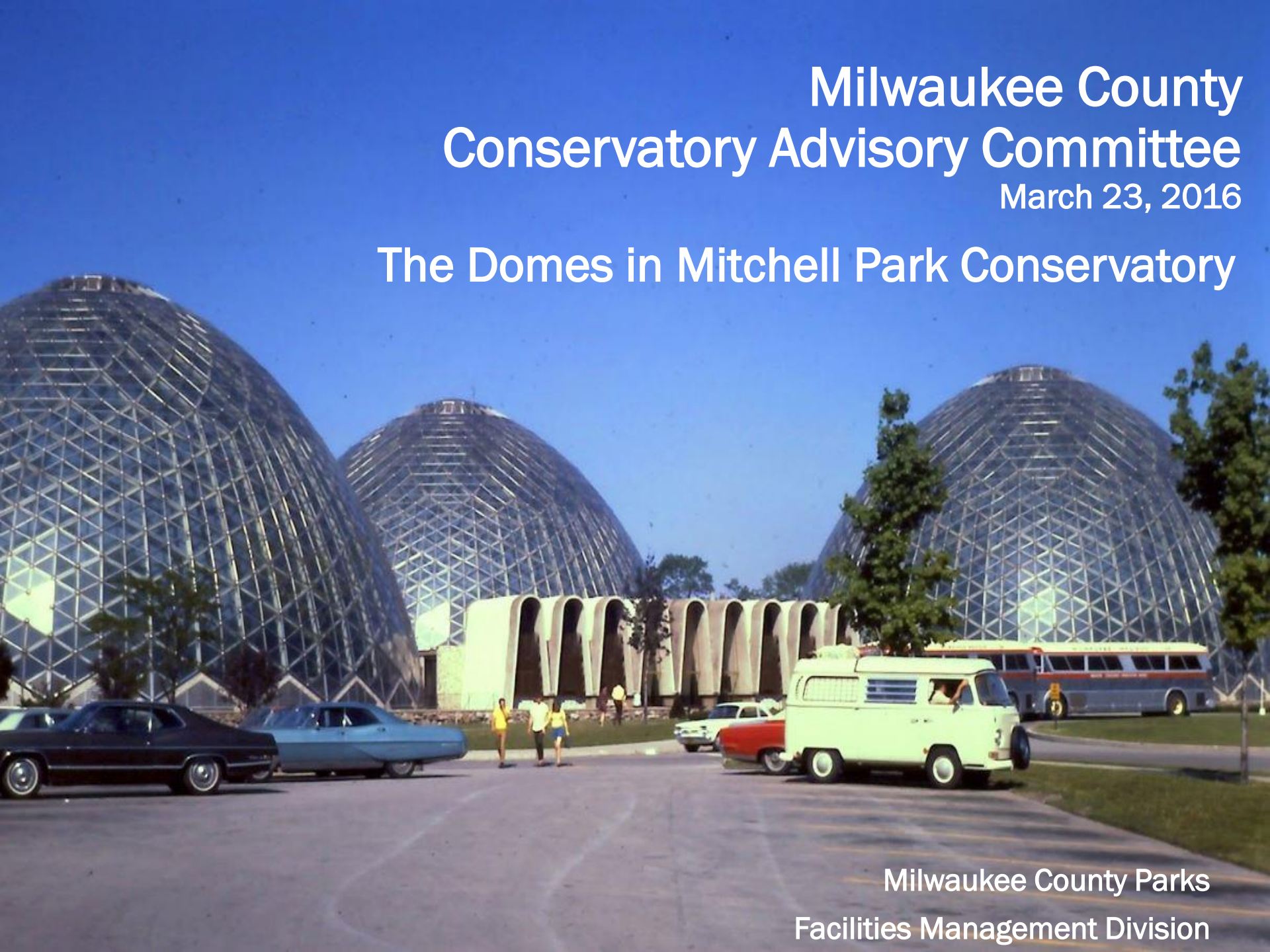
Milwaukee County Conservatory Advisory Committee

March 23, 2016

The Domes in Mitchell Park Conservatory



Milwaukee County Parks

Facilities Management Division

Conservatory Advisory Group Agenda

- *Welcome/Introduction*
- *Purpose and Timeline of advisory group*
- *Share Current Situation of The Domes*
- *Discuss Community Engagement Process*
- *Next steps / Next Meeting*

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.

Our Public Process Framework

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

Milwaukee County will establish a community engagement process to evaluate long term options for the future status of the Mitchell Park Horticultural Conservatory (aka The Domes) and associated uses, activities, costs, and benefits. This process will include a broad range of opinions from individuals and groups, as well as expert analysis of conditions, constraints, and opportunities. A three-phase work program will be stablished to achieve this goal to include the formation of a Conservatory Advisory Group, Public Engagement Process Phase, and Planning & Design Phase.

Long Term Planning

Phase 1: Community Engagement & Research (3 months)

- *Form a Conservatory Advisory Group*
- *Review materials, plans, reports, studies*
- *Assess 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?

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 Advisory Committee, County Executive and staff, and County Board of Supervisors*

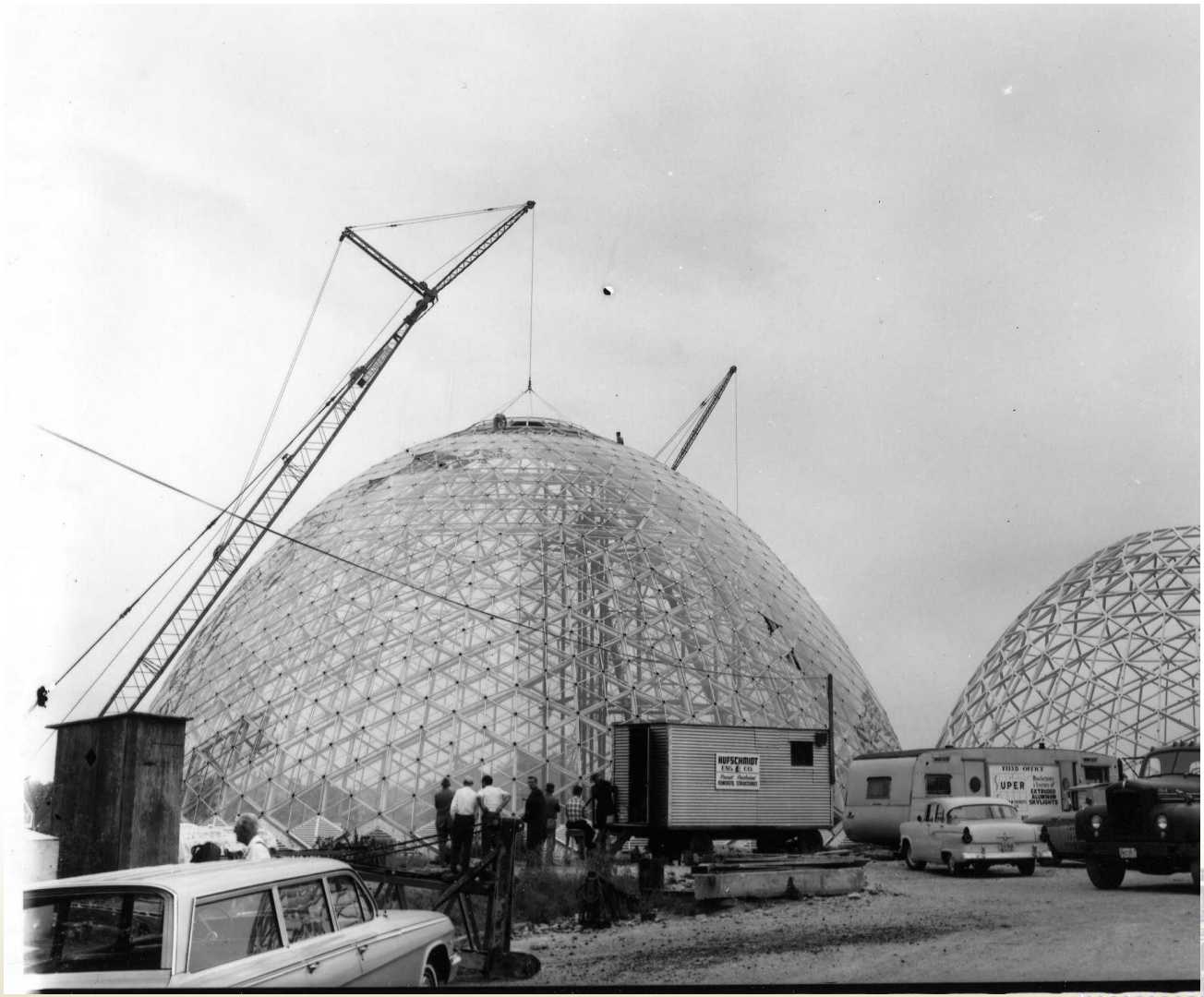
Phase 4: (contingent item) development of design, bid, build contract documents

Engineering Review

Engineering Review Agenda

- Construction Background
- Recent Timeline
- Long Term Cost Scenarios
- Short Term: Solution for Show Dome
- Medium Term: Arid & Tropical Domes

The Domes Construction



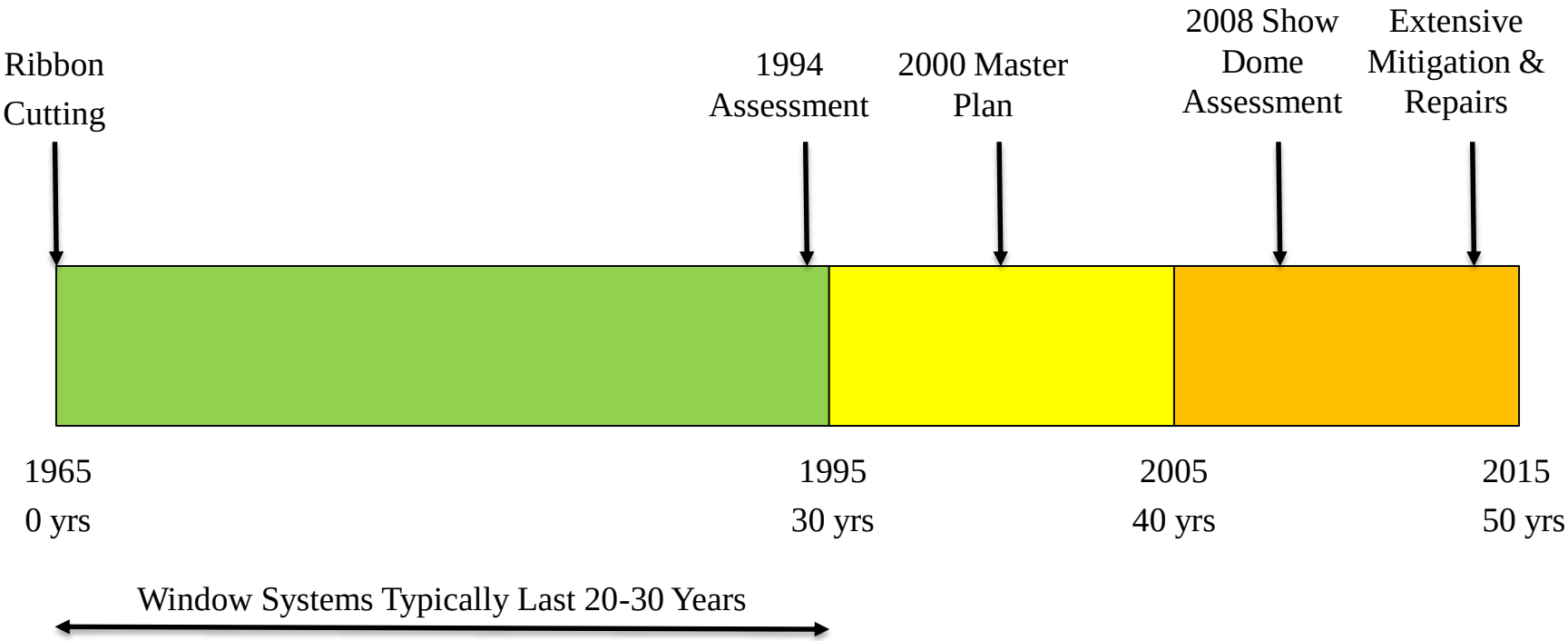
Video Link: http://www.milwaukeedomes.org/history.asp

The Domes Construction

- Construction of the **Milwaukee Domes** was completed in stages over four years.
- Milwaukee's Floral Show Dome was the first dome to open in 1964. Lady Bird Johnson dedicated the Floral Show Dome in 1965.
- Milwaukee's Tropical Dome was completed in 1966.
- Milwaukee's Desert Dome was completed in 1967.
- These stages of construction allowed Milwaukee County to pay for the construction in yearly appropriations, avoiding the cost of bonding.
- The last of Milwaukee's three Domes was opened on one of the most historic days for the Milwaukee Parks system in October, 1967.

Source: Friends of the Domes Website

Domes Engineering Timeline



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

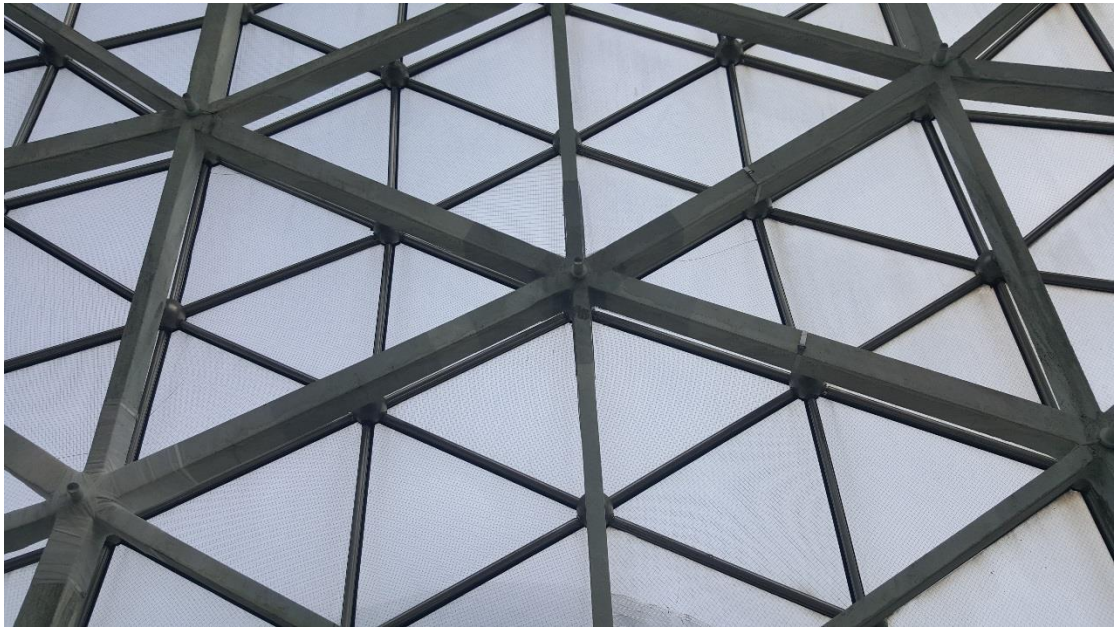
Challenges with Domes Design & Use

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.

Domes Construction

5,100 Hub Connections

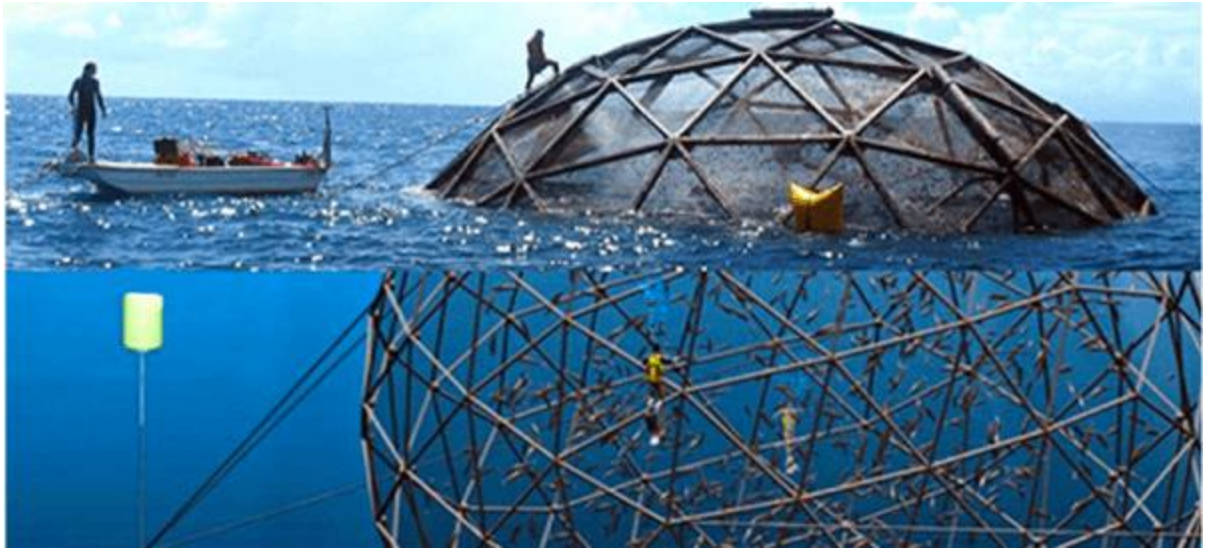
1,700 Per Dome



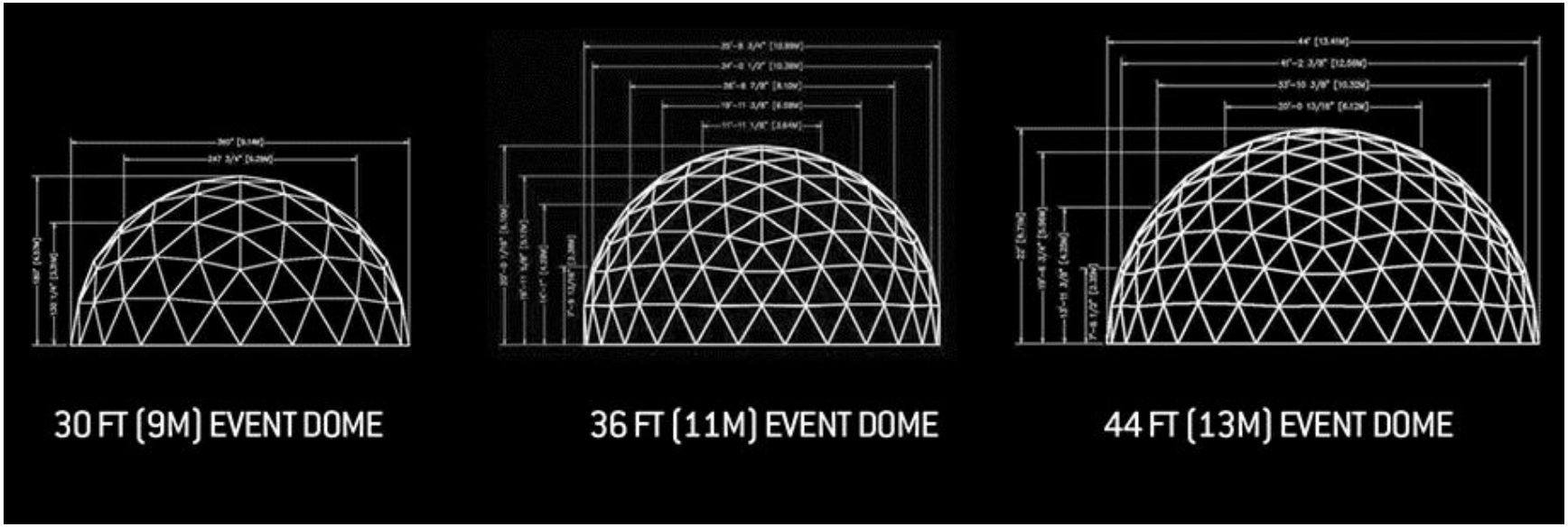
Mitchell Domes vs. Other Typical Domes: Geodesic domes typically do not entail concrete frame with steel plates.

21st Century Geodesic Dome

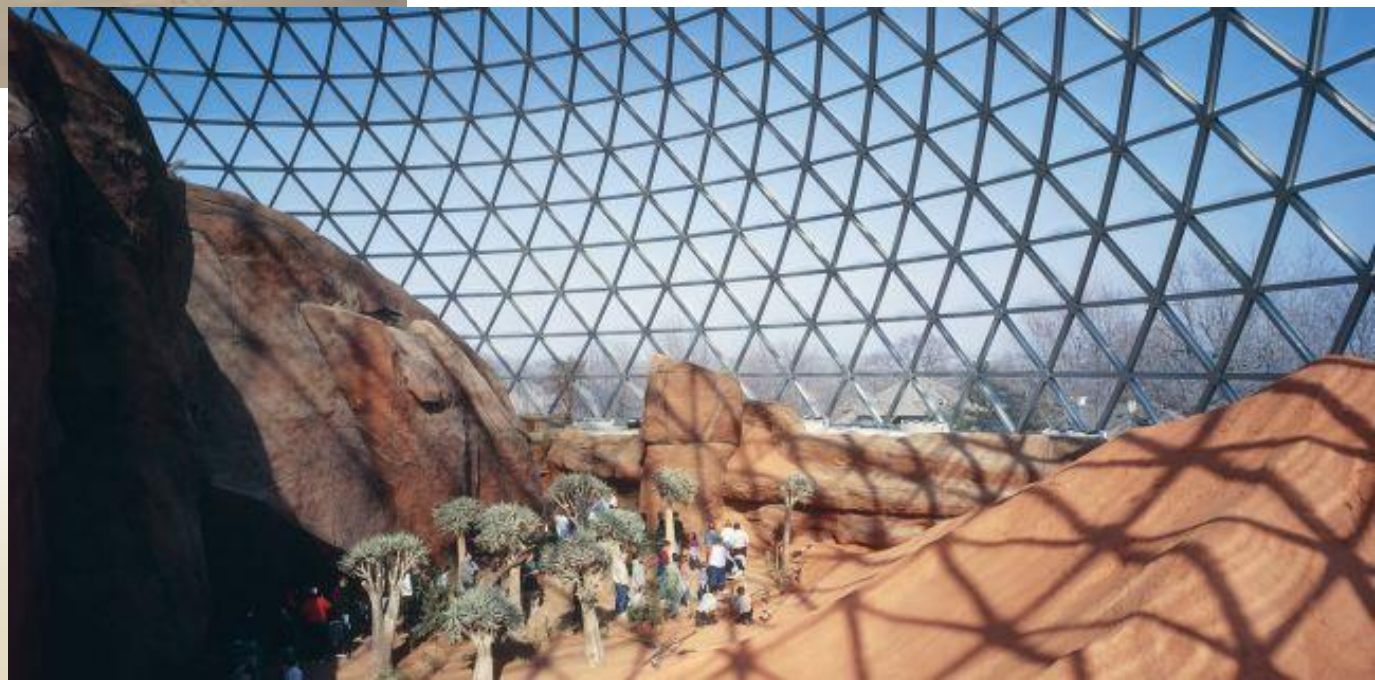
21st Century Geodesic Dome



21st Century Geodesic Dome



21st Century Geodesic Dome



Previous Cost Estimates

Previous Whole Renovations Reviewed	Estimate
• 1994: Complete Window Replacement	$10M (3 Domes)
– No costs indicated for framing, drainage, concrete work, or code upgrades	
• 2008: Full Restoration of Show Dome	$15M–$18M (1 Dome)
– No costs indicated for code upgrades and support facility requirements	
• Less Expensive Options	$4M-$13M (1 Dome)
– Partial Restorations or replacement of Dome with geodesic structure	
– No costs indicated for code upgrades and support facility requirements	

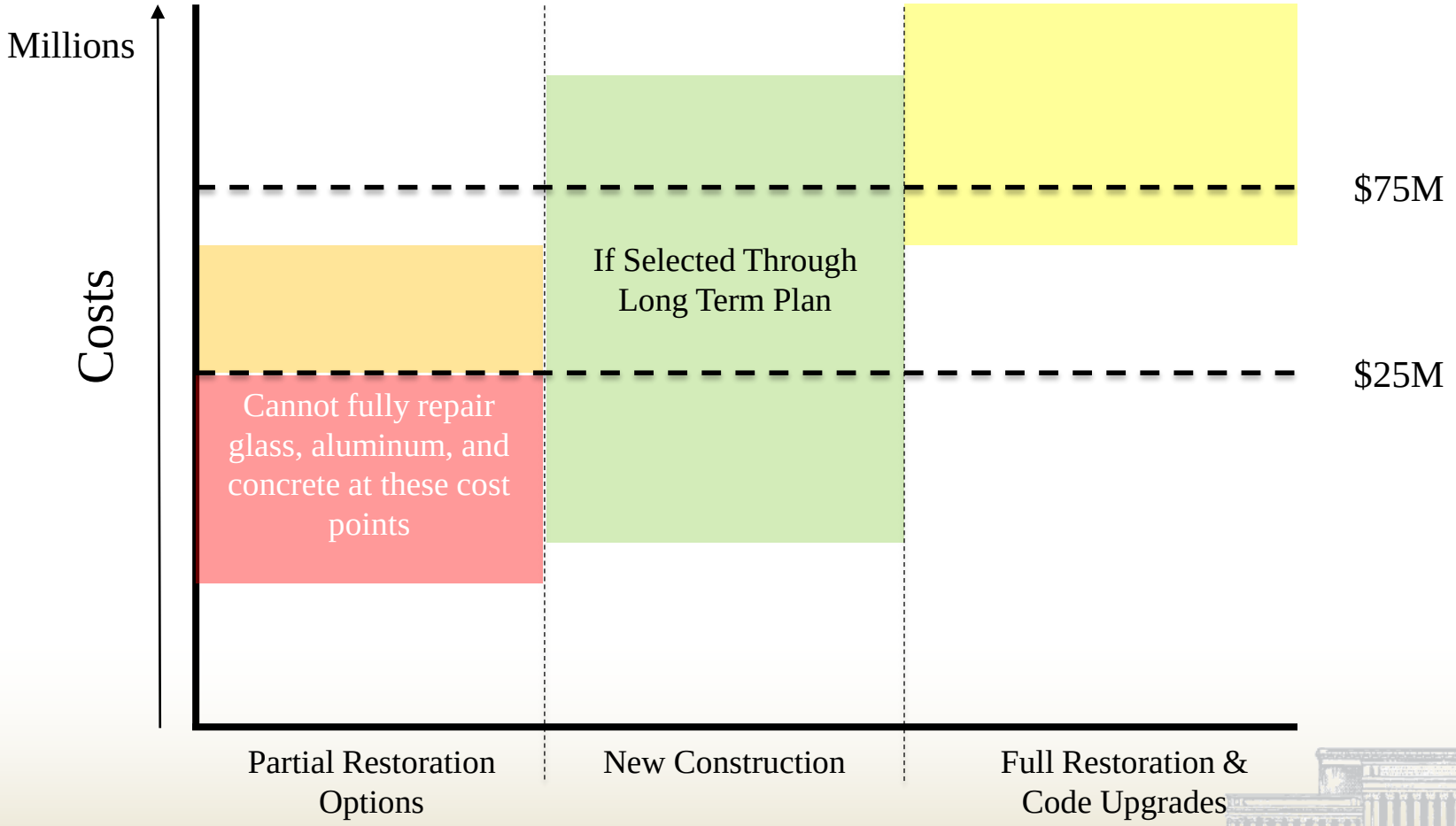
Where did the $75M Come From

1. Full Restoration of Show Dome in 2008* $15M–$18M (1 Dome)
2. Adjusted to 2016 Costs Using RSMeans Construction Cost Index
3. Projected to 2019 to Potential Construction Period
4. Factor for 3 Domes
5. Add in façade costs and aerial lift support
6. Add Construction Management oversight (Safety, QC, Shedule, Cost Mgt)
7. Total Range $60M - $71M for Full Rehabilitation Option***

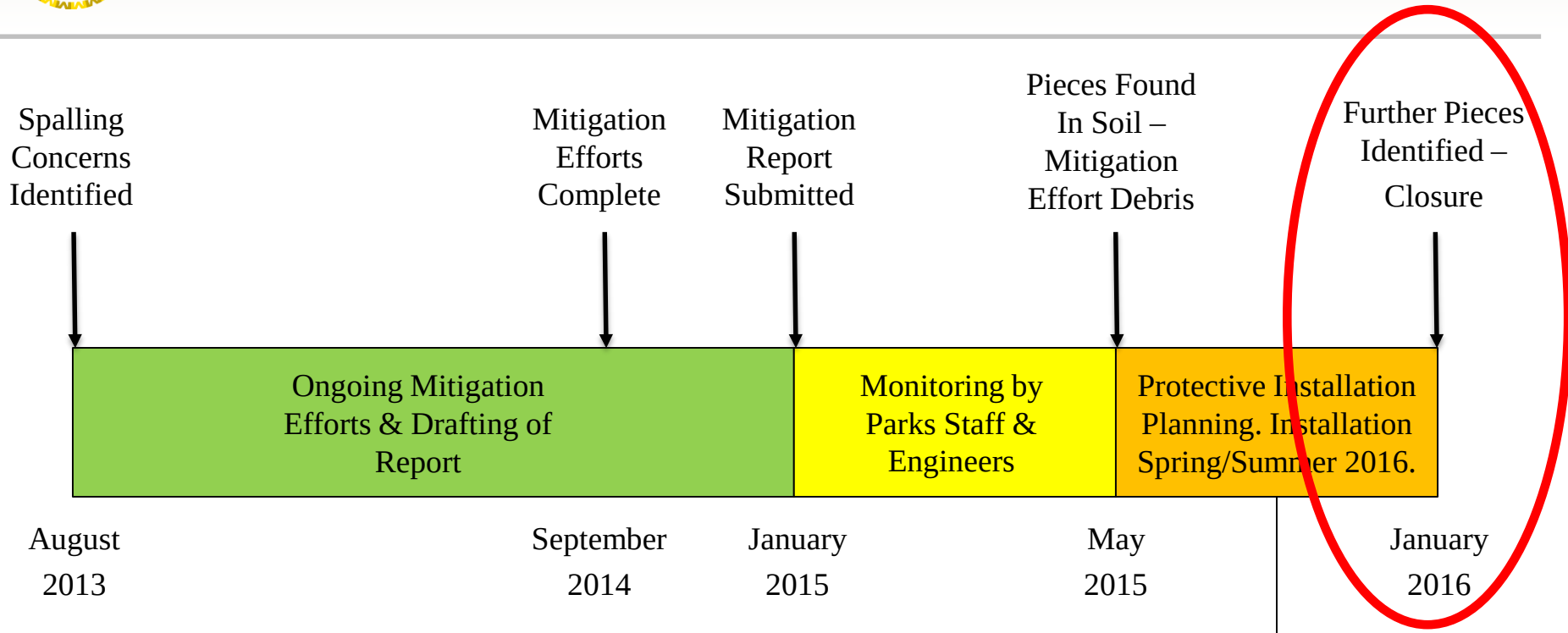
***Still does not include code required upgrades throughout.

Proposed resolution includes updating the 2008 options and required code costs.

Unique Construction = High Costs



Recent Timeline: 2015 Funding



2015 Funding Rec'd

Netting P&D

Long Range Plan Development

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

Photo F03: MISALIGNED CONNECTION LEAVES GAP WHERE WELD CANNNOT BE MADE ALONG THE BOTTOM EDGE OF PLATE.

Occurrences

- 4 Tropical
- 1 Arid
- 0 Show

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 <u>After</u> Mitigation Efforts

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

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

Sep. 2015: 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

Jan. 2016: 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.**

Prerequisites of Spalling Protection

- ½” 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

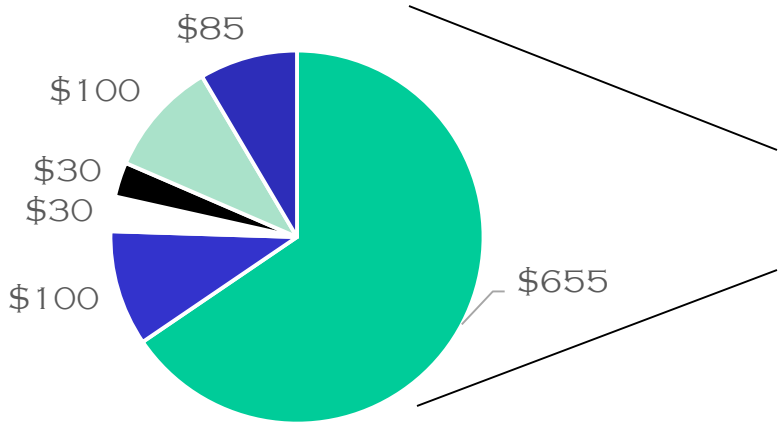
Project Cost	½" SS Hex Mesh
Show Dome	$266K
Tropical Dome*	$TBD
Arid Dome*	$TBD
Spalling Protection (Three Domes)	**$266K + Arid/Tropical Domes**
Updated 2008 Estimates	$30K
Pre-Award Long Range Plan Support	$50K
Long Range Planning RFP	$100K
Graef Engineering Support	$100K
AE&ES Project Management	$85K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

County Board approved resolution and $500K.

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

Total Funded on 2015-2016 Efforts

Refined Spalling Protection, Incorporation of Urban Planning, & Updated 2008 Cost Estimates ($K)



Totals
$1M

- Revised Protection Costs*** Updated 2008 Costs & Options
- Long Term Planning Requirements
- Engineering Support
- RFQ Development w/ Urban Planner
- AE&ES PM Costs

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 & Medium 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

Community Engagement Approaches

- Large Group Events
- Targeted Group Events
- Detailed Information Gathering
- Problem Solving

Community Engagement Approaches

Large Group Events

- Public Information Meetings
- Public Feedback Meetings
- Open Houses
- Listening Sessions
- Questions & Answers Sessions

Milwaukee County Parks

GRAEF

Community Engagement Approaches

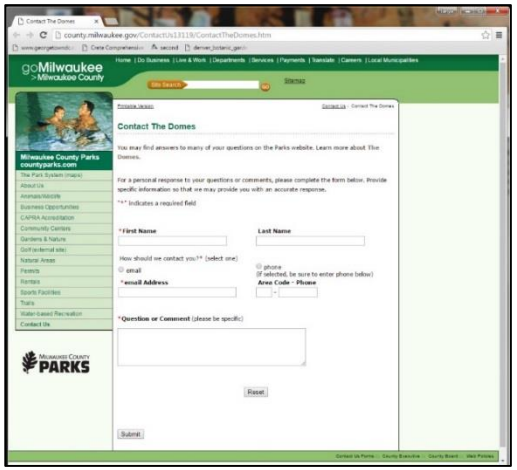
Targeted Group Events

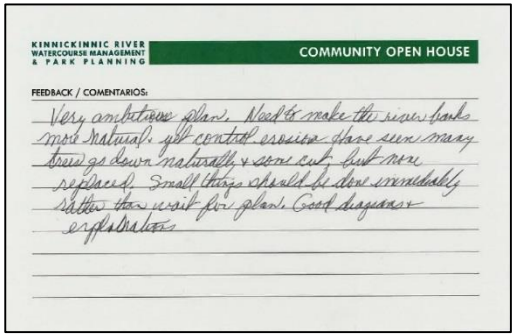
- Focus Groups
- Guest Presentations
- One-on-One Meetings / Interviews

Community Engagement Approaches

Detailed Information Gathering

- Surveys
- Online Surveys
- Registered Comments (name, address)



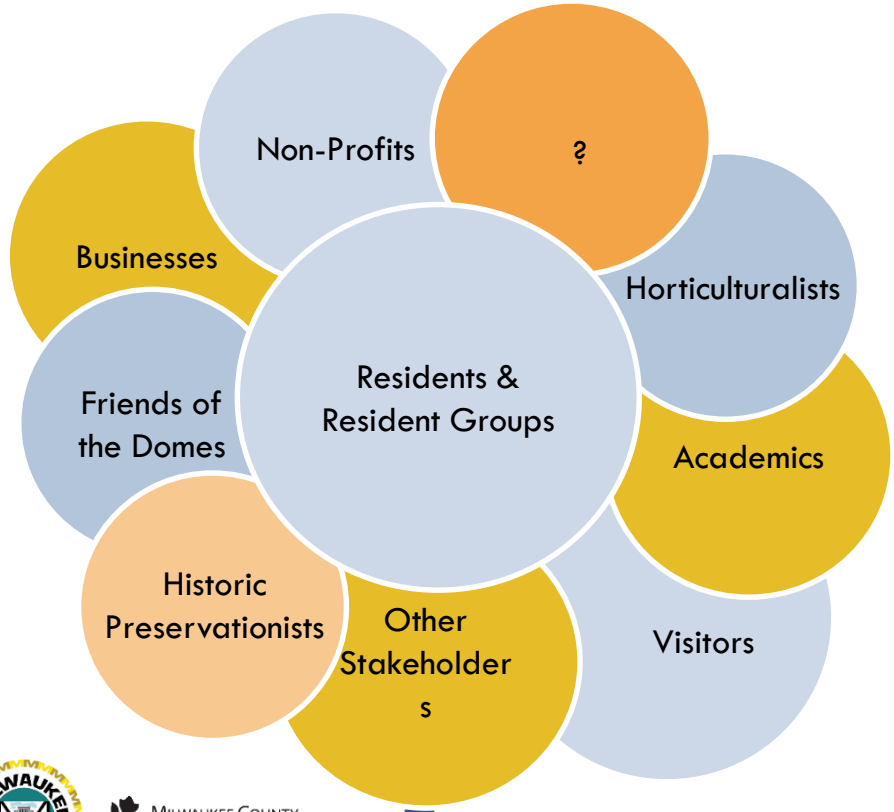


Community Engagement Approaches

Problem Solving

- Charrettes & Workshops
- Round Table Discussions
- Expert Interviews
- Case Study Presentations

Stakeholder Input



The New Plan

Milwaukee County Executive

Milwaukee County Parks

Milwaukee County Board of Supervisors

Parks, Energy & Environment Committee

Next Steps

- Members
- Chair
- Future Meetings
- Communications

Milwaukee County Conservatory Advisory Committee

March 23, 2016

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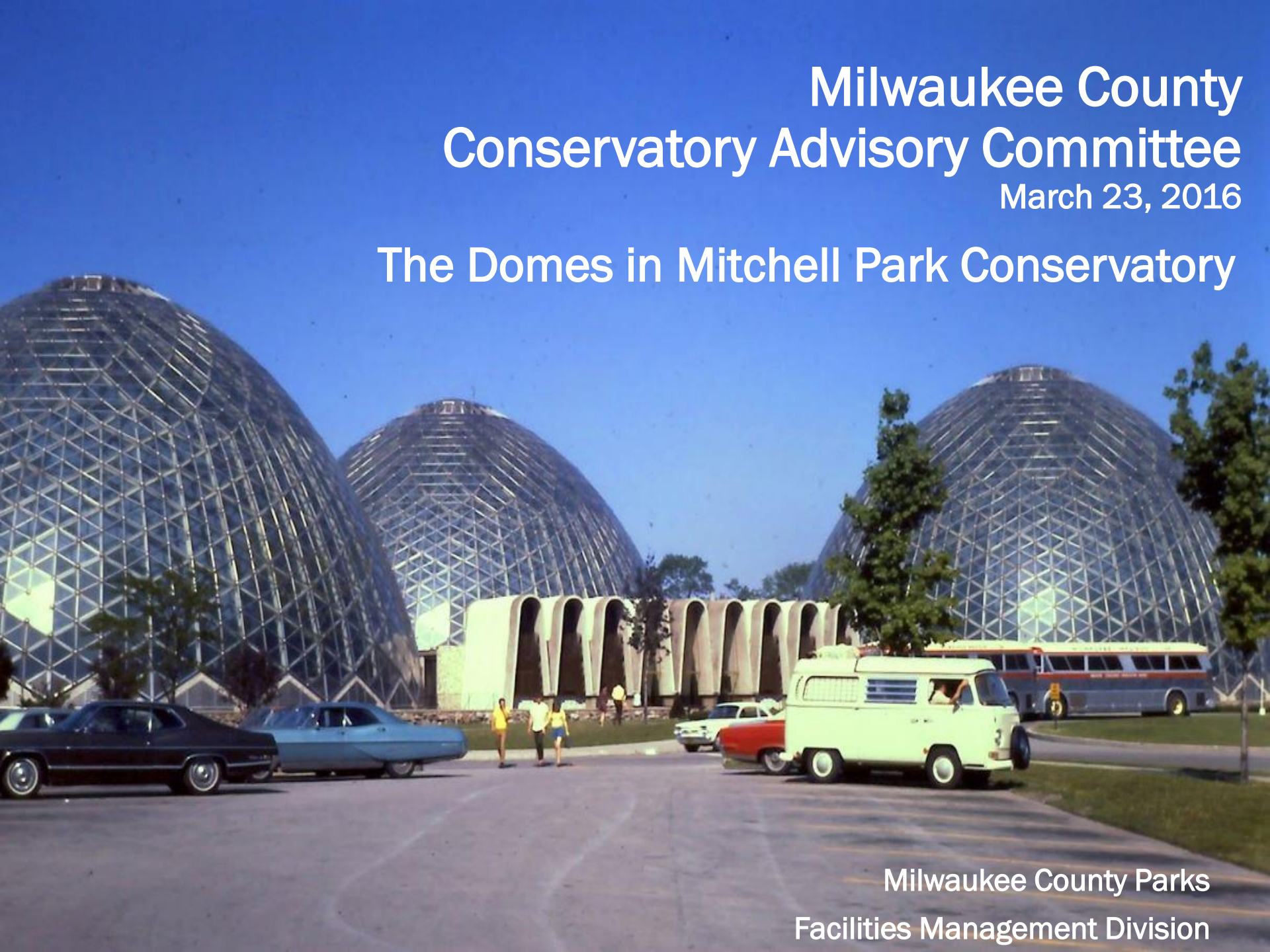

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