



# Monona Terrace Tunnel Lighting Upgrade

Public Information Meeting  
City of Madison Engineering Division  
February 22, 2024

*Thank you for attending. We will begin shortly...*

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# Meeting Technical Housekeeping

- This meeting will be **recorded** and posted to the project page.
- All attendees should be **muted** to keep background noise to a minimum.
- Use the **“chat”** button for technical issues with meeting to troubleshoot with staff to assist.
- Use the **“Q and A”** button to type questions about presentation. Questions will be answered live after the presentation.
- Inappropriate questions may be dismissed.
- Use the **“raise your hand”** button to verbally ask your question. You will be prompted to unmute when it is your turn.



**This meeting is being recorded.**

**It is a public record subject to disclosure.**

By continuing to be in the meeting, you are consenting to being recorded and consenting to this record being released to public record requestors.

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# How to Participate

The screenshot displays a Zoom meeting interface. At the top, a green banner reads "You are viewing City of Madison's screen" with a "View Options" dropdown. Below this, a Microsoft Excel spreadsheet is shared, showing a calendar for 2019 and 2020. The spreadsheet has columns for months and rows for years. A "City of Madison" window is visible in the top right corner. In the center, a "Join Audio by Computer" button is highlighted with a red arrow. Below the spreadsheet, there are "Phone Call" and "Computer Audio" options. At the bottom of the Zoom interface, there is a "Join Audio" button with a headset icon, and other icons for "Q&A", "Chat", and "Raise Hand". A "Leave Webinar" button is in the bottom right corner.

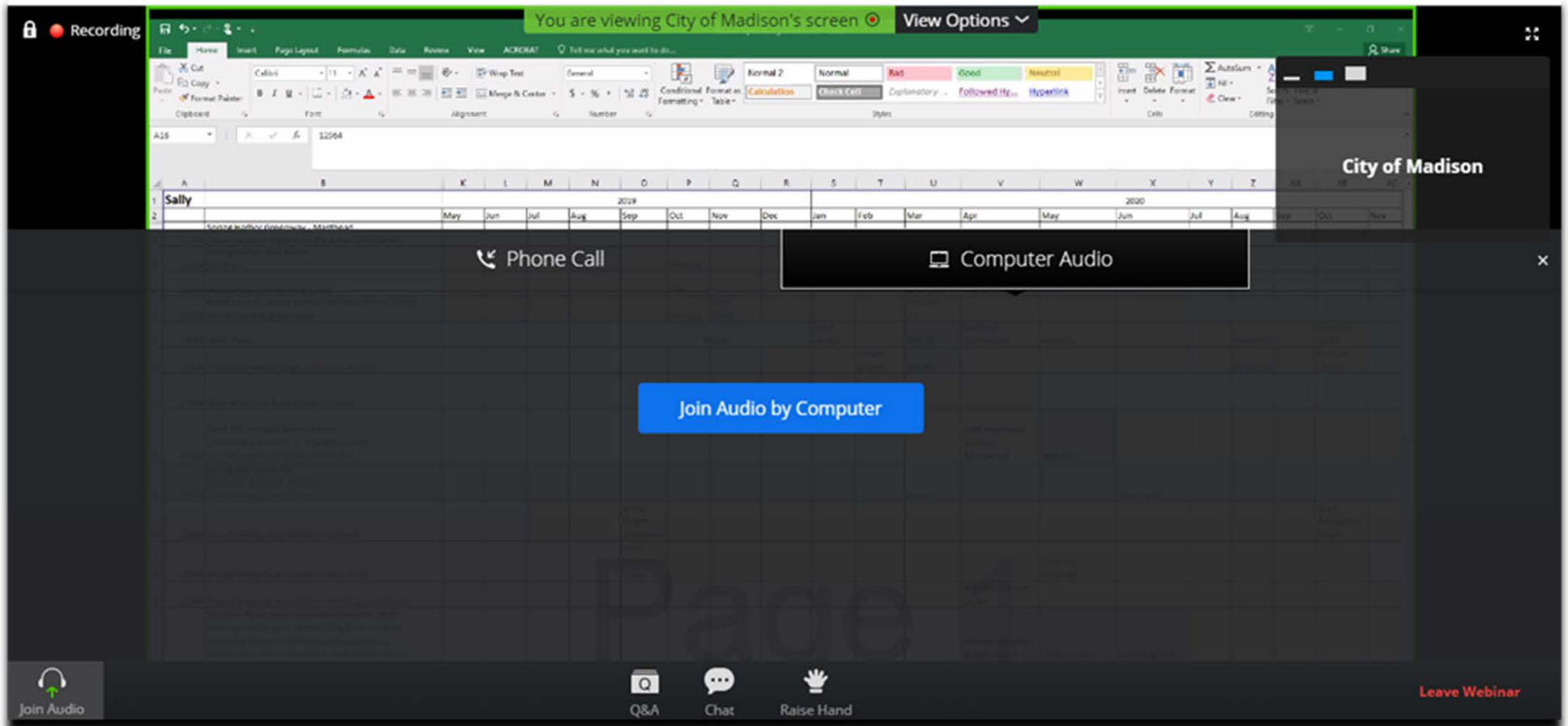


Make sure to join audio

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# How to Participate



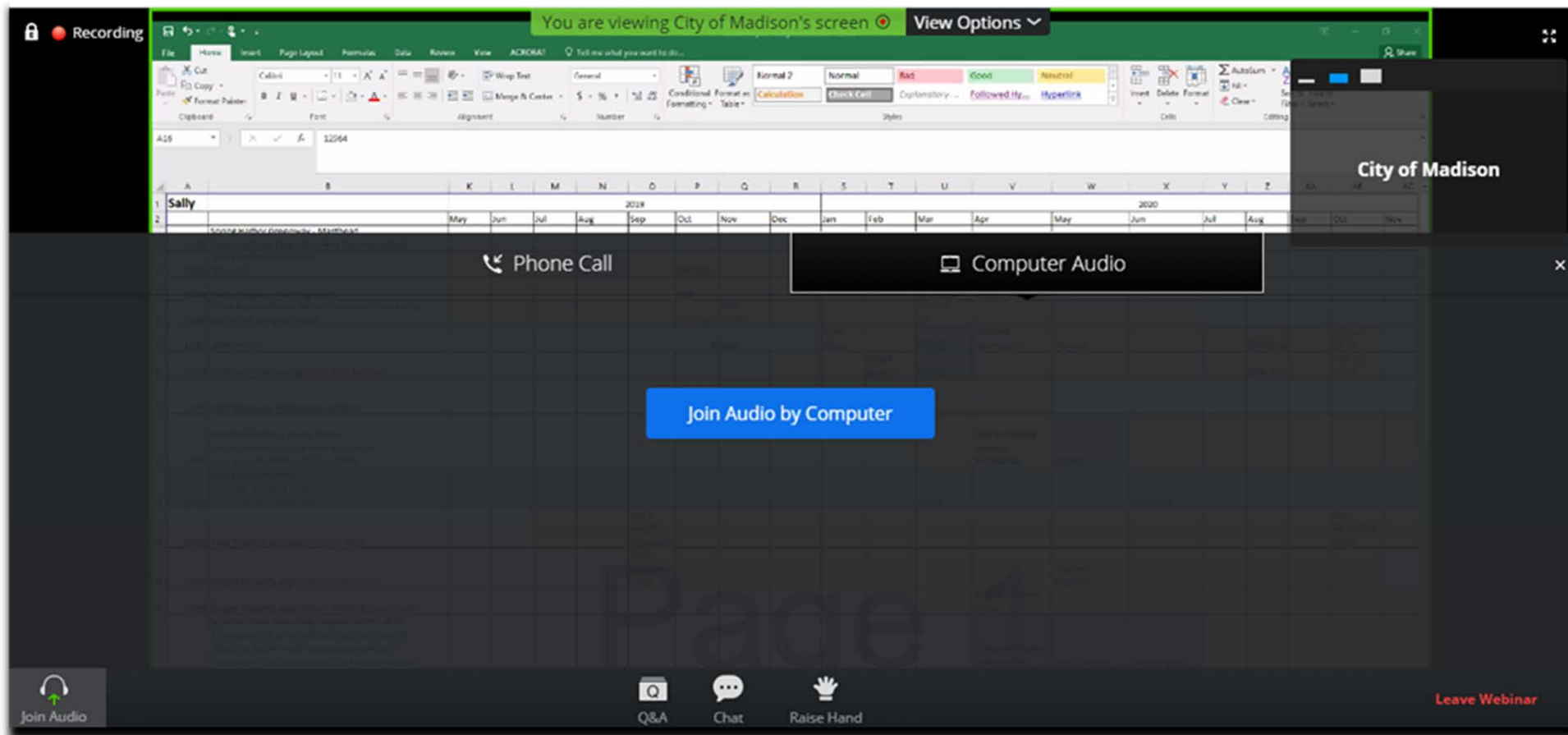
Raise your hand to be unmuted  
For comments or ask additional questions.



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# How to Participate



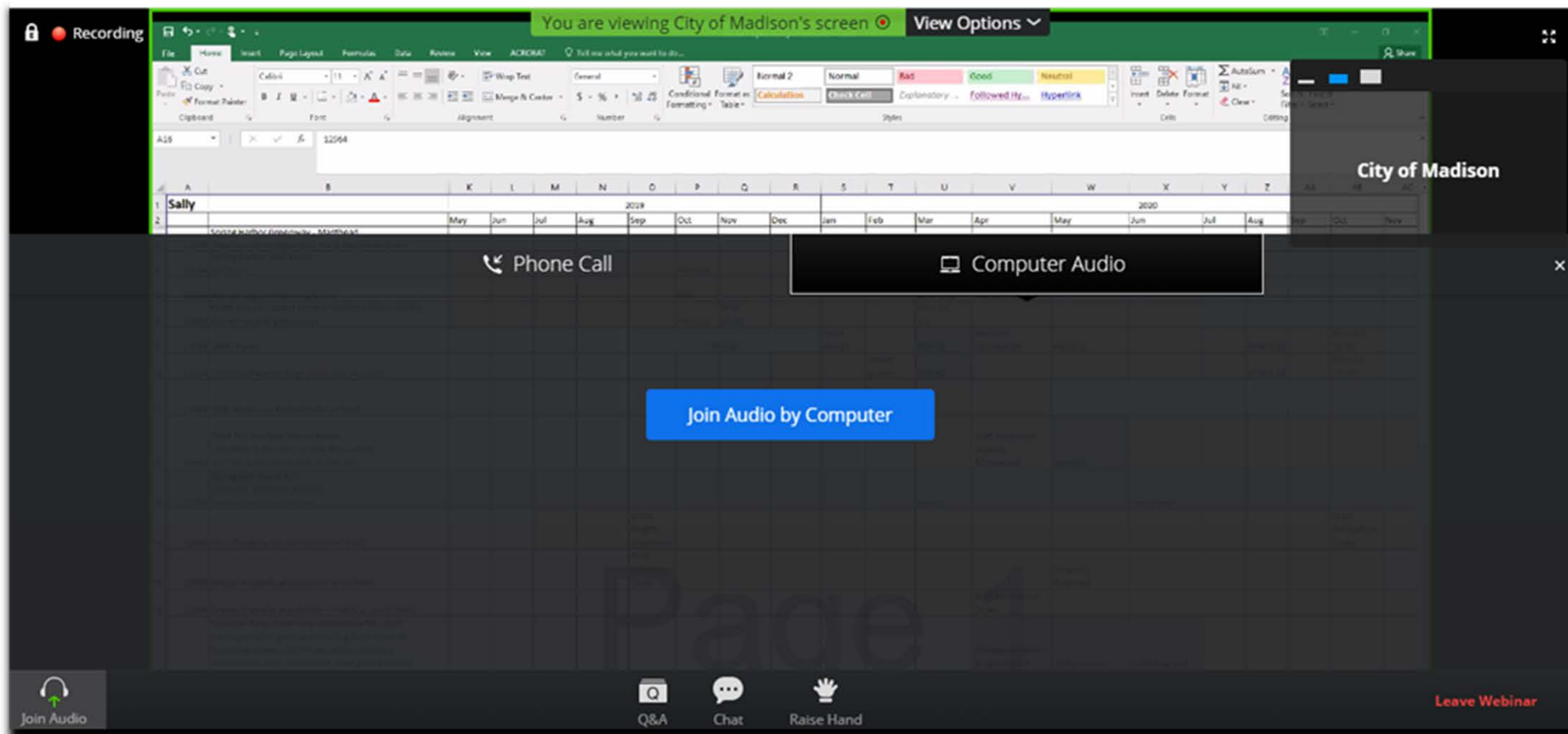
Use chat if you have technical issues or a question for the panelists



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# How to Participate



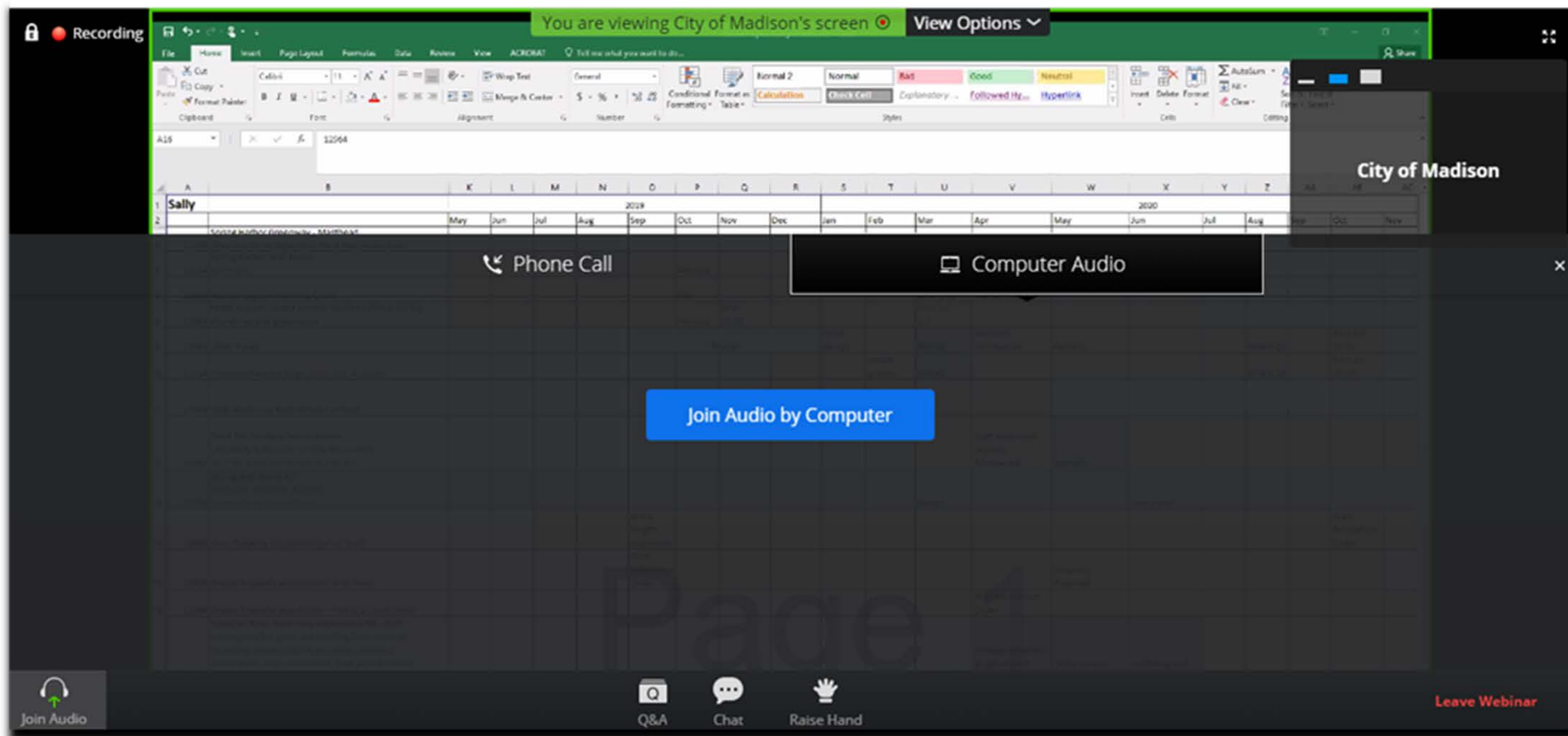
Use Q/A if you have questions.  
We will answer after the presentation



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# How to Participate



To leave the meeting  
click here

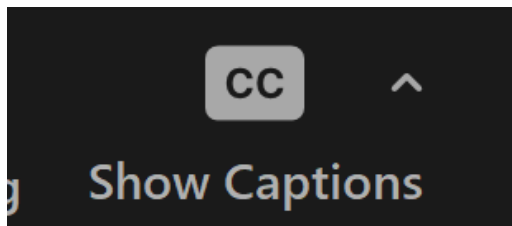
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# Closed Captioning

- If you'd like to enable closed captioning, click "show closed captions" button on the bottom of the screen.
- This may already be enabled. If this is not enabled, click the button to allow closed captioning.



## Discussion Ground Rules

- Respect your neighbors' time and perspectives.
- Focus your input on the future lighting design
- Ask clarifying questions as we go (e.g., explain a term or repeat a state
- Save other questions for the Q&A – they may be answered during the presentation!



# Agenda

1. Project Overview
  - History of the Monona Terrace
  - Public Engagement Goals
2. Existing Conditions of the Lighting System
  - Need for the Project
3. Proposed Upgrades
  - Lighting Fundamentals
  - Design Alternatives
4. Options for the Project (polling)



# Monona Terrace Today

- Gateway “Iconic” Entrance to Downtown
  - Frank Lloyd Wright Design
  - Opened in 1997
- John Nolen Drive
  - 6 Lanes thru the Tunnel
  - Nearly 40,000 vehicles per day
- Capital City Trail
  - Linking Olin Park and Law Park
- Lake Monona Shoreline
- Wisconsin & Southern Railroad (WSOR)
  - Average of 8 Trains per Day



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# Project Goals

- ✓ Replace Existing Lighting System
- ✓ Increase Safety and Visibility
- ✓ Replace Aging Infrastructure
- ✓ Reduce Maintenance
- ✓ Increase Energy Efficiency
- ✓ Improve Aesthetics
- ✓ Future-Proofing



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# Public Engagement Goals

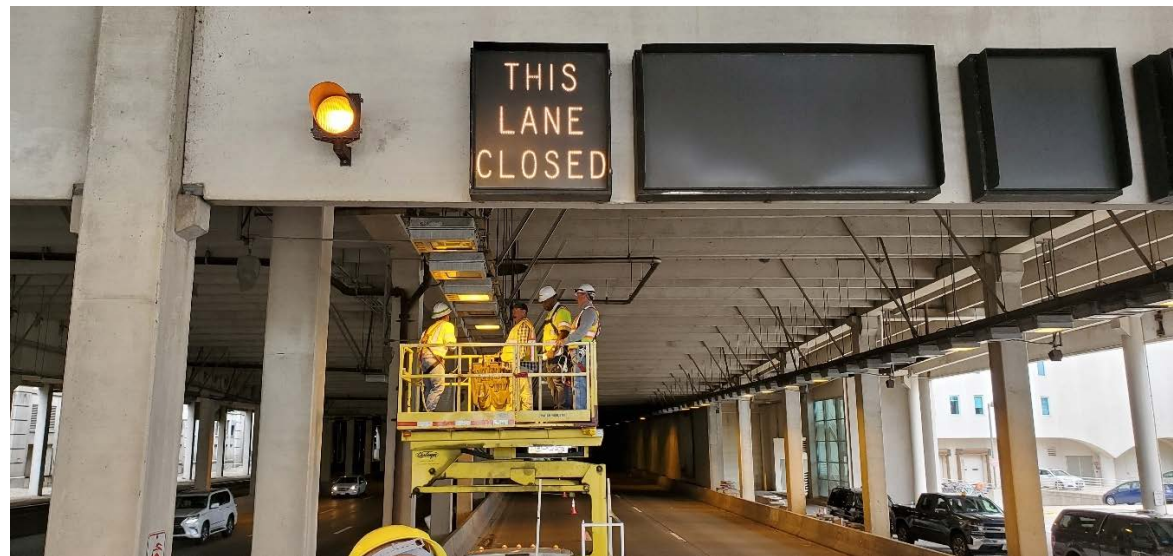
- ✓ Inform the Community
- ✓ Gather Community Input
- ✓ Engage Diverse Perspectives
- ✓ Achieve a Project the Community Supports





# Existing Conditions – Comprehensive Site Inspection

- Non-Operable Fixtures
- Uneven Lighting Levels
- Corrosion & Degradation
- Damage From Stormwater
- Outdated Controls
- Structural Conditions
- Railroad Corridor
- Loading Dock Areas
- Lots of Dirt and Grime!



# Light Fixtures

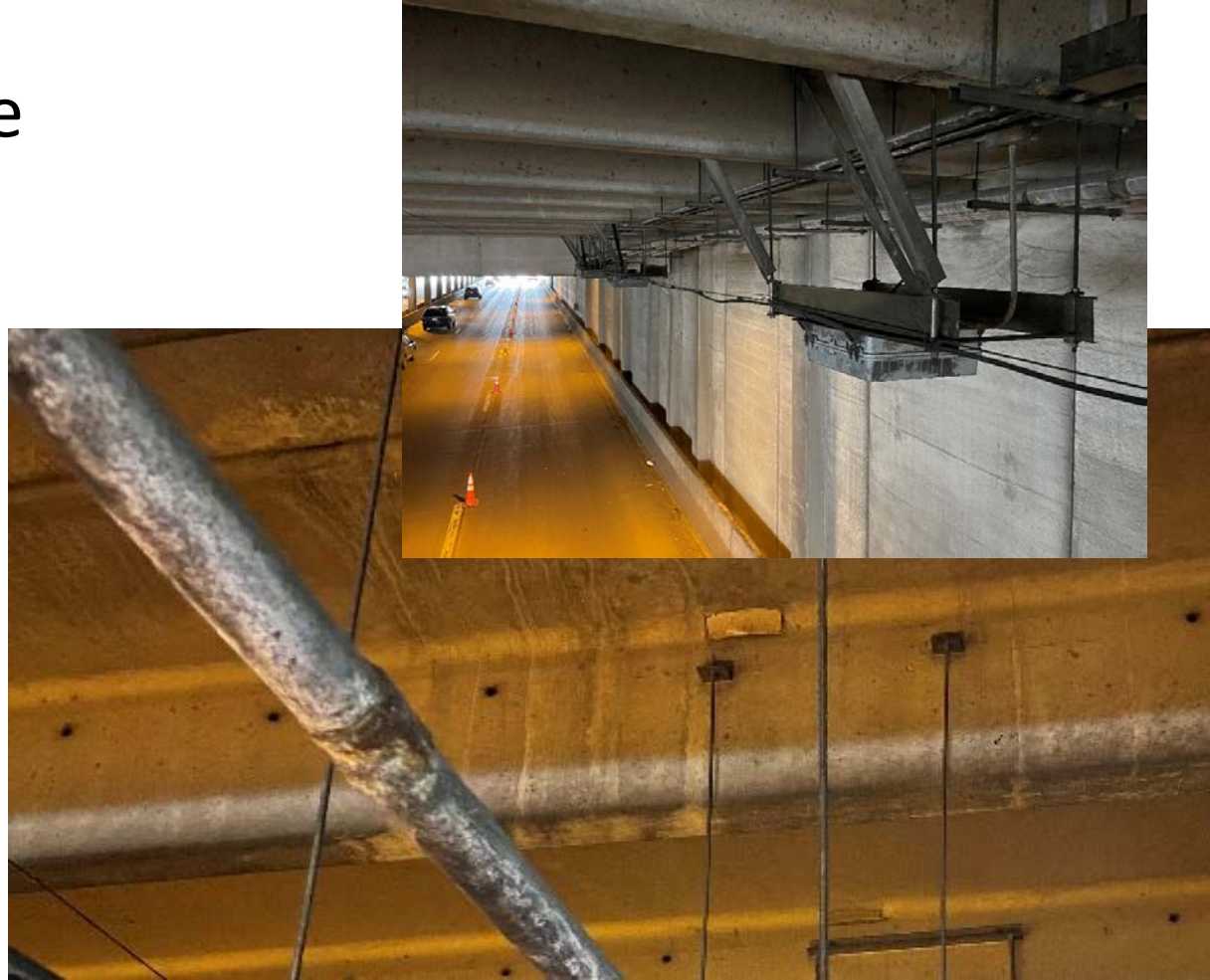
- Non-Operable Equipment
- Outdated Technology
  - Originally HPS
  - Current LED
- Replacements No Longer Available
- Only ~15% of the Fixtures Still Work





# Electrical Infrastructure

- Ladder Style Cable “Tray”
- Exposed Conduits
- Road Salt Damage
- Bi-Metallic Corrosion



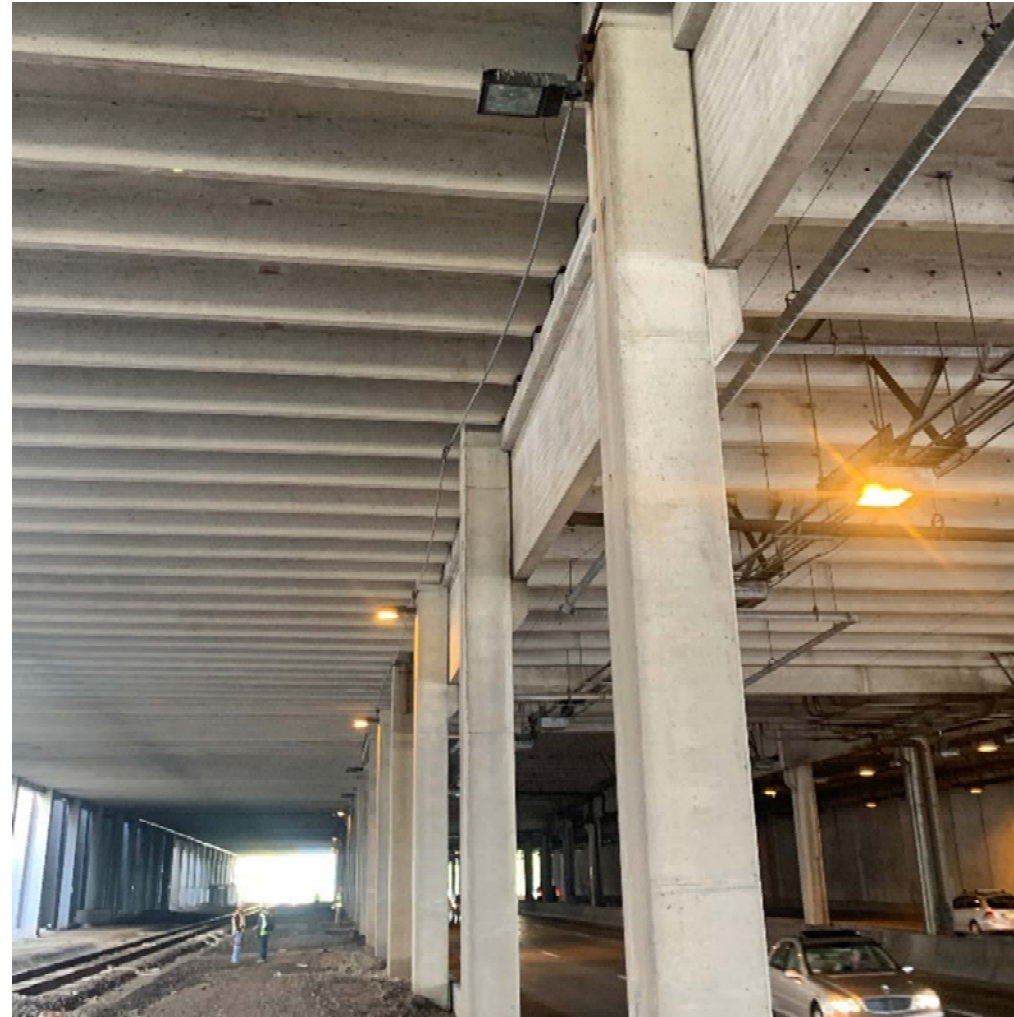
# Structural Hangers

- Structural Inspection
- Stainless Steel
- Rods & Channels
- Dirt & Grime
- Overall Good Condition
- Ability to Re-Use



# Railroad Corridor

- Water Damaged Fixtures
- Outdated Technology
  - Originally HPS
  - Current LED
- Replacements No Longer Available
- Very Few of the Fixtures Still Work





## Loading Dock Areas

- Poor Lighting Levels
- Outdated Technology
  - Originally HPS
  - Current LED
- Difficult to Maintain
- City Owned Fixtures Wired to State Owned Panel



# Power Supply Conduits

- City Owned Ducts with MG&E Cables
- Road Salt Damage
- Bi-Metallic Corrosion



# Existing Lighting Levels

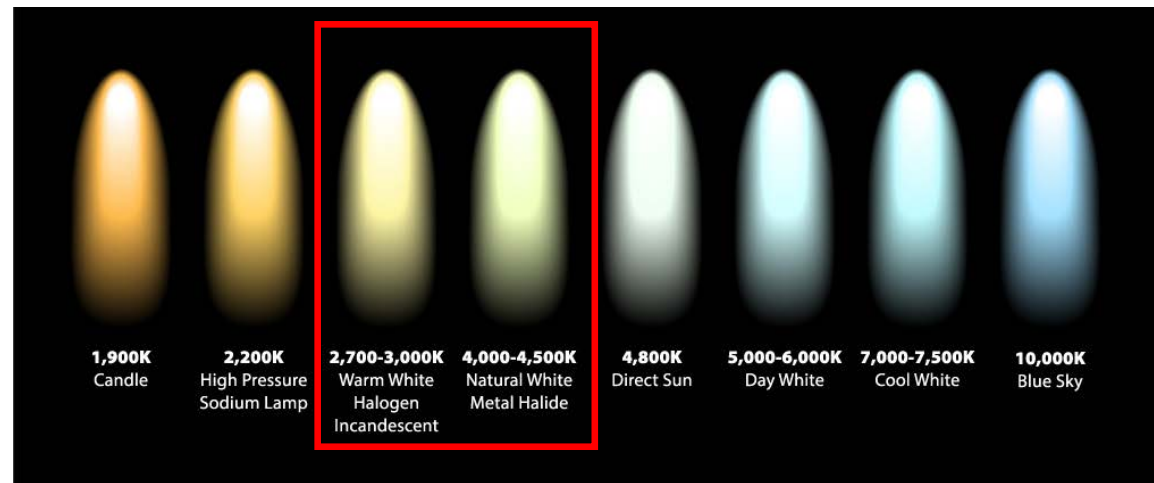
- Daytime Levels
- Nighttime Levels



# Lighting Fundamentals

- “Illuminance” describes measurable light emitted onto a surface
- “Brightness” describes perceived amount of light

Lighting condition	Footcandles	Lux
Full daylight	1,000	10,000
Overcast day	100	1,000
Very dark day	10	100
Twilight	1	10
Deep twilight	0.1	1
Full moon	0.01	0.1
Quarter moon	0.001	0.01
Starlight	0.0001	0.001

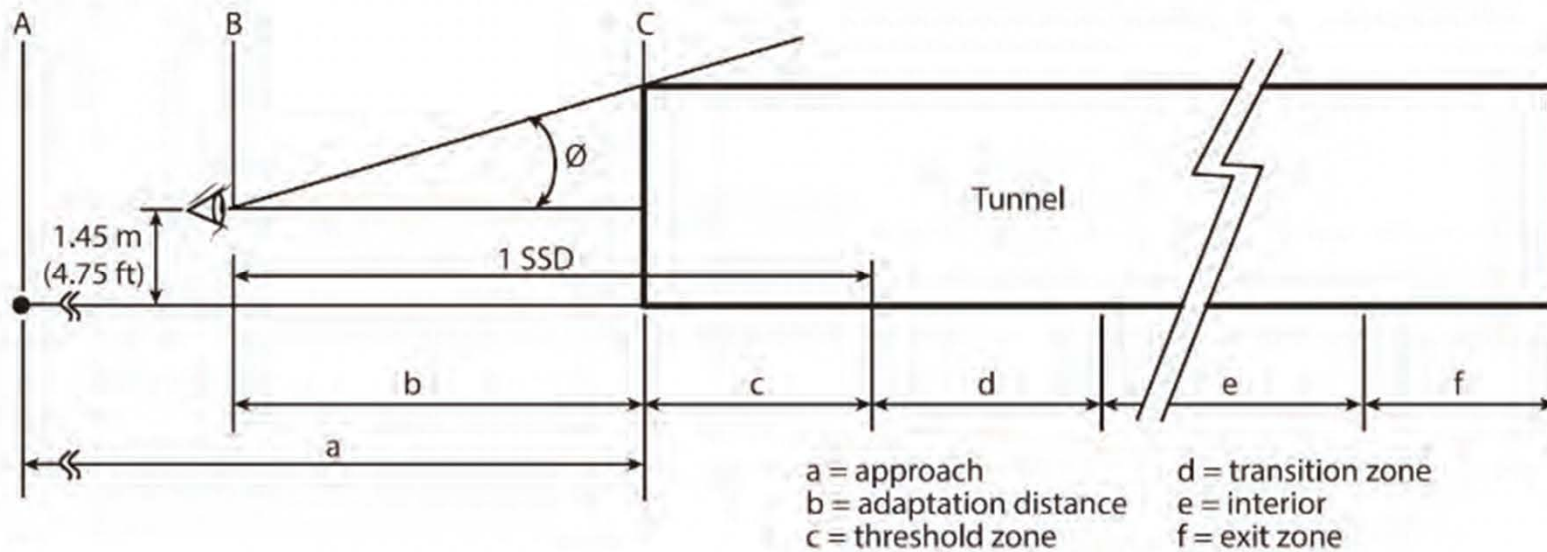




# Tunnel Lighting Theory



A = Point of Observation  
B = Adaptation Point  
C = Portal  
 $\emptyset = 22^\circ$  to  $25^\circ$



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# Tunnel Lighting Theory



Tightly Spaced lighting in the threshold zone

Larger spacing between lights at the tunnel exit

# Lighting Design - Photometrics

- Significant Daylight Penetration and Ambient Light Levels
- Existing High-Output Luminaires were Decommissioned
- Recommend Designing to 50% of IES Target Criteria

Tunnel lighting criteria: IES RP-8-18 Adjustment Factors for Pavement Luminance in Threshold Zone

Tunnel Length	Traffic Volume (AADT)	Cyclists Present	Exit Visible (from 1 SSSD)				Exit Not Visible (from 1 SSSD)			
			Daylight Penetration				Daylight Penetration			
			Good		Poor		Good		Poor	
			Wall Reflectance*				Wall Reflectance*			
		High	Low	High	Low	High	Low	High	Low	
<25 m <80 ft	N.A.	N.A.	0% (No Threshold Lighting Required)				0% (No Threshold Lighting Required)			
25 – 75 m 80 – 250 ft	< 15,000	No	0%	50%	50%	50%	50%	50%	100%	100%
		Yes	0%	50%	50%	100%	100%	100%	100%	100%
		No	50%	50%	50%	50%	100%	100%	100%	100%
76 – 125 m 251 – 410 ft	> 15,000	Yes	50%	50%	50%	100%	100%	100%	100%	100%
		No	50%	50%	50%	50%	100%	100%	100%	100%
		Yes	50%	50%	100%	100%	100%	100%	100%	100%
>125 m >410 ft	All	All	100%				100%			



Daylight Penetration at Tunnel Entrance

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# Lighting Design - Alternatives



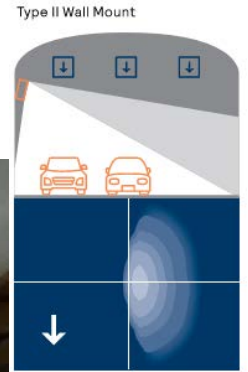
Existing Tunnel Lighting Configuration

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# Lighting Design – Alternative 1



Alternative 1 – Rendering



# Lighting Design – Alternative 1

## Advantages

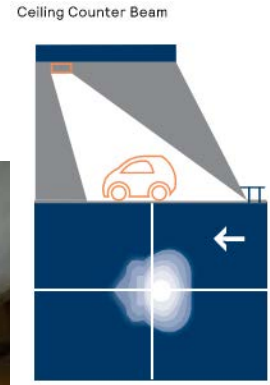
- Consistent with typical tunnel lighting layouts
- Maintenance does not require as tall a lift
- Meets target photometrics

## Disadvantages

- Structural impacts
- Higher cost due to custom structure supports
- Relocation of co-mingled utilities



# Lighting Design – Alternative 2



Counter Beam Distribution

Alternative 2 – Rendering





## Lighting Design – Alternative 2

### Advantages

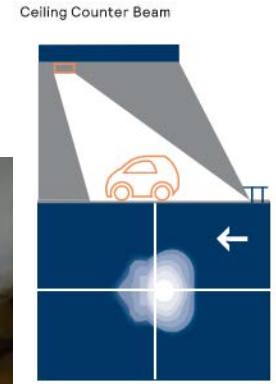
- No/minimal requirement for new structural supports (re-use existing from inside lane)
- Only need to maintain 1 row of lighting per direction

### Disadvantages

- Custom tilted luminaire brackets
- Difficult to meet photometric criteria
- Relocation of co-mingled utilities
- Requires a lift for maintenance



# Lighting Design



Counter Beam Distribution

Alternative 3 –Rendering



## Lighting Design – Alternative 3

### Advantages

- No/minimal requirement for new structural supports
- Consistent with existing conditions
- Meets target photometrics
- No relocation of co-mingled utilities

### Disadvantages

- Maintenance of two rows per direction
- Requires a lift for maintenance



# Other Project Items – External Controls

- Existing Controls – Internally Located
  - Mechanical Rooms in the Parking Structure Above the Tunnel
  - Hard to Access
  - Deteriorating
- Externally Located Controls
  - Easy Access for Maintenance
  - Visibility
  - Independence



Water Damage to Main Disconnect in Room 307B (switch to be replaced by DOA project 21K2D)



Potential Locations for Outdoor Lighting Control Cabinets

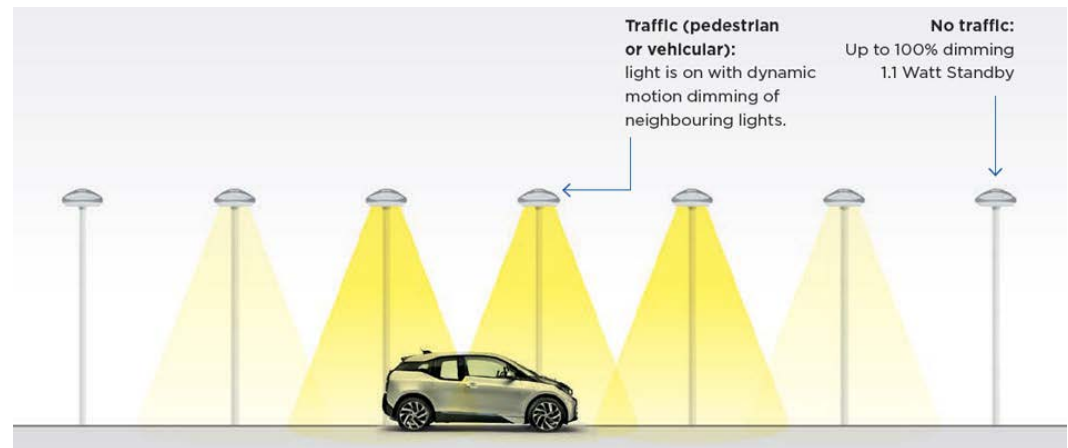
# Other Project Items – Advanced Controls

## Existing Controls

- Operate on Night, Low, Medium, and High Intervals

## Advanced Controls

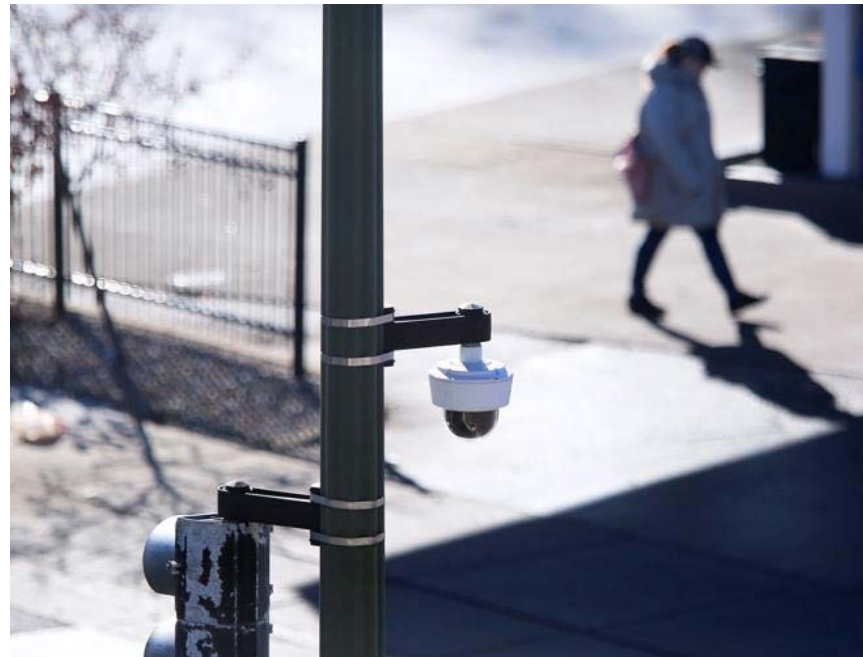
- Dimming Capabilities
- Maintenance Monitoring
- Energy Reporting



Example Advanced Control Lighting System

## Other Project Items – Traffic Life Safety Cameras

- Cameras will be installed on each end of the tunnel
  - Traffic monitoring during significant events
  - False alarm verification
  - Public Safety



City of Madison Camera – East Washington Ave & North Marquette  
Source: Wisconsin State Journal



## Other Project Items – Traffic Impacts

- 2 Lanes per Direction during Peak Periods (Rush Hours)
- 1 Lane per Direction during Off-Peak



Example Traffic Control Lane Closures

# Summary of Project Benefits

- Improved Lighting Levels
- Decreased Energy Consumption
- Reduced Maintenance Requirements
- Harness Modern Technology
- Improved Safety
- Improved Aesthetics



Monona Terrace at Night  
Source: Wisconsin State Journal

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## We Need Your Input – Mural

- Located on the north side of the tunnel - Across the railroad tracks
- Artist – Richard Haas (1987)
- Opportunity to install infrastructure for future mural lighting



Mural in the Monona Terrace Tunnel

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# We Need Your Input – Mural

- Alternative 1 – Light from Above #1
  - Good Illumination
  - Difficult to Maintain – Equipment Must be brought across the railroad
  - Minimal Concerns with Vandalism
  - No Environmental Concerns



Alternative 1 – Rendering



# We Need Your Input – Mural

- Alternative 2 – Light from Above #2
  - Good illumination
  - Difficult to Maintain – But eliminates maintenance concerns with crossing the railroad
  - No Vandalism Concerns
  - No Environmental Concerns



Alternative 2 – Rendering

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# We Need Your Input – Mural

- Alternative 3 – Light from Below
  - Good illumination
  - Difficult to Maintain – Equipment Must be brought across the railroad
  - Significant Vandalism Concerns
  - Environmental Concerns



Alternative 3 – Rendering

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# We Need Your Input – Mural

- Alternative 4 – Direct Lighting
  - Good illumination
  - Easy to Maintain – Equipment does not need to be brought across the railroad
  - No Vandalism Concerns
  - No Environmental Concerns



Alternative 3 – Rendering

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We Need Your Input – Mural

Please Vote!

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# We Need Your Input – Tunnel Entrance

- Static or Color Changing, Programmable Lighting



Hoan Bridge – Milwaukee Wisconsin (Light the Hoan Project)



Madison College – Entrance Facade

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# We Need Your Input – Tunnel Entrance

- Infrastructure Only – Lighting to be Installed at a future date



We Need Your Input – Tunnel Entrance

**Please Vote!**

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# Project Schedule

- Spring – Summer 2024: Finalize Project Design
- August 2024: Bid the Project
- Mid-November 2024: Begin Construction
- Late Spring 2025: End Construction





# Contact Information & Resources

- Engineering
  - Project Manager, David Hansen, (608) 266-4589 , [DHansen@cityofmadison.com](mailto:DHansen@cityofmadison.com)
  - City Traffic Engineering, Gretchen Avilés Piñeiro, [GAvilesPineiro@cityofmadison.com](mailto:GAvilesPineiro@cityofmadison.com)
  - City Engineering, Jonathan Evans, [JEvans@cityofmadison.com](mailto:JEvans@cityofmadison.com)
  - City Planning, Karin Wolf, [KWolf@cityofmadison.com](mailto:KWolf@cityofmadison.com)
  - KL Engineering, Mike Scarmon, [Mike.Scarmon@klengineering.com](mailto:Mike.Scarmon@klengineering.com)
  - KL Engineering, Jacob Joyal, [Jake.Joyal@klengineering.com](mailto:Jake.Joyal@klengineering.com)
- Project Website: [www.cityofmadison.com/trafficengineering/MononaTerraceTunnelLighting.cfm](http://www.cityofmadison.com/trafficengineering/MononaTerraceTunnelLighting.cfm)
  - Updates will be posted to the project website
  - Recording for this meeting will be posted on project webpage
- Facebook – City of Madison Traffic and Parking
- Twitter/X – @MadWIParking
- Engineering Podcast: Everyday Engineering on iTunes, GooglePlay



Thank You!  
Q & A

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