CAC Value Engineering History Presentation

September 9, 2014

Transbay Transit Center

TJPA

Transbay Transit Center

Value Engineering Presentation Outline

Value Engineering throughout each phase of design and construction:

- Concept Validation
- Design
  - Schematic Design Overview
  - Design Development Overview
  - Construction Documents Overview
- Value Engineering Idea Examples
- Bidding Documents
- Construction Administration
- Summary

Transbay Transit Center

Concept Validation

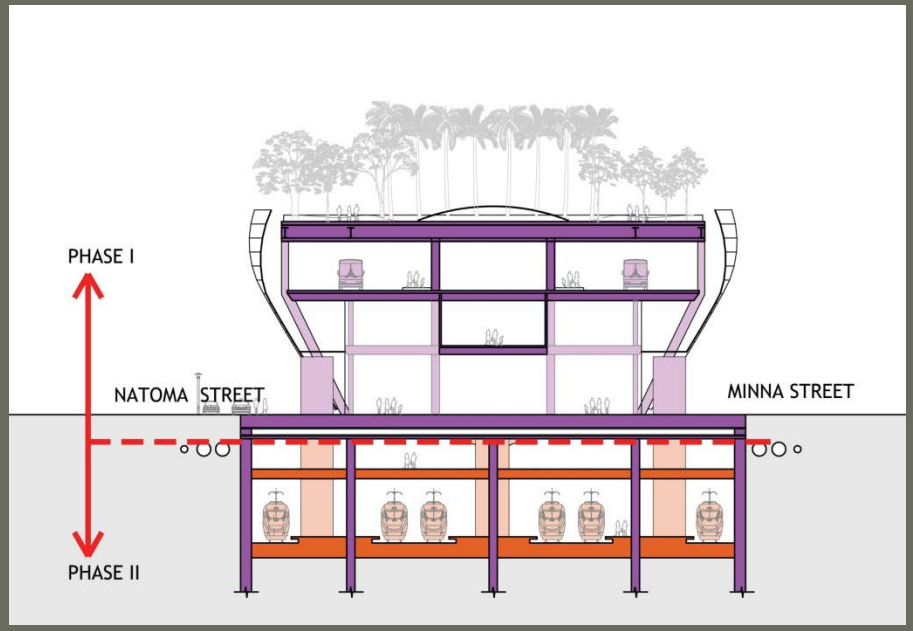
May 2008 – August 2009

- Began in May 2008
- Full analysis and evaluation of the Master Plan Scope Definition Scheme by HOK and comparison to PCPA's Competition Design Submission
- The most significant finding and recommendation was to employ a single phase "bottom-up" rather than a two phase "top-down" construction strategy which significantly reduced risks

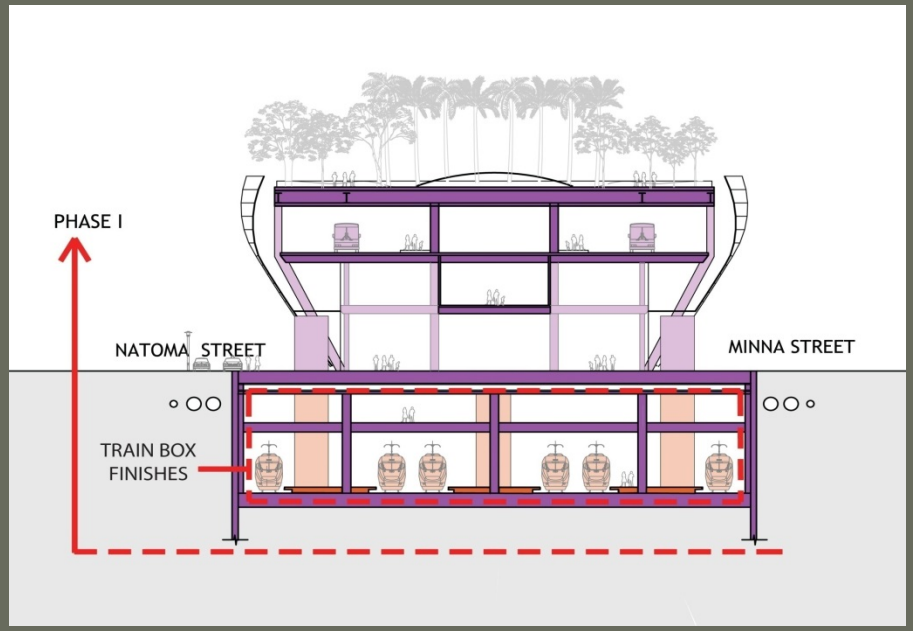
Transbay Transit Center

Concept Validation

Bottom-Up VS Top-Down



Top-Down



Bottom-Up

Transbay Transit Center

Concept Validation

May 2008 – August 2009

- Overall reduction cost of construction = $100M in 2008 dollars
  - Elimination of the 180’ deep drilled piers saved $50M in Phase 1
  - Elimination of site constraints associated with working below a fully functioning Transit Center saved $50M in Phase 2

Transbay Transit Center

Design

- Schematic Design
- Preliminary Design Development
- Final Design Development
- Preliminary Construction Documents
- Final Construction Documents

Transbay Transit Center

Schematic Design

September 2008 – March 2009

- Concept Validation cost estimate revealed the need for significant Phase 1 savings
- January 2009 – Initial VE ideas presented during Schematic Design - $120M identified
- May 2009 – Following the completion of the Schematic Design Cost Estimate, final VE options were selected for further study/implementation

Transbay Transit Center

Schematic Design

VE Decision/Scope Matrix Considerations* – May 2009

Partial list of Value Engineering ideas implemented:

- Eliminate Bus Deck Waiting Area Enclosure
- Relocate Elevators/Delete Bridges
- Eliminated Glass Paving in Main Plaza
- Eliminate Flagstone paving around Escalator Glass Box
- Eliminated Southern Bus Jet Fountain

*Partial List

Transbay Transit Center

Preliminary Design Development

March 2009 – October 2009

- Prior to compiling the 50% Design Development (DD) cost estimate, a VE target of $40M was set
- September 2009 – Initial VE ideas presented during Preliminary Design Development
- October 2009 – Following the completion of the 50% DD cost estimate and reconciliation with Webcor/Obayashi, final VE options were selected for further study/implementation.

Transbay Transit Center

Preliminary Design Development

VE Decision/Scope Matrix Considerations* - October 2009

Partial list of Value Engineering ideas implemented:

- Return to 5’ mat with new tie down design
- Substitute Concrete Columns for steel at Concourse level
- Shift Train Box and Building 2’ & reduce box by 20”
- Redefine Train Box SW cross-wall location according to property lines
- Reduce number of trees – 10% of total value, others

*Partial List

Transbay Transit Center

Final Design Development

Up to 100% milestone

October 2009 – February 2010

- Initial 100% DD estimate (March 2010) demonstrated much closer alignment with revised Phase 1 construction budgets
- April 2010 – An additional $6M potential savings were identified, presented and implemented
- June 2010 – The 100% DD reconciled estimate was completed

Transbay Transit Center

Preliminary Construction Documents

March 2010 – November 2011

- Initiated in March 2010
  - Focused Value Engineering Workshop in October 2010
  - Began to develop Deduct Alternates for inclusion into the bidding documents
  - Updated Risk and Vulnerability Assessment in 2011

Transbay Transit Center

Preliminary Construction Documents

Value Engineering Workshop - October 2010

- At the Beginning of the CD phase, a Value Engineering (VE) Workshop was conducted based on the 100% Design Development
- Outside consultants and experts were invited to participate
- The Workshop was focused on the following four elements:
  - GFRC Ceiling Systems
  - Vertical Transportation
  - Lighting Systems
  - Landscaped Rooftop Park
- 106 creative ideas were identified, 73 of these ideas were considered for further evaluation and analysis

Transbay Transit Center

Final Construction Documents

November 2012 – May 2013

- Implemented Value Engineering Ideas and developed Deductive Alternates worth $36M which were presented and accepted by the Board in July 2013

Transbay Transit Center

Final Construction Documents

VE Ideas Implemented*
November 2012 – May 2013

Partial list of Value Engineering ideas approved in the July 2013 Board Meeting:

- W-1 Awning – Glass to Aluminum
- Ceiling – GFRC to Metal
- Bus Deck Flooring – Terrazzo to Polished Concrete
- Bus Deck Fascia – GFRC to Metal
- Eliminate Lily Pond @ Roof Park
- Simplify Glass Skylight at Grand Hall

*Partial List

Transbay Transit Center

Final Construction Documents

Deductive Alternates Documented*
November 2012 – May 2013

Partial list of Deductive Alternates approved in the July 2013 Board Meeting:

- W-5 Wall System – Glass to Metal
- W-7 System – Glass to Metal
- Defer Second Service Elevator to Phase 2
- Eliminate Light Tubes from Roof Park to Bus Deck
- Modify backlighting at Bus Jet Fountain

*Partial List

Transbay Transit Center

Final Construction Documents

Review Period
June 2013 – April 2014

- After review of the Final Construction Documents package, 167 additional VE ideas were developed and considered in early 2014
- Over a 3 month period of review, 43 VE ideas were implemented into the final Bidding Documents
- Additional Deductive Alternates were also incorporated into the Bidding Documents

Transbay Transit Center

Final Construction Documents

Phase 1 CD

Value Engineering Items Implemented*

Partial list of Value Engineering ideas incorporated into final Bidding Documents:

- Roof Park Fascia – GFRC to metal
- Delete Roof Park Glass Floor Uplighting
- Delete purchase of window washing equipment (Vendor Supplied)
- Delete purchase of Compactors and Containers in Loading Dock areas (Vendor Supplied)
- Redesigned the bus crash rail – steel to concrete option

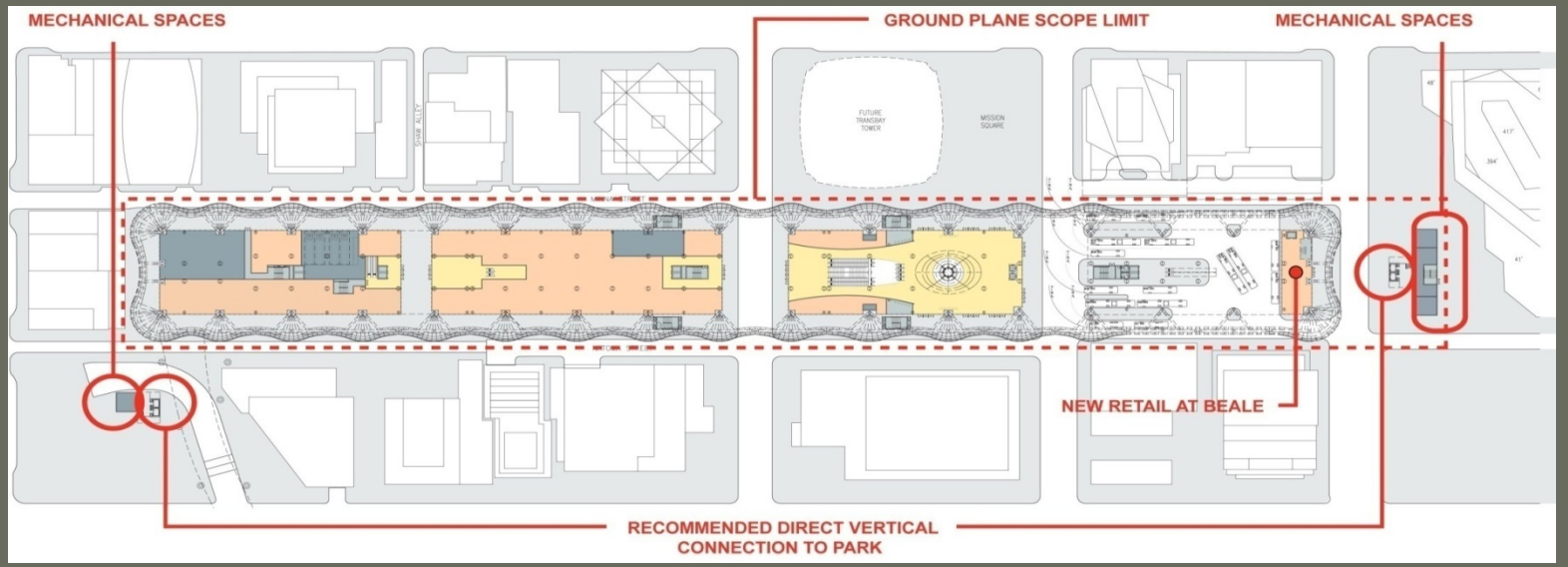
*Partial List

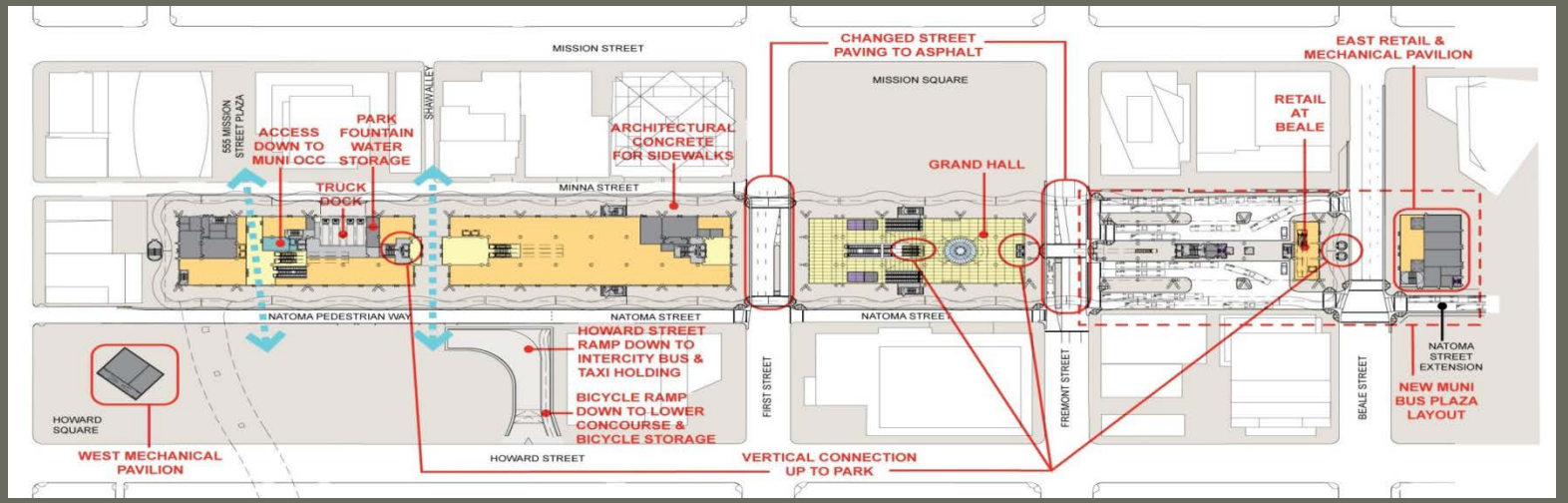
Value Engineering Examples

Transbay Transit Center

Value Engineering Example

Relocate Elevators/Delete Bridges

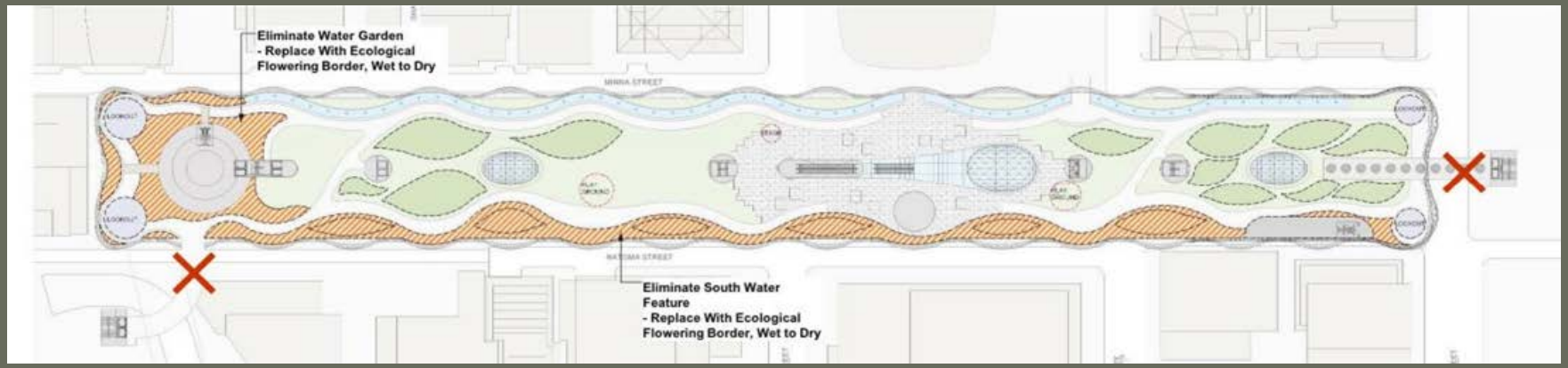




Transbay Transit Center

Value Engineering Example

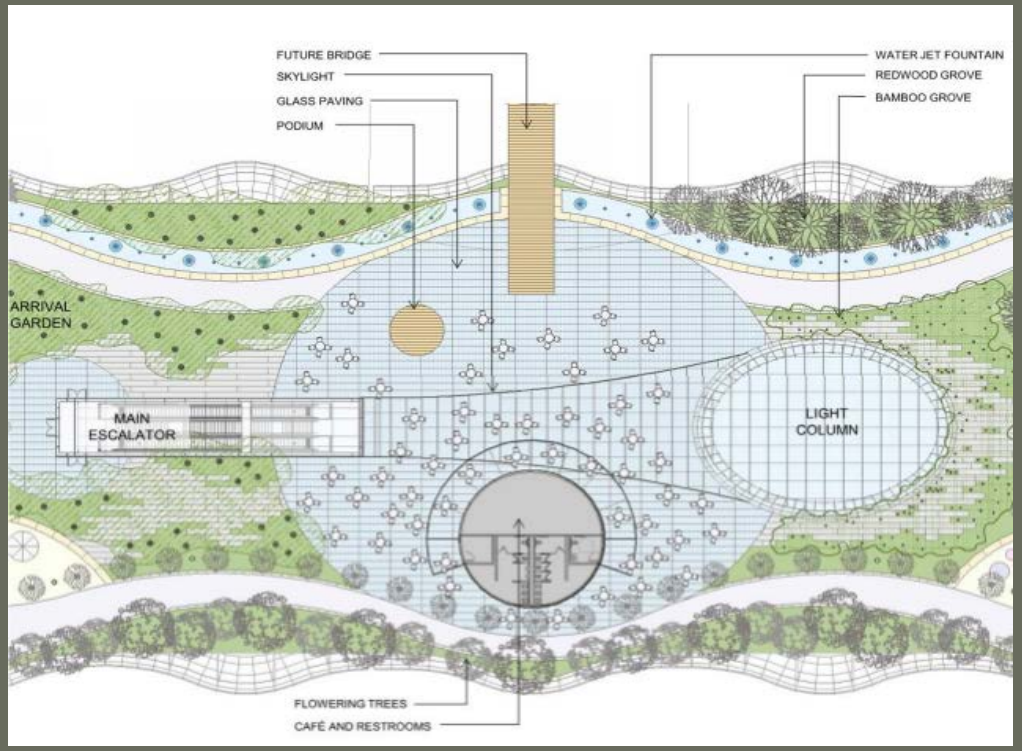
- Eliminated south water feature
- Eliminated bridge over Main Street to elevator on east side of Main
- Eliminated bridge from Howard Square



Transbay Transit Center

Value Engineering Example

- Eliminated Glass Paving in Main Plaza
- Eliminated Flagstone paving around Escalator Glass Box



Transbay Transit Center

Value Engineering Example

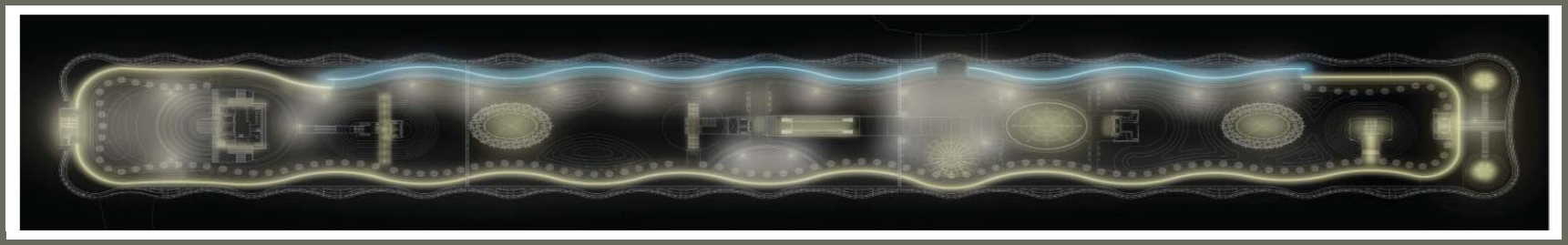
- Eliminated Lily Pond
- Eliminated Lawn Terraces in Amphitheatre

Transbay Transit Center

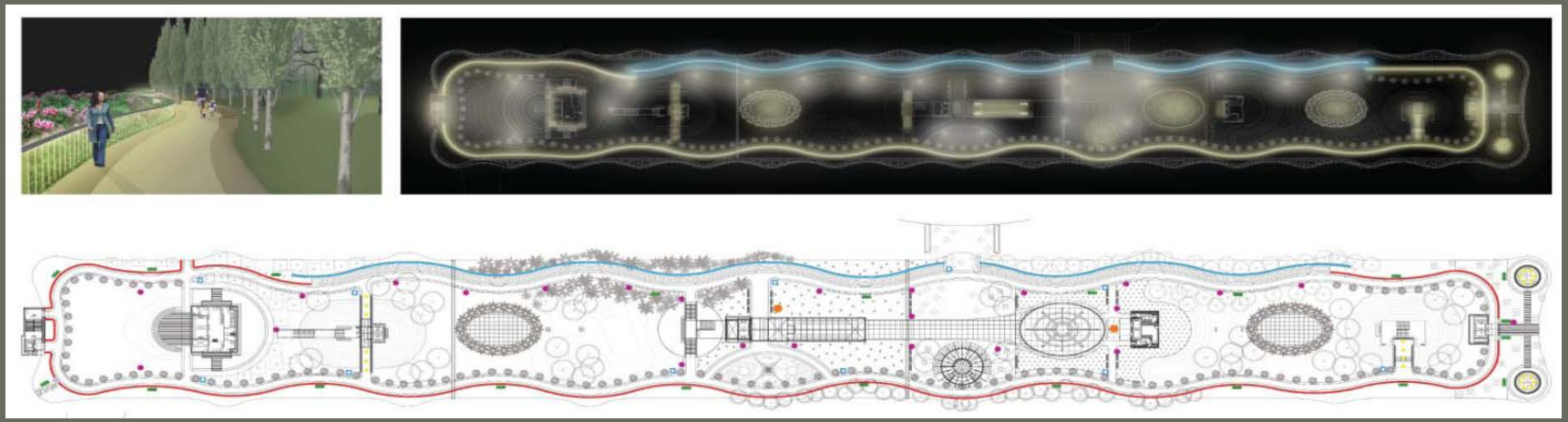
Value Engineering Example

Reduce/Eliminate Tree Uplighting

Original Design – Lighting Plan



Current Lighting Plan - Tree Uplighting Eliminated

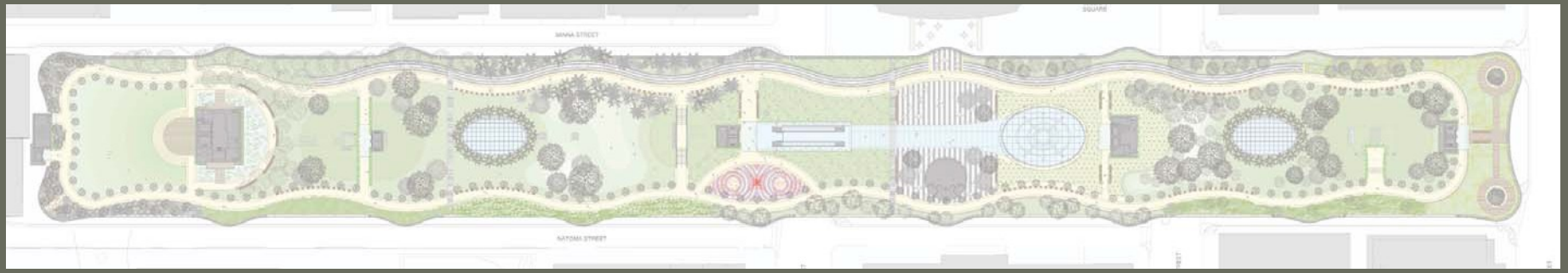


($500k)

Transbay Transit Center

Value Engineering Example

Reduce Specimen tree sizes to reflect a 10% cost savings



Design at 50% CD

Most trees were specified at specimen sizes.
At 50% CD, most trees were 60” Box or larger

Design at 95% CD

113 trees have been downsized

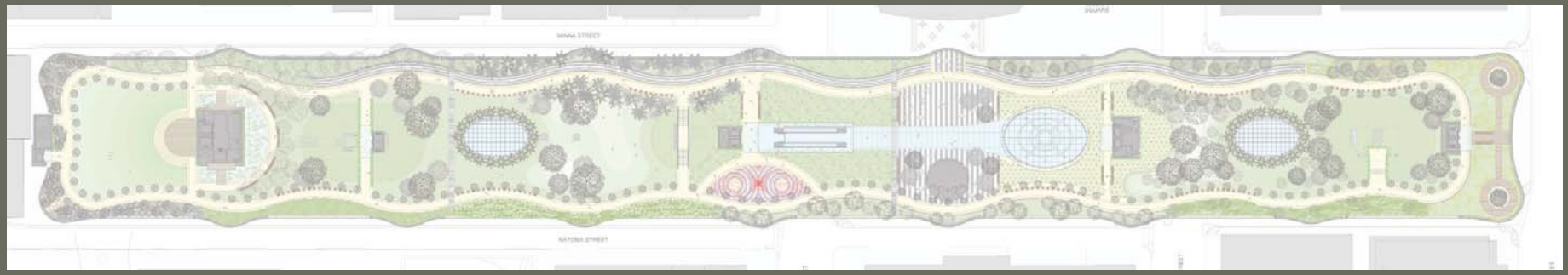
133 tree removed and/or replaced with shrubs

At 95% CD, most trees are 36” box

Transbay Transit Center

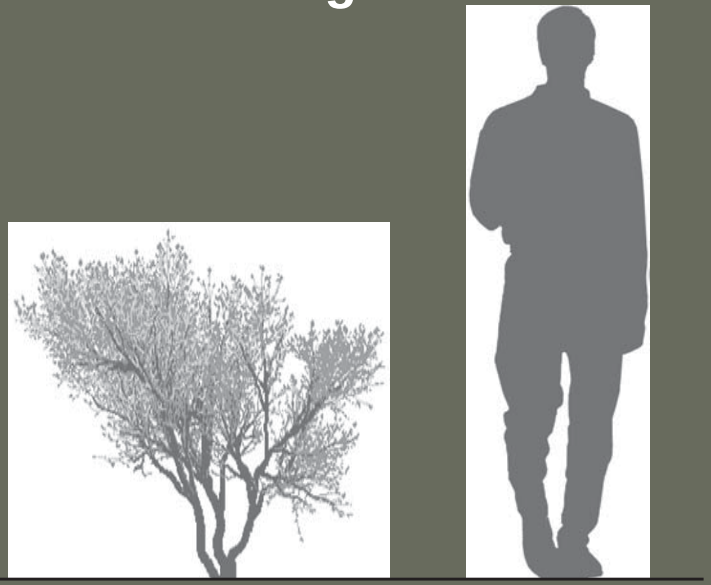
Value Engineering Example

Reduce shrub sizes



Original Design

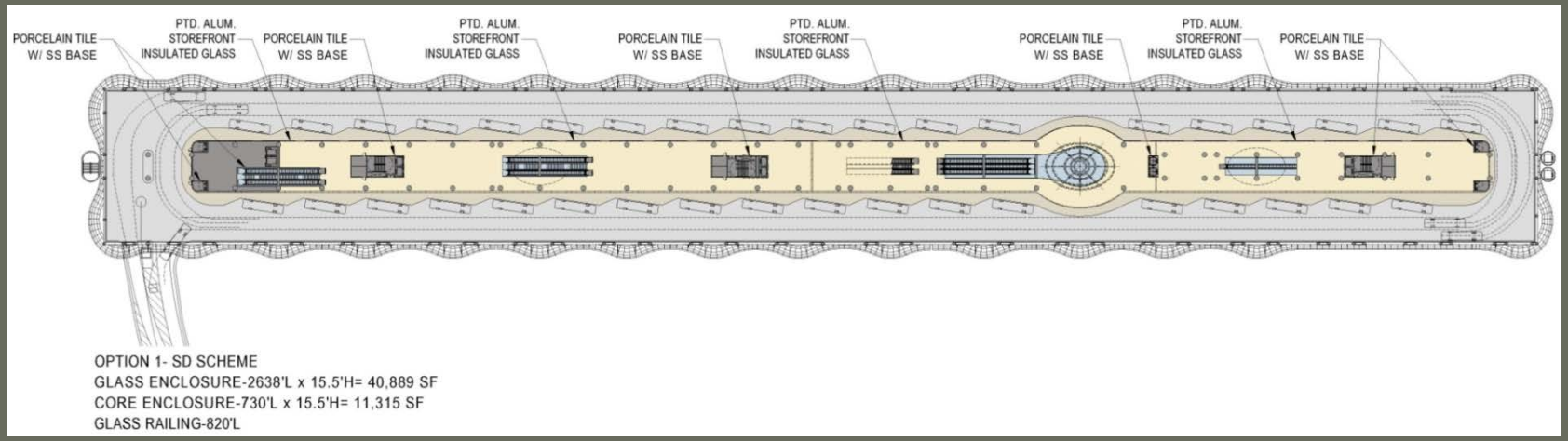
Current Design



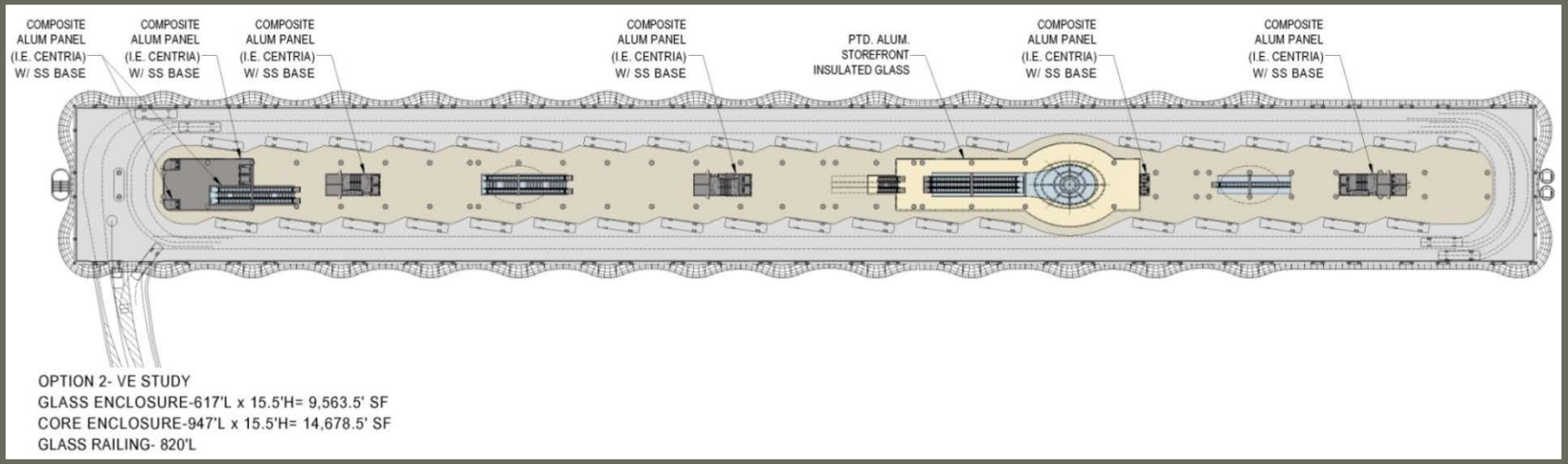
Transbay Transit Center

Value Engineering Example

Reduce Glass Enclosure around Bus Deck Waiting Area



OPTION 1- SD SCHEME
GLASS ENCLOSURE-2638'L x 15.5'H= 40,889 SF
CORE ENCLOSURE-730'L x 15.5'H= 11,315 SF
GLASS RAILING-820'L

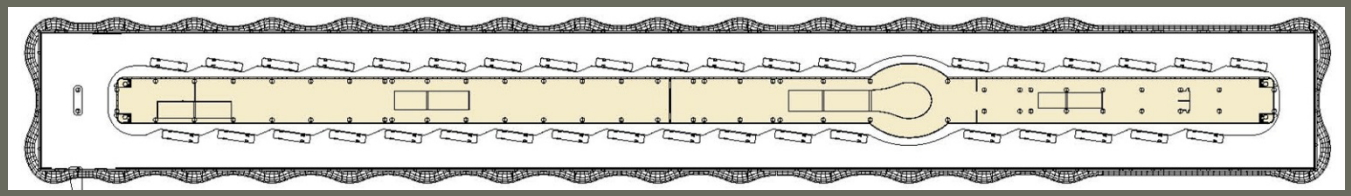


OPTION 2- VE STUDY
GLASS ENCLOSURE-617'L x 15.5'H= 9,563.5' SF
CORE ENCLOSURE-947'L x 15.5'H= 14,678.5' SF
GLASS RAILING- 820'L

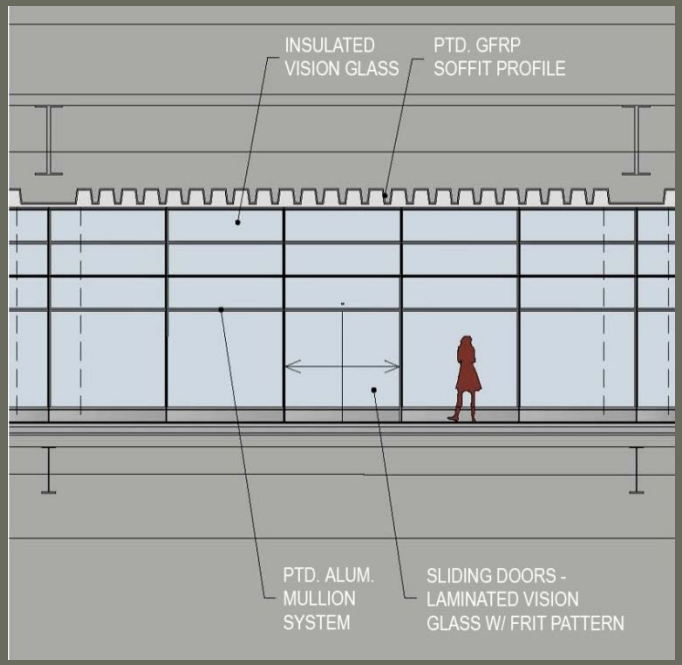
Transbay Transit Center

Value Engineering Example

Reduce Glass Enclosure around Bus Deck Waiting Area



Key Plan Bus Deck Storefront



Elevation Detail: Typical Bus Deck Storefront

View of Typical Bus Deck Storefront

Transbay Transit Center

Value Engineering Example

Substitute Floor Materials at Bus Deck Pedestrian Island

Original: two-colored wave pattern terrazzo

Transbay Transit Center

Value Engineering Example

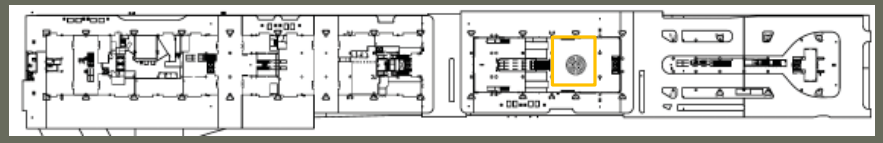
Substitute Polished Concrete for Wave Pattern Terrazzo at Floor

Current Design: Single Color Polished Concrete

Transbay Transit Center

Value Engineering Example

Grand Hall Interior Skylight - Glass Floor in lieu of conical skylight and bench



Original Design

Current Base

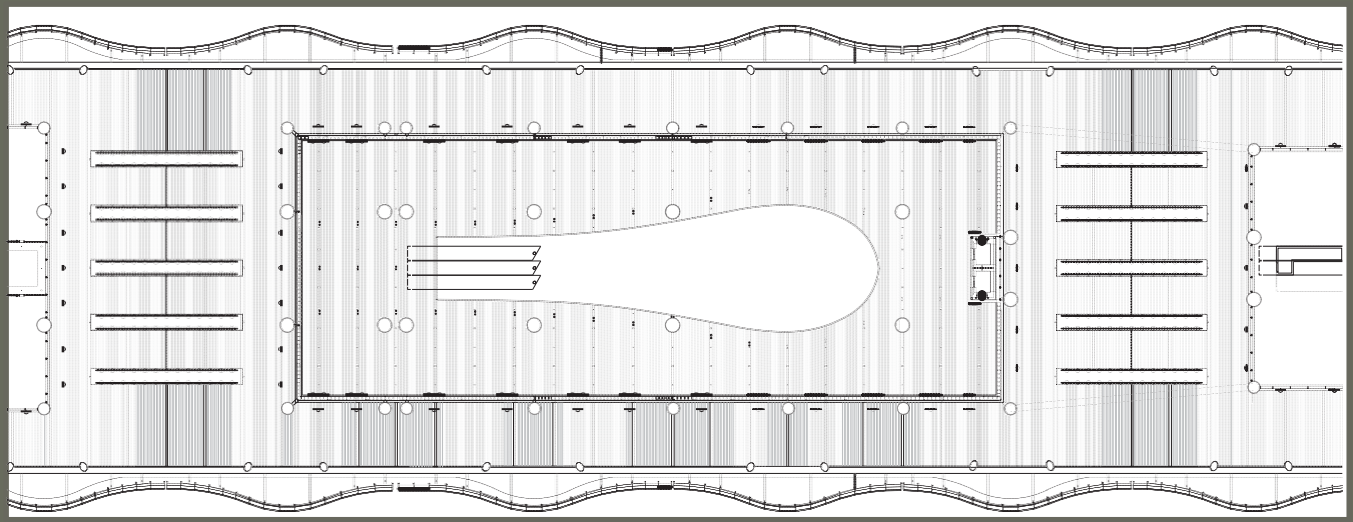
Transbay Transit Center

Value Engineering Example

Transbay Transit Center

Value Engineering Example

Remove LED Lighting Controls at Street Pass Through. Soffits (1st & Fremont Streets), Add Uplights



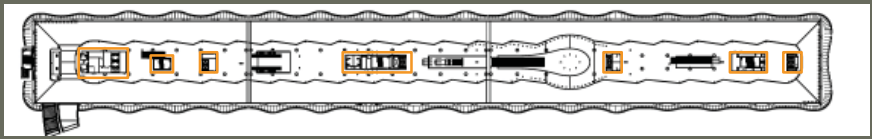
Original Design

Current Design - Remove LED lighting

Transbay Transit Center

Value Engineering Example

Replace Glass Wall Panels (W-5) with Metal Panels



Original Design

Current Design

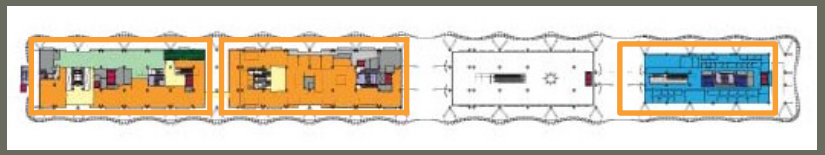
Transbay Transit Center

Value Engineering Example

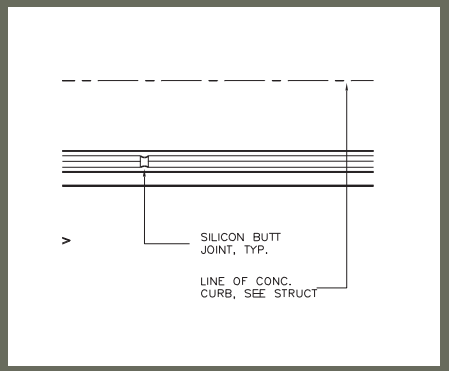
Substitute Standard Reinforced Storefront System (Kawneer) in Lieu of Top/Bottom Supported System (W-2) at Retail Locations, Ground, and Second Levels

Ground Level Retail

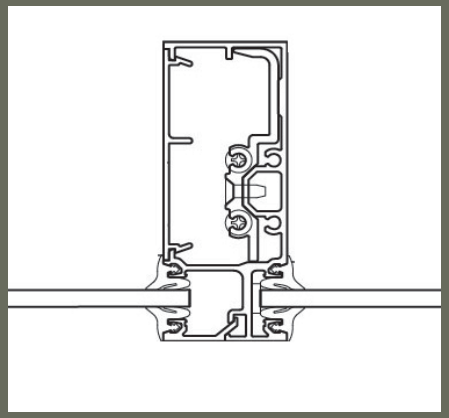
Second Level Retail



Original Design
(no vertical mullion)



Current Design
(with standard vertical and horizontal mullion)

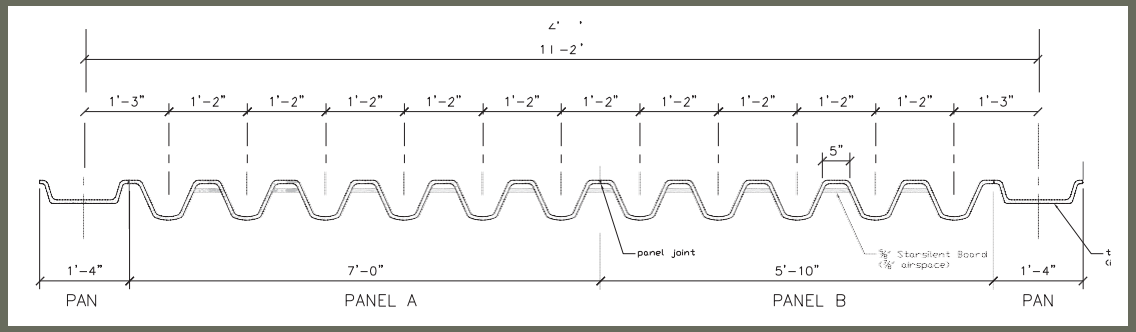


Transbay Transit Center

Value Engineering Example

Alternate Ceiling Designs

Original Design: GFRC

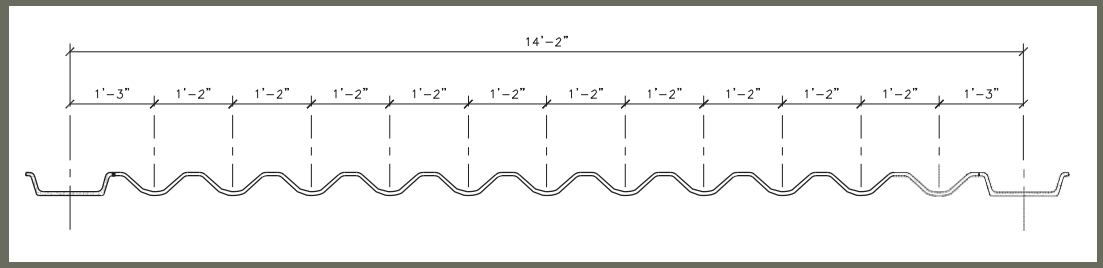


Transbay Transit Center

Value Engineering Example

Ceilings: Revised Profiles in Selected Area

Option A: Shallow GFRC Corrugation Alternate



Transbay Transit Center

Value Engineering Example

Ceilings: Alternate Included in Construction Documents

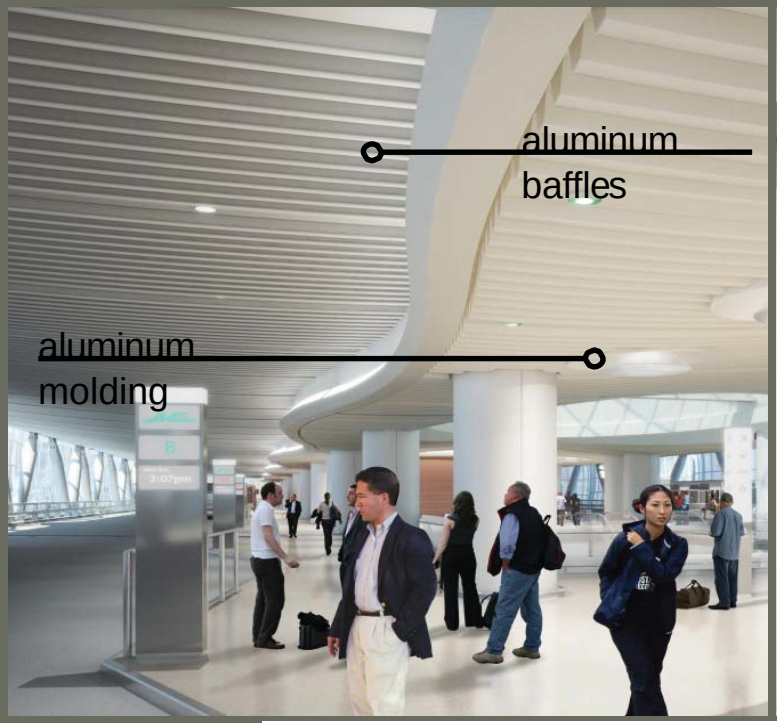
Option B: Metal Alternate (Same Profile with Moldings)

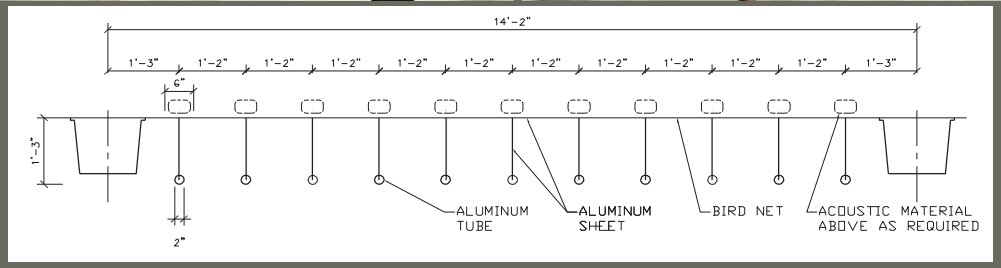
Transbay Transit Center

Value Engineering Example

Ceilings: Revised Profiles Selected in Areas

Option C: Aluminum Alternate





Transbay Transit Center

Value Engineering Example

Detail of current Metal Ceiling

Transbay Transit Center

Value Engineering Example

W-1 Metal Awning – Natoma Street View

Transbay Transit Center

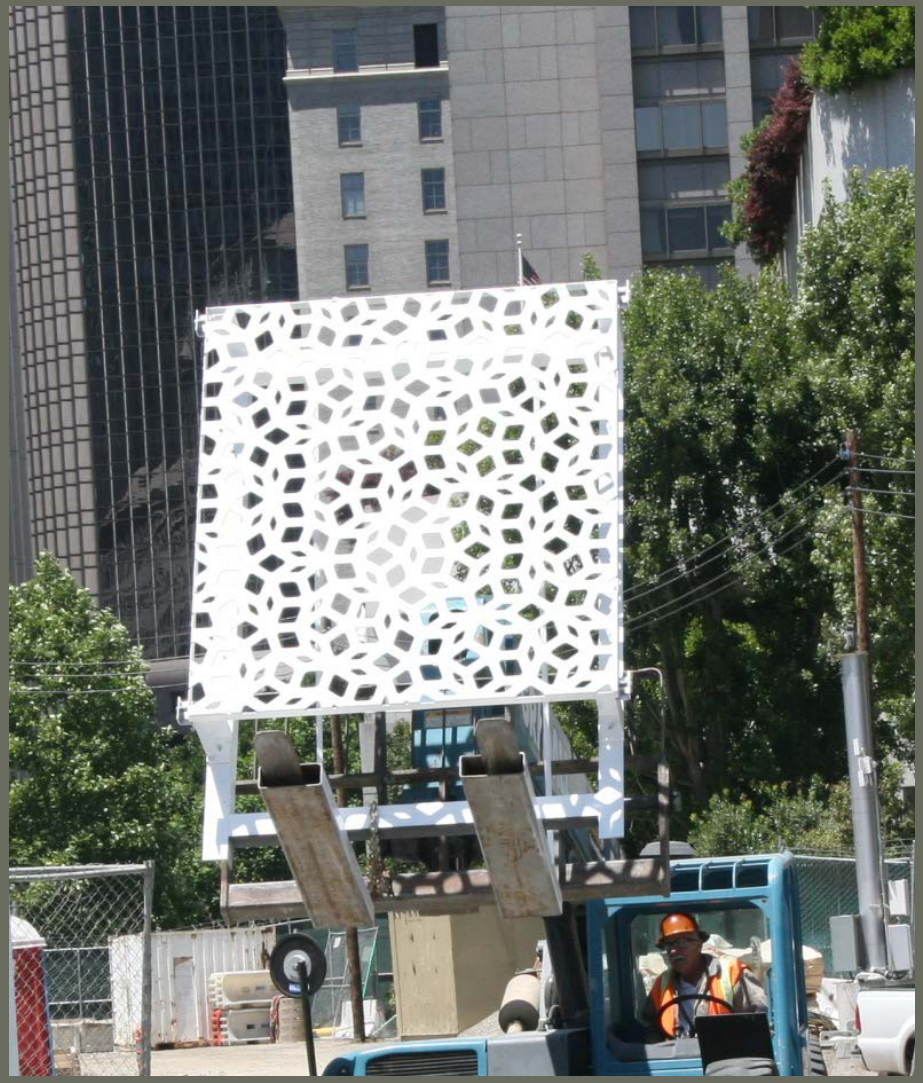
Value Engineering Example

W-1 Metal Awning – Pattern Scale Study at PCPA New Haven

Transbay Transit Center

Value Engineering Example

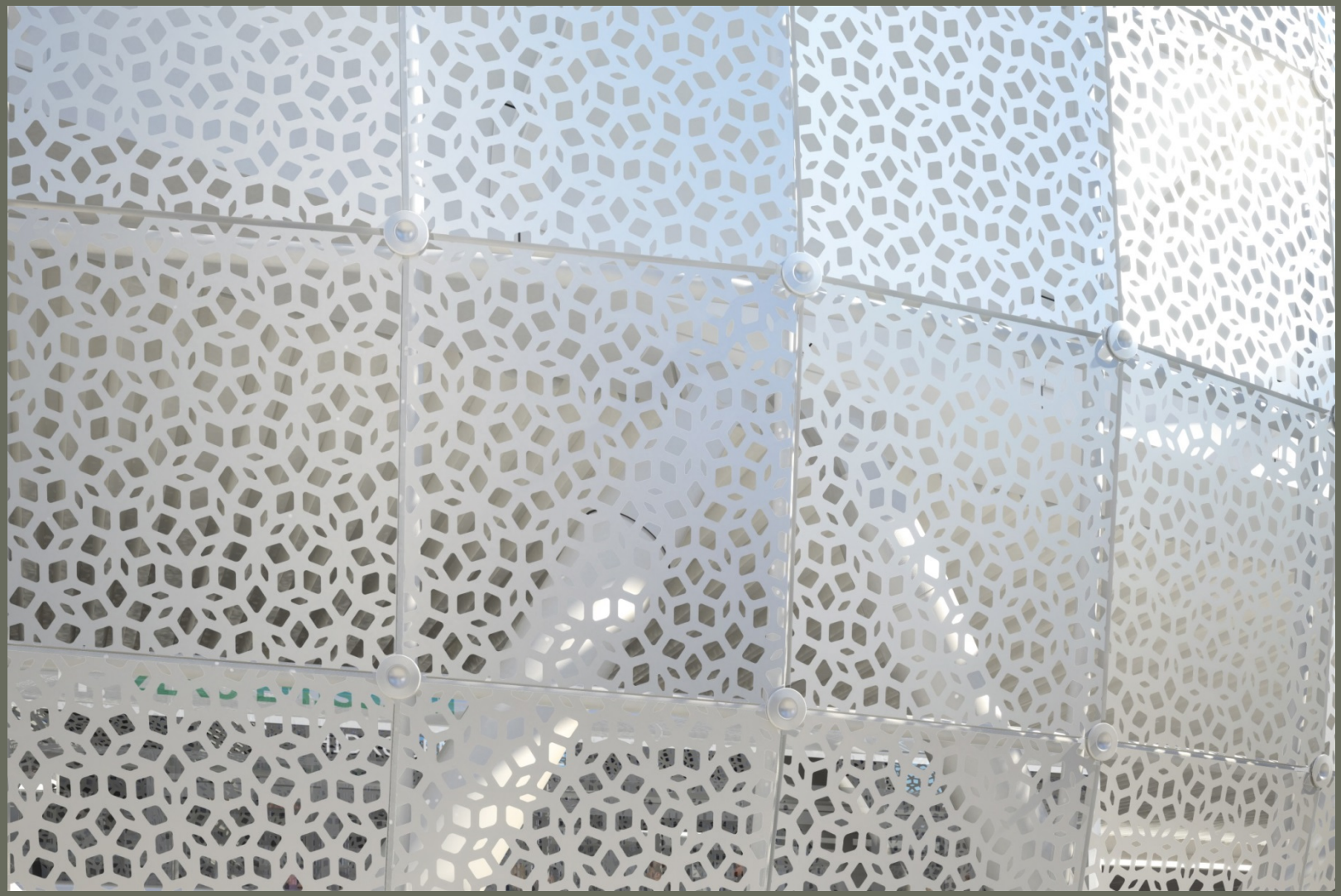
W-1 Metal Awning – Full Size Panels in San Francisco



Transbay Transit Center

Value Engineering Example

W-1 Metal Awning – Detailed View, Without LED Light



Transbay Transit Center

Value Engineering Example

W-1 Metal Awning – Mission Square View

Transbay Transit Center

Value Engineering Example

W-1 Metal Awning – First and Minna Street View – Relationship to Transbay Tower

Transbay Transit Center

Phase 1 VE Results

September 2009 – April 2014

- Concept Validation Phase – Estimated savings in Phase 1 as a result of the elimination of the 180’ deep drilled piers - $50M (2008 $)

Delete 180’ deep piers (2014 $)	$ 58,300,000

- Design Phase – Estimated savings of accepted VEs from SD thru CD.

Enclosure/Glazing	$ 50,503,000
Finishes – Ceiling	$ 10,000,000
Finishes – Floor	$ 2,220,000
Finishes - Misc.	$ 2,335,000
MEP	$ 8,567,000
Rail	$ 2,700,000
Roof Park	$ 15,234,000
Other	$ 5,092,000
Subtotal	$ 96,651,000
Indirect Costs (23.7%)	$ 22,906,300
Total (2010 $)	**$ 119,557,300**
Total (2014 $)	**$ 136,295,300**

Transbay Transit Center

Bidding Phase

Value Engineering Proposals Ongoing

- Specification Section 00 04 20 – Value Engineering Proposals
- As a continued effort, Bidders are encouraged to submit Value Engineering (VE) proposals during the pre-bid period
- The intent is to have Bidders use their expertise to develop, prepare and submit proposals to optimize value during the performance of the work
- TJPA gets full value of the VE

Transbay Transit Center

Bidding Phase

Value Engineering Proposals

- To date, $954,000 worth of Bidder suggested VE proposals have been accepted.
- Examples include:
  - Revision of the Saddle Connection at the Bus Ramp
  - Alternate Fittings – Premade in lieu of soldering in field for Plumbing
- 33 Trade Group Packages yet to bid

Transbay Transit Center

Construction Phase

Value Engineering Proposals

- Specification Section 00 04 20 – Value Engineering Proposals
- As a continued effort, Trade Subcontractors are encouraged to submit Value Engineering (VE) proposals during the post-bid period
- The intent is to have Trade Subcontractors use their expertise to develop, prepare and submit proposals to optimize value during the performance of the work
- TJPA gets 50% value of the VE

Transbay Transit Center

Construction Phase

Value Engineering Proposals

- To date, $2,401,459 worth of Subcontractor suggested VE proposals have been accepted
- Examples include:
  - Replacement of Orthotropic Steel Box Girders with Composite Griders
  - Rebar Revisions in Train Box Matt Slab
- 36 Subcontracts yet to award

Transbay Transit Center

Summary

- Value Engineering has been a continuous process throughout all phases
- From April 2009 to date, there have been 129 meetings discussing Value Engineering
- As of September 9th, 2014 Value Engineering has yielded an estimated $198 Million in savings for Phase 1
- The program team continues to look for cost reduction strategies during the Bidding and Construction Phases