grade



Daylight and Visual Connectivity



well suited to take advantage of the openness and spatial characteristics of the Armouries. By deploying programme spaces onto appropriate floor plates that have been designed for double- and triple-height volumes, the design will achieve spatial continuity between floors for multi-level viewing and optimal daylight penetration throughout the building. The provision of generous daylight through all levels of the building, including the new lower level, will be its essential life-blood, and will help bring the building to life and energize its students.

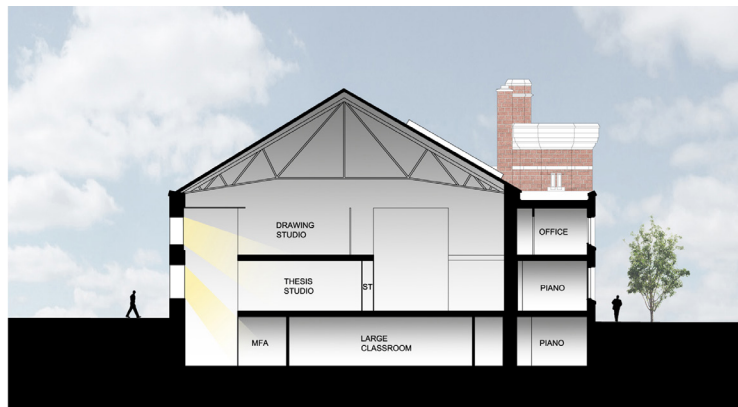
### ***Universal Accessibility***

Ease of visibility and access to all parts of the Armouries and Bus Depot is an extremely important principle, particularly for a university arts facility, where community outreach and engagement is a key educational mandate. Accessing all floors levels in the Armouries is a challenge and was a key factor in assessing the need for internal modifications.

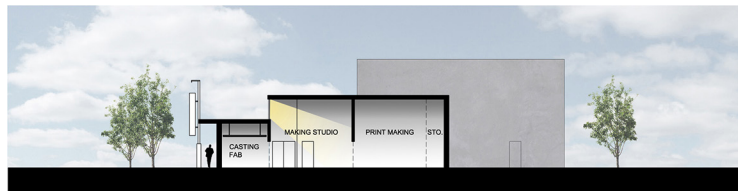
### ***Expose the Building's Systems and Fabric as Visible 'Learning Tools' for its Occupants***

As exposed components, the masonry walls, the structural components, mechanical, and electrical systems of the building represent an invaluable learning resource to all students using the building, and in particular the Architecture students. They also imbue the building with its robust, industrial aesthetic which is integral to its heritage character. All new 'fit-out' components which are to be added to the building should be carefully designed to ensure the building's fabric remains 'front and centre' in the expression of the Armouries.

Armouries Section Looking North



Depot Sections Looking South



### ***Encourage Collaboration***

Perhaps the most important opportunity presented by this project, one which is critical to any creative work, is to foster multi-disciplinary collaboration between students from each discipline—music, film, and visual arts. To encourage and support this goal, the design has created a dynamic and amenable public realm both outside and within the buildings, comprised of daylit lobbies, public walkways, bridges, lounges, and other social meeting spaces. These social spaces link together as a coherent whole and in turn interconnect the programme spaces located within the two buildings.

### ***Imaginative Adaptive Reuse***

The new School for Arts and Creative Innovation programme within the Armouries building will change the current use from a drill hall and a military event space to a more public, educational facility. This change can positively alter the relationship of existing building spaces to the way it is perceived in the city. A careful restoration and imaginative reconsideration of how these buildings can improve, and better articulate their interior and exterior relationship with users, should enhance their heritage characteristics and value to the city, and create a new foothold for the University in an emerging downtown campus.

The various programme spaces from all the Visual Art programmes have been strategically mixed together to break down the territoriality of the departments in favour of an interdisciplinary collaboration essential to a creative arts program. The ground floors are designed



View of Armouries entry area looking south



View at Armouries Amphitheatre looking south

to open onto and animate the new public realm designed for its north, east, and west roadway exposures. Activities within the public lobby spaces located at the north and east entrances of the Armouries building are encouraged by the design to extend onto the streets or public plaza. Similarly, a new public second floor terrace visible from the south and Freedom Way will allow students to enjoy a new outdoor recreation space, as well as to use it for outdoor artistic pursuits, which would further energize the civic life of the building.

## SCHOOL OF SOCIAL WORK AND CEPE

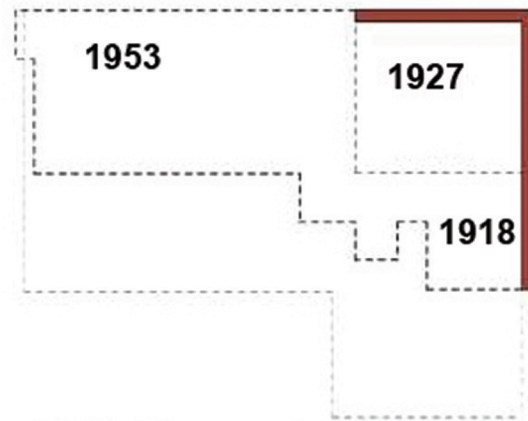
### *Introduce and Integrate Green Space for the Campus and City at Grade Level*

The introduction of a network of attractive open space to the downtown location is a critical and compelling component for its success as a campus. This will establish a coherent sense of place, where people can meet, socialize, and actively use the building amenities. The introduction of usable, landscaped space at grade and above, as critical interventions for a new green downtown campus is a priority. These spaces will not only provide a healthy, more stimulating and attractive educational environment, they will also allow for a unique variety of teaching and learning opportunities. A new, dynamic space at the roof level can be shared by staff and students. This space is developed as an important teaching and learning space as well as a unique social meeting place. The design introduces additional green spaces and associated benefits with the new courtyard and green roof as visually connected areas for social encounter.

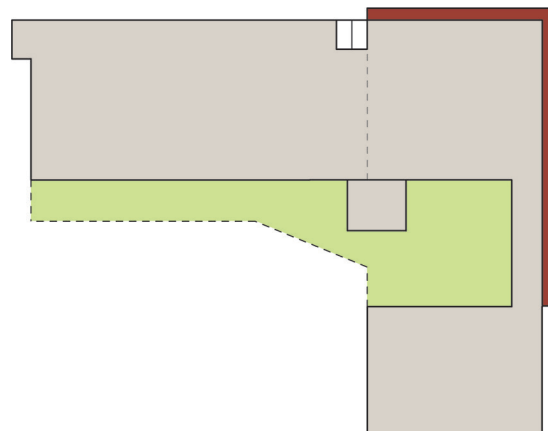
### *Interconnect Pedestrian Circulation between University Buildings and the Public Realm*

This project presents the important opportunity to better knit or 'stitch together' the buildings' circulation network to the city's public realm. Particular attention was focused on the location and number of entranceways, major routes through the building, and other streets and pathways to the buildings from all sides. The town/gown relationship so beneficial to both the city and university is best expressed and understood at street level where university buildings and the city co-exist. The development of public, grade-level uses, the porosity, transparency, and accessibility of the building, and the urban design treatment of the sidewalk and building's edges are all key contributing factors to the desired animation of the streetscape.

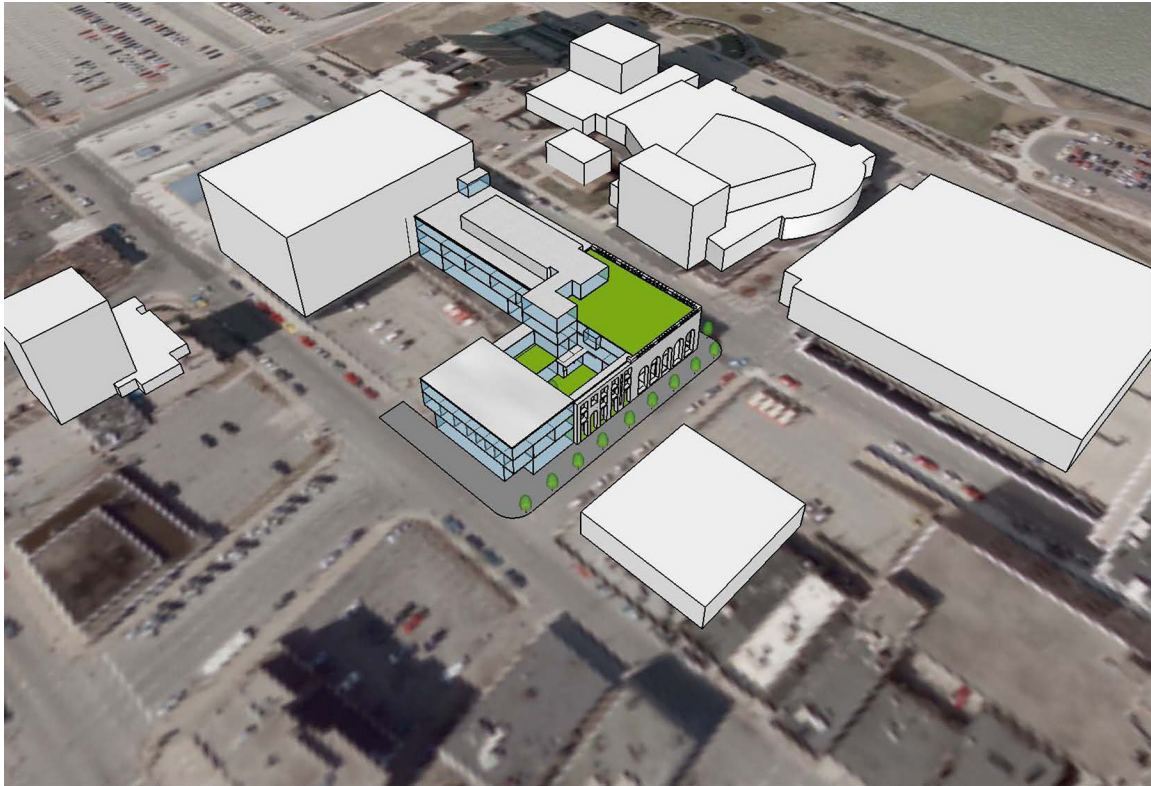
Existing Heritage Facades to be retained



New Courtyard Design Strategy







***Make All Program and Support Areas of the Building Universally Accessible***

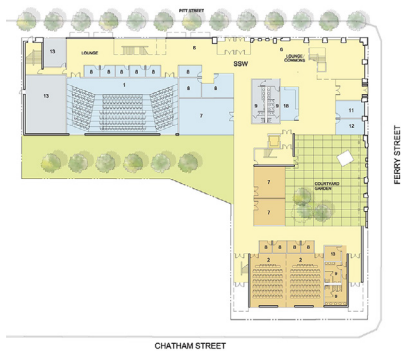
Ease of visibility and access to all parts of the building is an extremely important principle, particularly to a School of Social Work, where community outreach and engagement is at the core of its educational curriculum. Linking floors through double- and triple-height volume atria will reduce separation between users and create a more coherent sense of place, as well as a more collaborative and collegial environment.

***Maximize Daylight to All Parts of the Building***

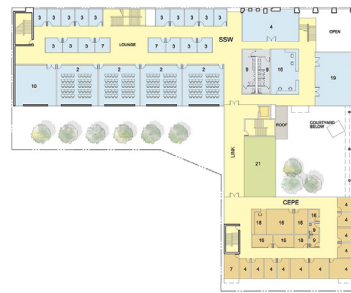
Providing natural light into all spaces of the facilities is essential to the health and well-being of all students and staff. The plan layouts of each floor optimize daylight opportunities. Through its sectional configuration of new atria carved out of the floor plates, the building allows greater daylight penetration between floors and into the deepest parts of the floor plan.

The design employs the principle of providing the largest, more public uses such as the large classrooms, and major lounge/study spaces, at street level, with additional teaching, research, and office spaces for the School of Social Work equally distributed on the upper two floors. The administrative and work spaces for CEPE occupy the second and third floors of the building, with strategically located reception areas as control points for access and security. Shared facilities between the two users include classrooms, boardroom and meeting spaces, lounge and study spaces, as well as support services such as washrooms, copy, and storage rooms. The south end of the courtyard is to be phased as a future expansion.

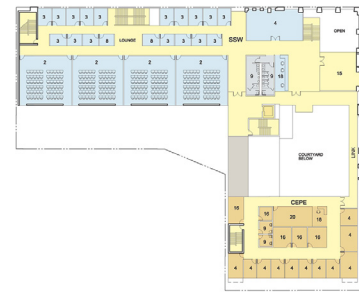
Ground Floor



Second Floor



Third Floor



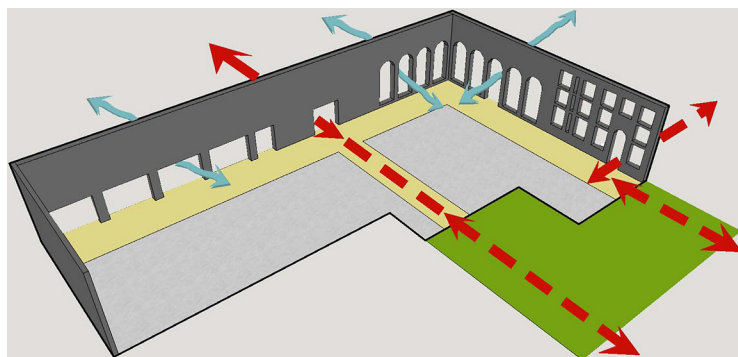
The design has a ground floor organization which recognizes the importance of a new pedestrian route that can foster a stronger set of connections with the city fabric and link to potential future routes to the Armouries site. The design carves floor area out of the important corner of the 1927 building to create an attractive three-storey atrium space which will highlight the full height of the building's elegant, arched openings along Pitt and Ferry Streets.

The courtyard strategy offers a new and interesting way of interpreting the heritage façade as a gateway or filter, rather than a solid mass. The courtyard itself is developed as a

Section Looking East



Internal Circulation at Grade Level





View to the new Courtyard

View to Pitt Street



space connected with the history of the building as the former home to the Windsor Star. The inclusion of artifacts from the previous occupants and photo reproductions of the existing south wall murals, creates an opportunity to curate the story of the building.

The courtyard itself, which can be secured at night, provides a new and important city asset as a sort of ‘pocket park’ that can be enjoyed by people from the university and the city. The courtyard also provides additional daylight to the buildings themselves. The critically important aspect of tying the building and city together, and animating the streetscape, is facilitated with new construction and a building option which stretches the ‘gravitational field’ of the University building furthest along the street edges.

***Create imaginative re-use and spatial reconsideration.***

The new programs to occupy the Windsor Star site will change the usage from a publishing and printing facility to a more public educational facility. This change positively alters the relationship of existing building spaces to the exterior fenestration pattern and offers new



architectural possibilities. For example, fuller advantage of the double volume arched openings of both heritage buildings will be taken, to improve the entranceway access to each building, and fundamentally reinterpret the building's façade as a 'filter' or screen rather than as an enclosure.

## **BUILDING REUSE URBAN SUSTAINABILITY BENEFITS**

***Jane Jacobs: 'Every community needs a mix of newer and older buildings....'***<sup>1</sup>

This University of Windsor project has demonstrated a sustainable urban development, incorporating existing significant heritage structures for various adaptive and building reuse strategies. Strategies range from complete building retrofit (Armouries) to new construction with heritage facades retained and restored *in situ* (Depot and Star). These projects offer a remarkable opportunity for the University of Windsor to inhabit historic and prominent corners of downtown Windsor, to create a seamless integration of campus and city, and to demonstrate the reciprocal benefits and assets each has to offer. It demonstrates a best practice North American exemplar for the reuse and regeneration of downtown and inner-city sites.

These three projects illustrate adaptive use of historic buildings and cultural landscapes in a manner that preserves historic context and character-defining features. The three structures each contribute to the sense of local and unique identity in downtown Windsor. A sense of historical continuity, and respect for the existing community fabric, was evidenced during extensive community consultation as being important to the local community.

Each of the three buildings has been repurposed together with significant new green space. The Star has a new inner courtyard/park and a roof-level greenscape, and the Armouries/Depot have a new Arts Plaza and Art Park concept which includes a through-block walkway to increase connectivity and linkages. These new open space opportunities can improve physical and mental health, increase social capital by facilitating social networking, and increase civic engagement, physical activity, and active time spent outdoors.

The public realm has been improved in these projects by providing safe, appealing, and comfortable street environments that encourage physical activity and can remove the emphasis or reliance upon automobile travel. A well-used public realm is created, with features that reinforce the street wall, appropriately scaled buildings, interesting street furniture and trees, and minimized service bay disruption to the street fabric. Together with the existing small block sizes, this facilitates a walkable neighbourhood, increasing opportunities for social interaction.

Except for a small lot on the depot site, parking has not been provided within these facilities, to take advantage of existing local parking capacity within the city. This offsets the existing imbalance that favours automobile usage, increases the pedestrian orientation of the projects, and minimizes the adverse environmental effects of new parking facilities.

As these new institutional and public uses are added to the downtown core, mixed-use opportunities are increased. The new uses are intended to be a community resource and accessible to a wide range of people, from students who use the facilities, to the public who are able to visit and use the exhibition areas, performance halls, meeting, and education resources. These new uses will create spin-off benefits and additional retail, food, and education uses in the nearby areas, leading gradually to an increase of housing and jobs in the areas, as well as trickle down improvement to the mixed-use amenities in the area. Ultimately a new population may be attracted to the downtown core, which is the ultimate goal of a vibrant, mixed-use, and diverse community.

Specific environmental benefits of the adaptive reuse approach are wide ranging. Building reuse bypasses complete demolition and reconstruction, and conserves the considerable embodied energy stored within the structure. The reuse and retrofit of existing buildings is increasingly viewed as a critical initiative, as existing building fabric, and associated greenhouse gas emissions, represents the majority of our built environment. Historic building reuse or adaptive use reduces the overall environmental consequences of new construction and associated raw material extraction, manufacturing, and transpiration, as well as significantly reduces the energy use associated with demolition as well as constructing waste. The materials of existing buildings have significant embodied energy, and this is especially apparent in older and historic buildings (especially those built before 1945)<sup>2</sup> which were often constructed from primary materials, such as timber brick, and concrete, that were far less energy consumptive than the components of more recent buildings. Materials from historic buildings, such as the Armouries, are often more durable and have a longer lifespan than newer materials.

Retrofitting buildings with improved building envelopes and new mechanical and electrical systems can increase the energy efficiency of the structure dramatically. This reduces greenhouse gas emissions, and reduces air, water, land pollution, and adverse environmental effects from energy production and consumption. Energy efficiency upgrades and the improved construction save operational costs through savings on utility costs.

New development within existing communities conserves land and habitat, and reduces carbon footprint by encouraging transit, walking, and cycling. Development of these downtown and inner city sites spares greenfield areas, utilizes existing infrastructure, and reduces adverse environmental and public health effects associated with sprawl. The reuse of inner-city sites reduces edge development and urban sprawl, conserves land, and promotes liveability, walkability, and transportation efficiency. Daily physical activity associated with walking and bicycling is encouraged. Economic benefits can follow as the adaptive reuse and revitalization creates renewal and new opportunities.

The new University of Windsor downtown campus imaginatively explores the inherent programmatic 'alchemy' which results through the combining of these faculty components. Conventional ingredients such as learning, social interaction, and arts and culture are mixed into new forms of academic culture. This resulting combination of programming, built form, and urban design will ignite into a new and more dynamic whole, reactivating the city with the zest of daily student life. It serves the more integrated needs of our future generations, blending urban vitality and learning environments. As shown in other urban centres, this downtown campus project will serve as an economic catalyst to initiate a thriving urban centre, one that will assist in increasing activity and vitality within the downtown core.

In conclusion, historic preservation, adaptive reuse, and sustainable urban design that considers the full range of social, environmental, and economic factors is an essential component of sustainable urban development. The use of these three existing historic buildings in a successful and relevant adaptive reuse strategy is an urban catalyst towards inner city revitalization and an exemplar to other mid-sized communities in Canada and the U.S. The inherent value of these existing building components, and their place within the community's memory, helps to reinforce Windsor's sense of place and the university's position as a pillar of the city. The use of these existing heritage buildings, in a successful and relevant adaptive reuse strategy, is an urban catalyst towards inner-city revitalization.

## NOTES

1. *The Death and Life of Great American Cities* (New York: Random House, 1961), p. 187.
2. *Green Neighbourhood Development*, LEED Reference Guide for Neighbourhood Development, 2009, p. 368.