

Project Description

The John Nolen Drive and Law Park Redevelopment Plan, completed by Isthmus Engineering and Consulting (IEC) for Downtown Madison, Inc, has been designed to provide improved pedestrian access from the Madison downtown to the Lake Monona waterfront, while alleviating traffic congestion and increasing safety in the area. The scope of the project includes redesigning the John Nolen Dr/Blair St/Williamson St/E Wilson St intersection and expanding the area and accessibility of Law Park by extending it towards the Capitol District.

Law Park is currently completely separated from the Capitol District by US-151-John Nolen Drive and is only 1.77 acres in size. The majority of this area is taken up by the parking lot that serves the Machinery Row building complex and Lake Monona boat landing, leaving very little green space for visitors to utilize. IEC's vision for the urban lakeshore park is a space that can become a focal point for the surrounding community, and where lakefront recreation, community activities, and citywide events can seamlessly integrate with the downtown culture.



Figure 1: Current status of Law Park

Major Constraints and Challenges

In order to increase green space in downtown Madison by expanding Law Park, John Nolen Drive must be modified without negatively affecting traffic flow. Key design issues that were addressed were the dewatering of the site during construction and the anchoring of structures to combat buoyancy forces of the high water table. In addition, regulations from FWHA, ASCE and Wisconsin DOT were met in areas such as grades, clearance levels, and turning radii. All design options had to stay within the property boundaries outlined by the site's "untouchable" buildings including Machinery Row and Unit Well 17. Constraints were met while providing an aesthetically pleasing city park.

Overview

IEC and the City of Madison determined that tunneling is the best solution to meet our economic, social, environmental, and transportation project goals while complying with the stated constraints. Tunneling John Nolen underneath the intersection will reduce congestion and alleviate delay for vehicles as well as pedestrians. The tunnel will also allow for easier pedestrian access to the lake and air rights over the tunnel will be used to expand the green space.



Figure 2: Aerial view of Existing John Nolen Drive



Figure 3: Sketch of Proposed John Nolen Tunnel

Tunnel Specifications

The proposed tunnel will begin just to the northeast of the Monona Terrace east exit intersection. It will stretch a length of just over 2000 feet through the “hairball” intersection, or intersection of John Nolen Drive, E Wilson Street, Blair Street, and Williamson Street, and exit on Blair Street just prior to E Washington Avenue. It will have a total width of 76.5 feet through the John Nolen portion and a reduced width of 64.5 feet through the Blair Street portion to adhere to the surrounding buildings. The tunnel reaches a depth of 25.3 feet to maintain the necessary 16-foot road clearance set by the Federal Highway Administration. The tunnel is anchored against buoyancy forces by lateral foundation extensions as it descends alongside Lake Monona on John Nolen Drive.

Construction Staging Plan

Stage 1 of construction will include removals on E Wilson Street to create room for two-way traffic between its intersections with John Nolen Drive and Broom Street. Storm sewer realignment for Blair Street will also be addressed during this stage and it’s scheduled to last 5 months. Stage 2 will begin tunnel construction from the southern limit on John Nolen Drive to just south of the “hairball” intersection and is scheduled to last approximately 1 year. Stage 3 will continue tunnel construction through the “hairball” intersection until just north of the Wisconsin & Southern Railroad and will last approximately 4 months. Finally, stage 4 will conclude construction by installing the tunnel to its northern limit on Blair Street. This stage is scheduled to last approximately 1 year bringing the total construction time to 33 months, or 2.75 years.

Cost Analysis

Table 2 provides an estimate for the predicted costs. This project would be an excellent candidate for the TIGER Grant, awarded by the U.S. Department of Transportation to projects that help to achieve national transportation objectives, which would help reduce the high project cost. Additionally, improvement of the surrounding area through the creation of significant green space will result in a substantial increase in property values for future city profit.

Table 1: Cost Breakdowns for Tunnel Design

Opinion of Probable Costs		
Cost Item	Description	Subtotal
Construction Cost	\$150,000,000	\$150,000,000
Contingency Cost	20%	\$30,000,000
IEC Design Fee	10%	\$15,000,000
TOTAL		\$195,000,000
<i>Per Linear Foot (2,400ft)</i>		\$81,250.00

Concluding Remarks

The redevelopment of the area surrounding Law Park and John Nolen Drive is an opportunity to build upon the lively culture and green reputation that Madison prides itself in. The addition of a lakefront park downtown will attract residents and visitors alike, while improved traffic flow and safety will benefit all passersby, making this project a sustainable long-term investment for the city of Madison.

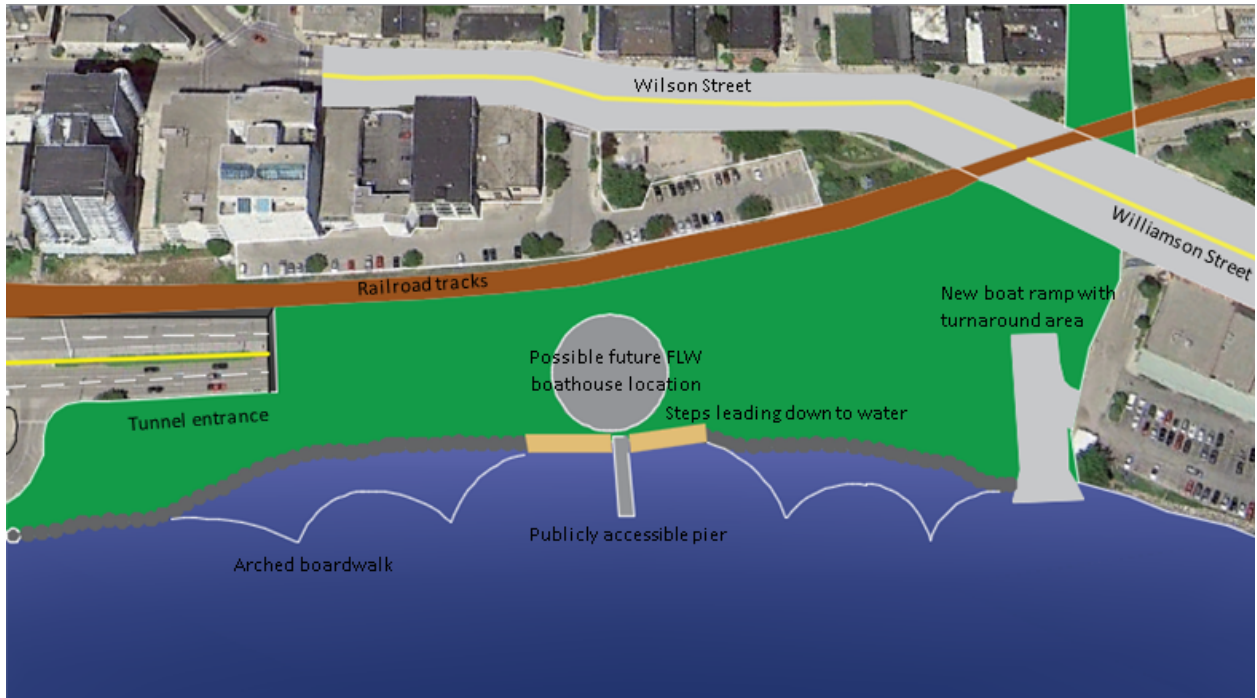


Figure 4: Law Park/Lake Monona Shoreline Plan View



Figure 5: Tunnel Plan View

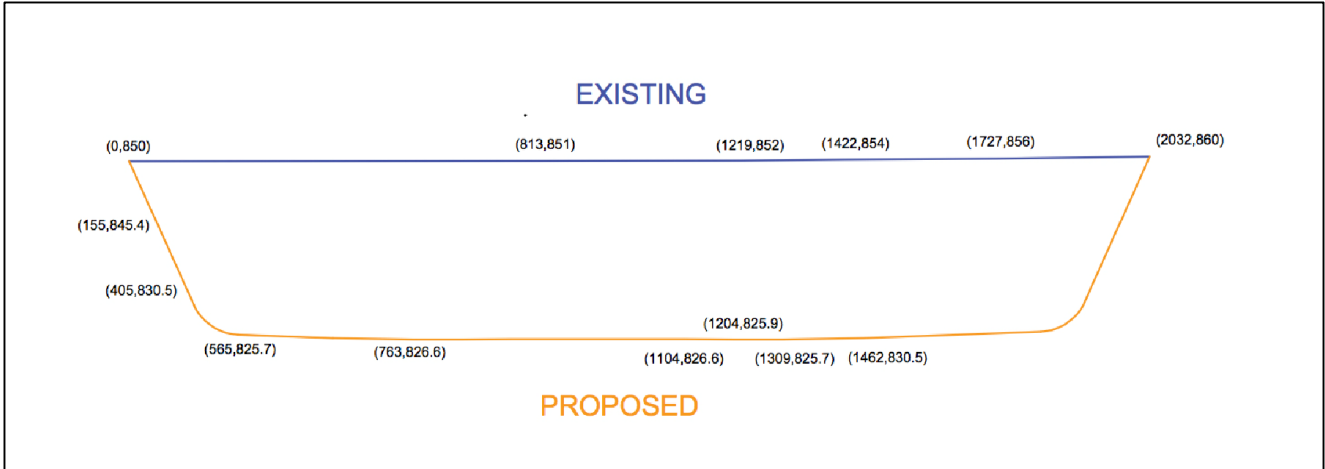


Figure 8: Centerline Profile View (Stretched in Vertical Direction)

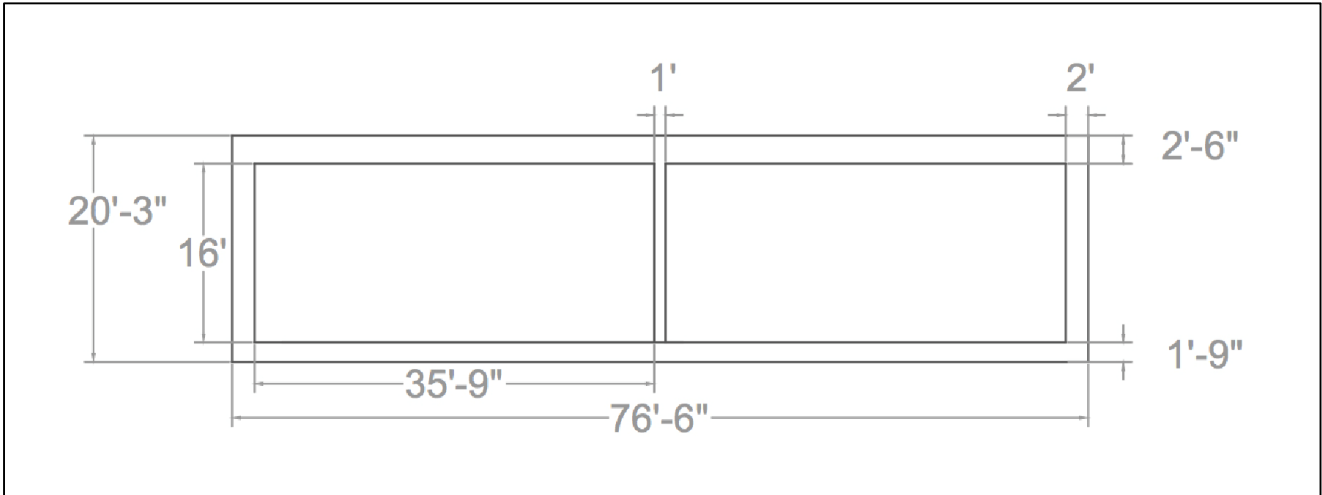


Figure 6: Tunnel Cross-Section – Typical Dimensions

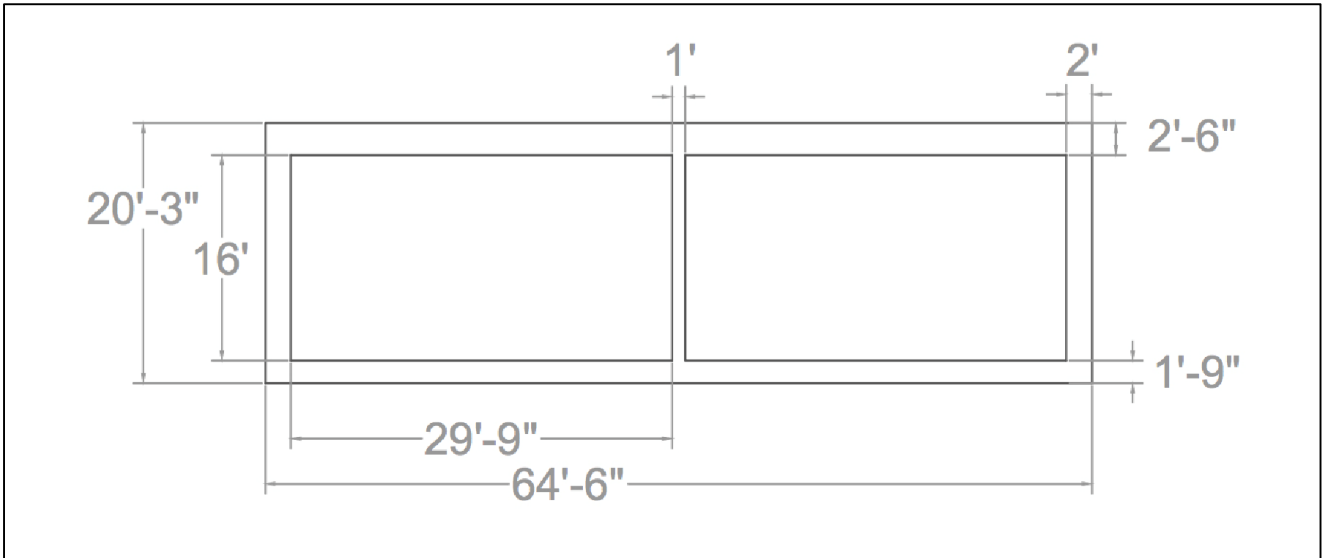


Figure 7: Tunnel Cross-Section – Reduced Dimensions



Figure 8: Angle View Tunnel Rendering

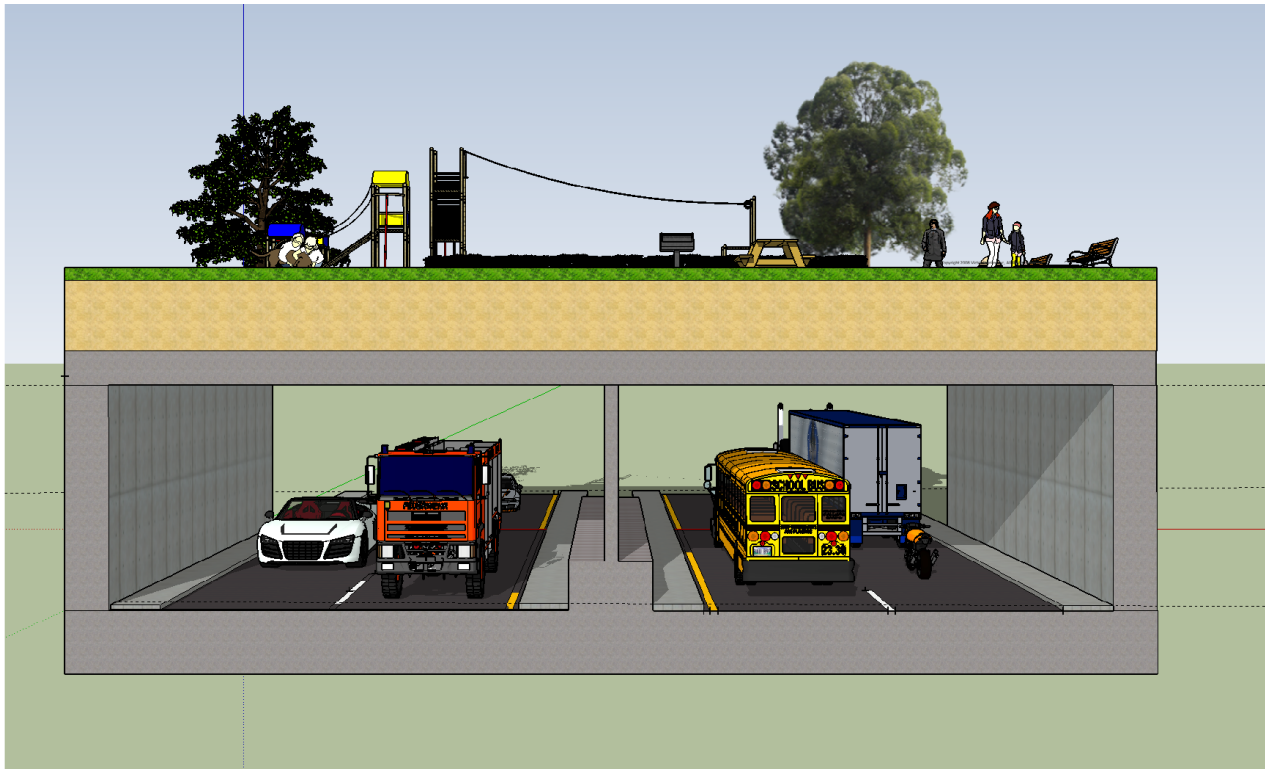


Figure 9: Cross Section Tunnel Rendering