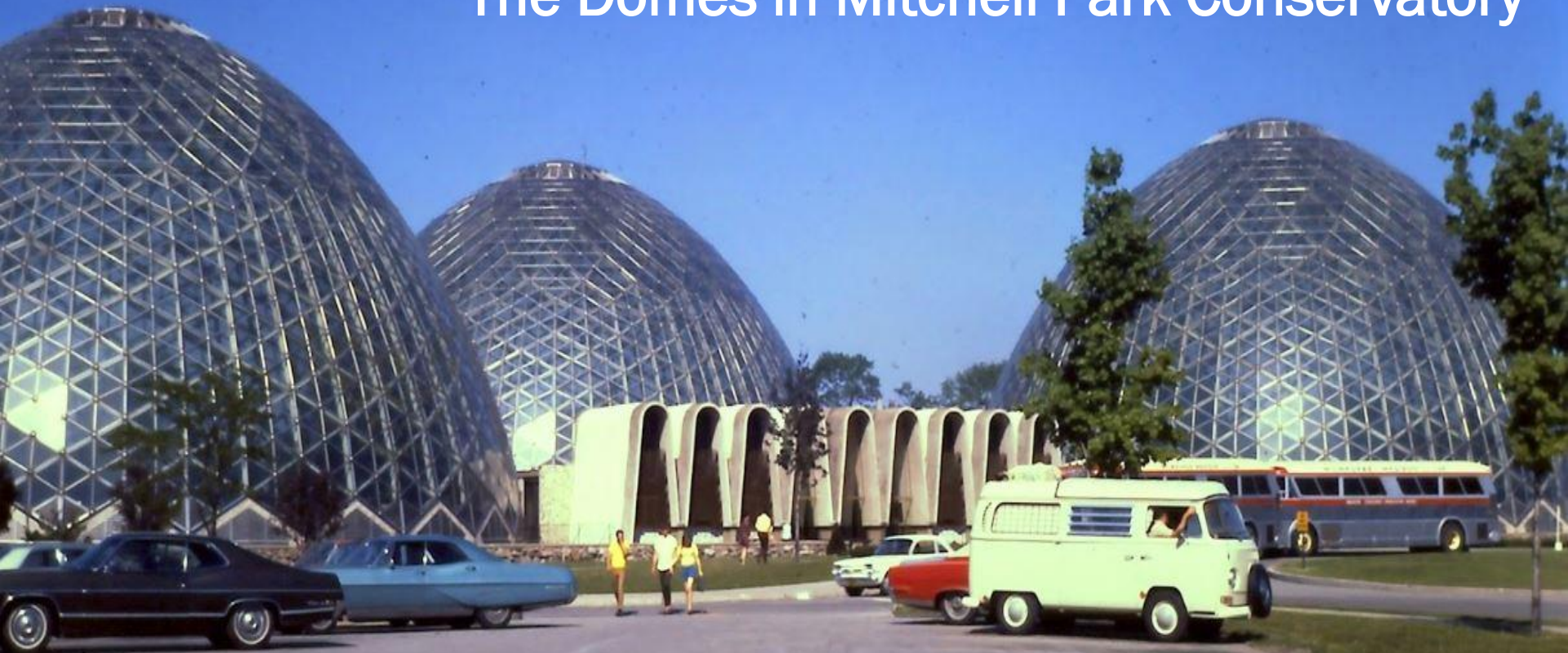


# Milwaukee County Parks, Energy, and Environment Committee

March 8, 2016

## The Domes in Mitchell Park Conservatory



Facilities Management Division  
Milwaukee County Parks



# File 16-220: Domes Recent Timeline

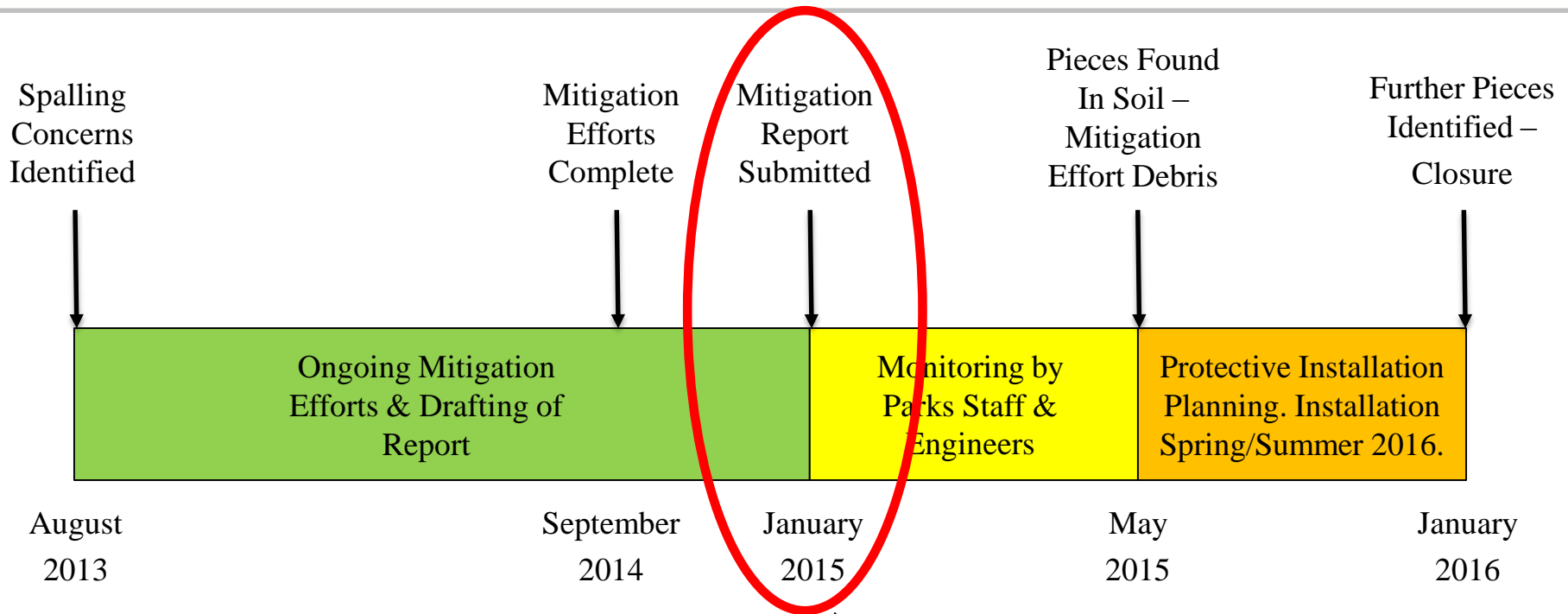
## Agenda

- 2015-2016 Timeline Review
- Short Term Solution for Show Dome
- Updated Cost Estimates
- Arid & Tropical Dome Next Steps
- Overarching Challenges with Domes
- Long Term Plan





# Recent Timeline: Overview



Recommendation to inspect entire structure “every 2-3 years.”





# 2015 Report Condition Photos

## BROKEN GLASS



**Photo F11: BROKEN GLASS LETS IN AIR AND MOISTURE.**





# 2015 Report Condition Photos



**Photo F12: WATER DIVERTER INSTALLED BELOW HUB.**





# 2015 Report Condition Photos

## Photo Taken Prior to Mitigation Efforts

### CONCRETE DETERIORATION AT EMBEDS

Typical for  
~40% of  
Connections



**Photo F01:** VISIBLE CONCRETE CRACKING AT CONNECTION OF GLAZING STANDOFF PIPE TO STRUCTURAL SPACE FRAME.



# 2015 Report Condition Photos

## Photo Taken During Mitigation Efforts

Typical for  
~40% of  
Connections



**Photo F02:** DELAMINATED CONCRETE WAS KNOCKED LOOSE. EXPOSED EDGES OF THE RUSTY STEEL PLATE WERE LATER PAINTED WITH GRAY ZINC-RICH SPRAY PAINT. REMOVING THE CONCRETE PICTURED IN THE PREVIOUS PHOTO ELIMINATES A POTENTIAL FALLING HAZARD.



# 2015 Report Condition Photos

## Photo Taken Prior to Mitigation Efforts

MISALIGNMENT BETWEEN GLAZING STANDOFF PIPE AND CONCRETE EMBED PLATE

### Occurrences

- 4 Tropical
- 1 Arid
- 0 Show

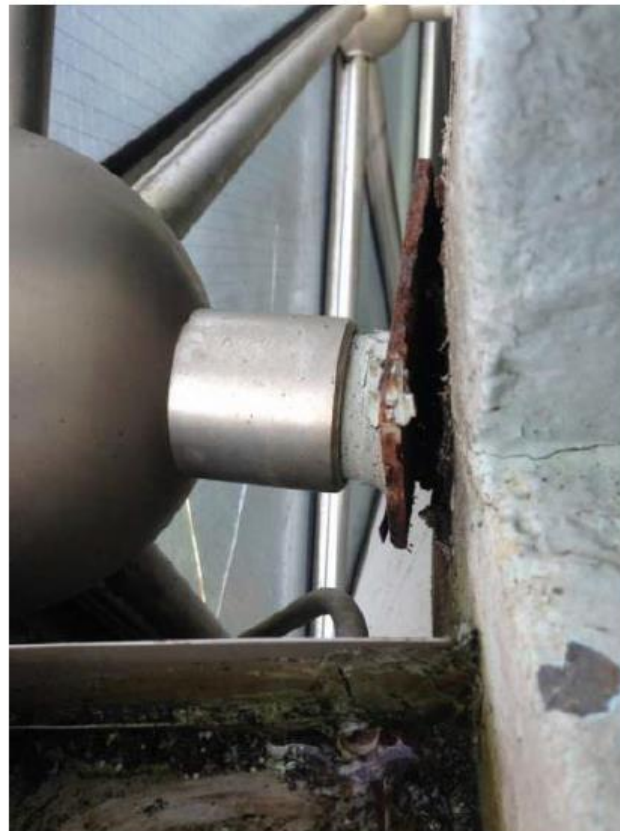


Photo F03: MISALIGNED CONNECTION LEAVES GAP WHERE WELD CANNOT BE MADE ALONG THE BOTTOM EDGE OF PLATE.







# 2015 Report Condition Photos

## Photo Taken After Mitigation Efforts

### Occurrences

- 4 Tropical
- 1 Arid
- 0 Show



**Photo F04:** STAINLESS STEEL CLAMPS PULL MISALIGNED CONNECTIONS TIGHT TO SUPPORTING REINFORCED CONCRETE STRUCTURE.



# 2015 Report Condition Photos

## Photo Taken After Mitigation Efforts

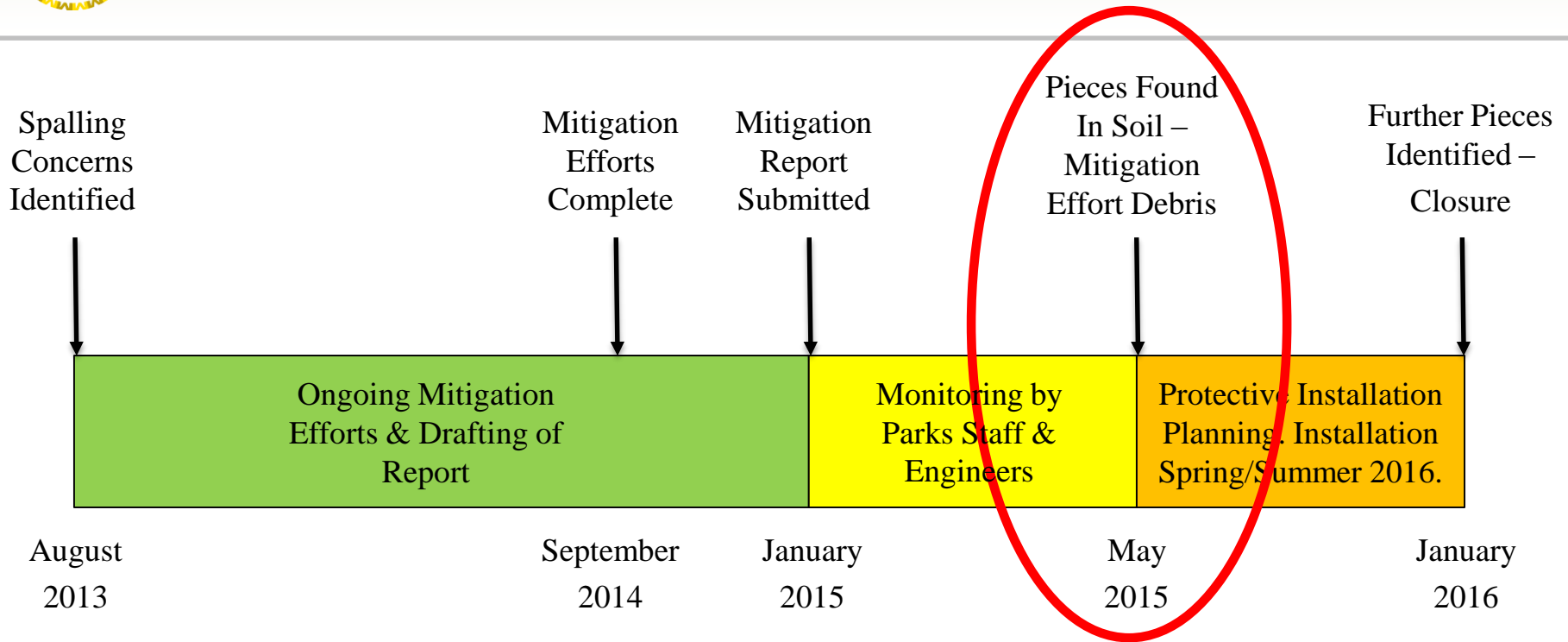


**Photo F07: REMOVAL OF GROUT MAKES ROOM FOR NEW GROUT REPAIR.  
CONNECTION PLATE EXHIBITS SOME RUST.**





# Recent Timeline: May 2015





May 2015

## Concrete Pieces Identified in Soil

- Appeared to be from mitigation project, but that short / medium / long term plans must be initiated.

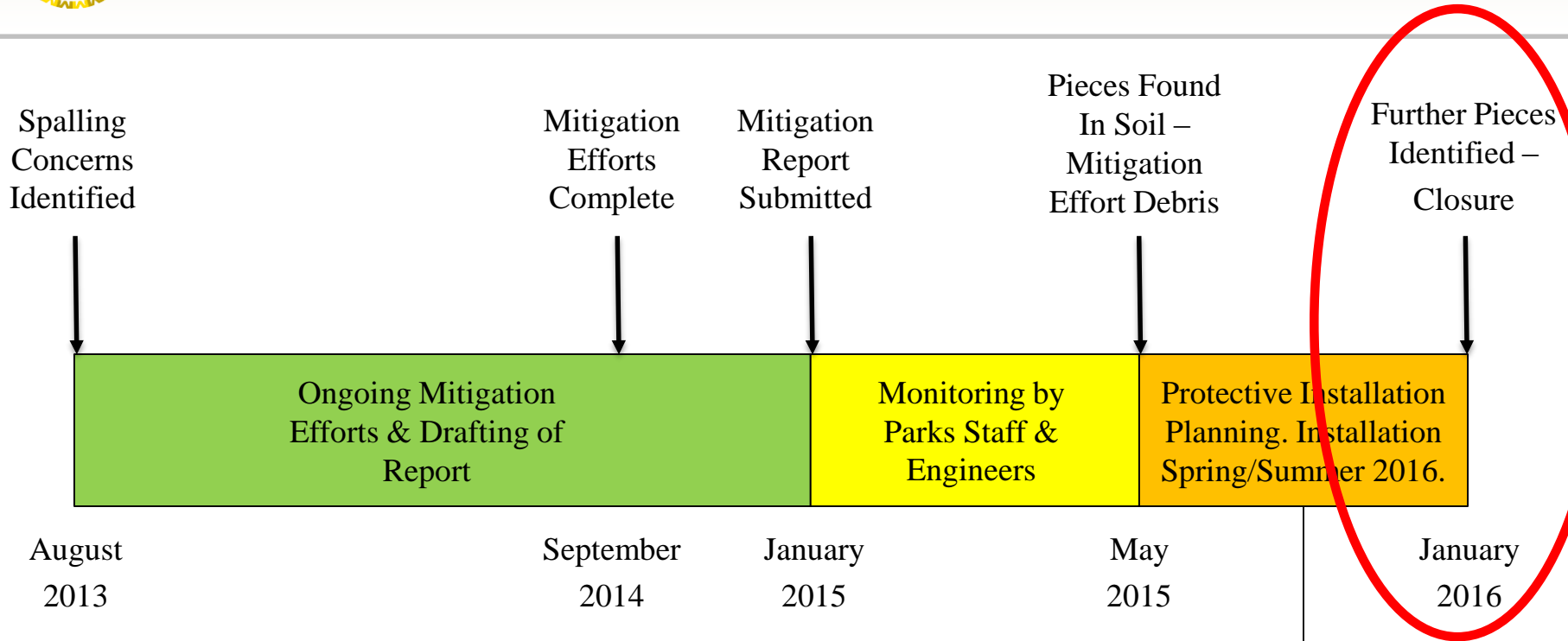
### Three Plans Initiated:

1. Extensive Monitoring & Logging
2. Netting Project Development
3. Public Long Range Planning Process for Repair or Replacement Options





# Recent Timeline: 2015 Funding

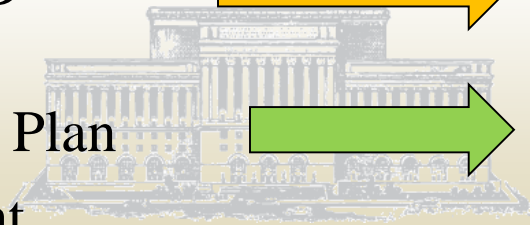


2015 Funding Rec'd

Netting P&D



Long Range Plan Development





# Recommendation to Close

## Situation

- Engineering team on site for netting mock up meeting in January 2016
- Further spalled concrete identified in January.

## Action Taken:

- Consultant Engineers, Risk Management, FMD, Parks, Exec's Office, and Budget met to discuss situation
- **Concurrence that with unknown source of larger piece and signs of continued spalling, despite mitigation efforts in 2014, only logical answer to close effective immediately.**





# Spalling Protection Options

## 1. Covered Pathways

- Doesn't protect staff and greatly lessens 'Domes experience'

## 2. Netting/Mesh on Inside of Structure

- Initially challenged due to aesthetics
- Better aesthetic solution identified recently
- Benefits related to simplicity & all encompassing protection

## 3. Netting/Mesh at Connections

5,100 Connections

- Initially viewed as top solution.
- Incredibly expensive
- Highly volatile pricing due to time required.
- Simply assuming \$300 per connection = \$1.5M





# Prerequisites of Spalling Protection

- 1/2" or smaller opening size
- Flame Resistant
- Mold/Mildew Resistant
- Drains Water







# Criteria for Objective Review

- Staff areas protected as well as pedestrian paths
- Cost
- Duration to install
- Availability
- Lifespan (5 yr min – up to 10+)
- Visually appealing
- Impact on future inspection
- Impact on plants
- Impact on visitor experience
- Vegetation/habitat modification requirements





# Objective Review

Criteria	Importance Rating	Metal Mesh Options			Poly Netting Options*		Canopy Over Walkways
		Wrap Joints SS 1/2" Hex	Interior Face SS 1/2" Hex	Interior Face Galv 1/4" Square	Wrap Joints 1/4" White	Interior Face 1/4" White	
Cost	5	1	2	2	1	3	3
Duration of Installation per Dome	3	2	3	3	2	3	1
Availability	1	2	2	3	1	1	2
Lifespan (5 yr min - up to 10+)	4	3	3	1	2	2	3
Visually appealing	2	3	3	2	3	1	1
Impact on future inspection	5	2	2	2	1	2	1
Impact on Plants	4	3	3	2	3	1	1
Impact on Visitor Experience	5	3	3	3	3	3	1
Protect Staff Area	5	3	3	3	3	3	1
Vegetation/Habitat Modification	4	3	3	3	3	3	1
Maximum Possible Points:	114	95	103	90	85	91	57
Minimum Possible Points:	38						
Approx Cost for Show Dome		\$301,000	\$266,000	\$239,000	\$276,000	\$231,000	\$283,000

\* Poly will not allow Show Dome to open in May due to lead time

Red indicates an unacceptable condition





# Cost Update – Interior Netting

<b>Project Cost</b>	<b>½" SS Hex Mesh</b>
Show Dome	\$266K
Tropical Dome*	\$TBD
Arid Dome*	\$TBD
<b>Spalling Protection (Three Domes)</b>	<b>\$266K + Arid/Tropical Domes</b>
Updated 2008 Estimates	\$30K
Pre-Award Long Range Plan Support	\$50K
Long Range Planning RFP	\$100K
Graef Engineering Support	\$100K
AE&ES Project Management	\$85K
<b>Short &amp; Long Term Soft Costs</b>	<b>\$365K</b>
<b>Current Total</b>	<b>\$631K + Arid/Tropical Domes</b>

Recommend approving resolution and \$500K.

\* Return in May with better cost analysis for Arid and Tropical Domes.





# Picture of Interior Netting - Distance





# Arid / Tropical Dome Plan

- Use lessons learned in Show Dome for efficiencies and cost control
- **Arid and Tropical Domes have highly variable schedule based on:**
  - Lift Availability
  - Material Availability
  - Personnel Availability & Concurrent Work Options
  - Acquisition Plan
- Specialized lift required to access concrete frame...





# Specialized Lift (Tropical and Arid)



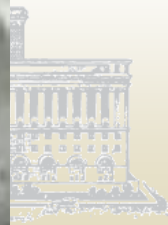


# Specialized Lift (Tropical and Arid)





# Specialized Lift (Tropical and Arid)







# Next Steps for Short Term Solutions

- Priority 1: Show Dome Opening
- Priority 2: Scope Development for Arid and Tropical
- Priority 3: Award work on Arid and Tropical Dome
- Timeline for Arid and Tropical Domes?
  - Too many variables to answer at this time.
  - 10-20 weeks per Dome
  - Material lead times vs. costs of more expensive materials
    - \$1/SF lead time possibly 3-4 months
    - \$4/SF lead time TBD
  - Concurrent work options based on lift availability





# Long Term Solutions Needed

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**None of the short term solutions greatly extend the serviceable life of the Domes' structure.**

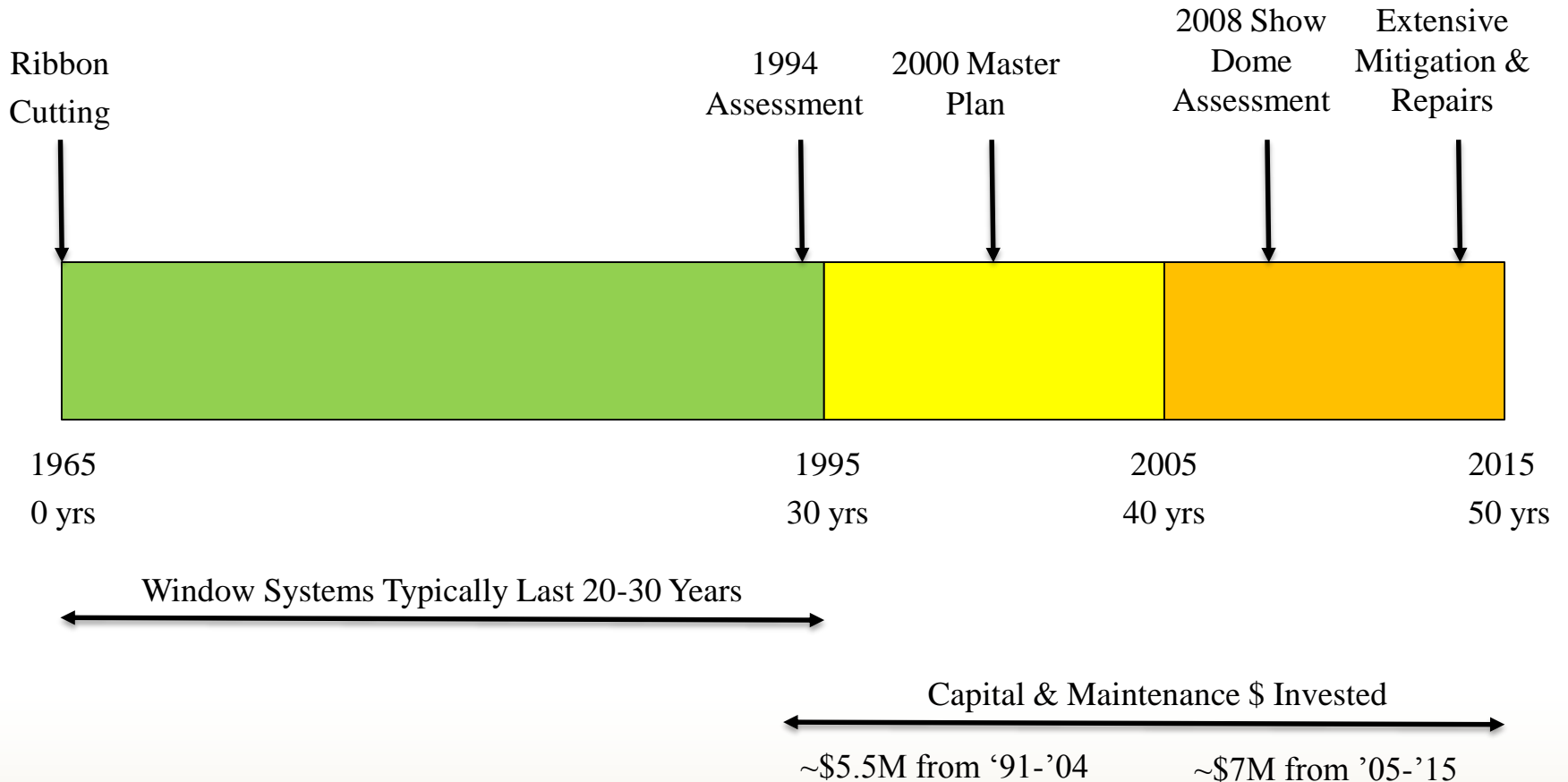
**Ongoing challenges will persist...**

**We have an opportunity we need to seize.**

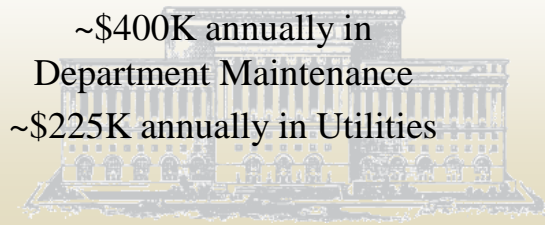




# Domes Engineering Timeline



**1994 to Current: Until the water infiltration is stopped, the Domes will continue to deteriorate.**





# Challenges with Domes Design & Use

1. Inability to affordably access interior or exterior above 20'.
  - Exterior typically requires crane for each maintenance action.
  - In 2013, located specialized lift to access Arid & Tropical Dome interiors.
  - Few economies of scale due to unique requirements for repair.
2. ~9,400 Windows
  - Each cut to size when replaced.
  - Due to racking/settling, every piece should be verified off site prior to install.
3. ~5,100 Hub Connections (aluminum to concrete frame)
  - Each a point of potential corrosion and spalling due to steel baseplate.
4. Internal Drainage System internal to aluminum framing
  - Clogged throughout structure and virtually inaccessible due to #1.
  - Tropical Dome constantly dripping inside due to backup in clogged drains.
5. Ensuring plant life maintained throughout repairs
  - Particularly challenging in Arid and Tropical Domes.
  - Must be trimmed back by staff to access interior walls.





# What's Next?

## Our Public Process Framework

- *Phase 1: Community Engagement & Research*
- *Phase 2: Conservatory Plan Development*
- *Phase 3: Conservatory Plan Presentation and Approvals*

*Our plan is to preserve and protect the Conservatory's legacy through a robust community planning process with active public involvement and ongoing respect for the history and unique heritage of the Mitchell Park Horticultural Conservatory.*





# What's Next?

## Phase 1: Community Engagement & Research (3 months)

- *Form a Conservatory Steering Committee*
- *Review materials, plans, reports, studies*
- *Asses conservatory programs, funding and structure*
- *Engage stakeholders and the community at large*
- *Identify options and make recommendations*
- *Answer “What is the long range plan for the Conservatory Domes?”*
- *Prepare a Scope (RFP/RFQ) for Conservatory Master Plan process (Phase 2)*





# Planning for the Future

- *Which options are on the table?*
  - *Repair the Domes?*
  - *Complete Restoration of the Domes?*
  - *Rebuild the Conservatory Domes?*
  - *Envision a new future of the Mitchell Park Conservatory?*
- *We are committed to engaging with the public in a long-term planning process that is transparent and comprehensive*





# What's Next?

## Conservatory Steering Committee

- *Horticultural Services Manager, Department of Parks, Recreation and Culture*
- *President, Friends of the Domes*
- *Representative, Clarke Square Neighborhood Initiative*
- *Representative, Potawatomi Bingo and Casino*
- *Representative, Journey House*
- *Representative, MPS, Department of Business, Community and Family Partnerships*
- *Representative, Visit Milwaukee*
- *Representative, Newaukee*
- *Representative, Zilber Foundation*
- *Representative, Brewers Foundation*
- *Representative, Horticultural Practitioner*
- *Representative, Historical Preservation Group*
- *Milwaukee County resident*
- *Consultant*







# What's Next?

## Phase 2: Conservatory Plan Development (3-6 months)

- *Public information and Public Workshop meetings*
- *Draft Conservatory Master Plan*
- *Detailed analysis and Projected costs*
- *Presentations of the draft plan*
- *Follow-up interviews and meetings*





# What's Next?

## Phase 3: Conservatory Plan Presentation and Approvals (3 months)

- *Final Conservatory Plan, including implementation plan*
- *Presentations to Steering Committee, County Executive and staff, and County Board of Supervisors*

Phase 4: (contingent item) development of design, bid, build contract documents



# Milwaukee County Parks, Energy, and Environment Committee

March 8, 2016

## The Domes in Mitchell Park Conservatory

<http://county.milwaukee.gov/Domes>

