ENTRY FORM

DVASE
2017 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

Buildings under $2M		Buildings Over $100M	
Buildings $2M-$10M		Other Structures Under $5M	x
Buildings $10M - $30M		Other Structures Over $5M	
Buildings $30M - $100M		Single Family Home	

Approximate construction cost of facility submitted:	**$ 350,000**
Name of Project:	**Emergency Stabilization of Timber Roof Trusses at St. Vincent de Paul R.C. Church**
Location of Project:	**109 East Price Street, Germantown, Philadelphia, PA**
Date construction was completed (M/Y):	**January 2016**
Structural Design Firm:	**Ortega Consulting, Richard I. Ortega, PE, AIA, FAPT**
Affiliation:	**DVASE member**
Architect:	**Heritage Design Collaborative, Carl Dress, AIA**
General Contractor:	**Haverstick-Borthwick Company**

Company Logo (insert .jpg in box below)

ORTEGA CONSULTING

Important Notes:

- Please .pdf your completed entry form and email to bkoroncai@barrhorstman.com.
- Please also email separately 2-3 of the best .jpg images of your project, for the slide presentation at the May dinner and for the DVASE website. Include a brief (approx. 4 sentences) summary of the project for the DVASE Awards Presentation with this separate email.

- Provide a concise project description in the following box (one page maximum). Include the significant aspects of the project and their relationship to the judging criteria.

In the fall of 2015, two of five timber trusses spanning the nave of St. Vincent de Paul Church in Germantown were found to have recently failed. Preliminary analyses indicated that the original truss design was marginally adequate to support code-mandated loads, but the two that had broken had likely been overstressed by snow accumulations at the base of the dome over the crossing, which had been a later addition to the church and to which they were adjacent.

A permanent repair and strengthening of the trusses would take several months to design, bid, and construct, and with winter fast approaching it was necessary to shore the roof before the advent of snow loads. The conventional approach – to erect scaffolding within the sanctuary – was unacceptable to the parish as it would disrupt use of the building for the duration of the work, and would damage the ornate interior plaster ceiling. Furthermore, budget constraints made paying for both a temporary solution (shoring) and a permanent solution (the eventual repairs) undesirable.

Ortega Consulting and Heritage Design Collaborative suggested installing three new timber trusses – one each between trusses No. 2, No. 3, No. 4., and No.5— to halve the loads on each of the broken trusses and to shore up the broken trusses by inserting three new beams between the new trusses to support the broken original trusses. The new trusses would remain permanently as part of the roof structure. St. Vincent de Paul church approved the approach and authorized proceeding with installation of the new trusses on 12 November 2015.

Working with the General Contractor, Haverstick-Borthwick, their sub-contractor, Hugh Lofting Timber Framing with CKS Structures, Structural Engineers, three timber trusses were designed and detailed to match the original geometry of the existing roof, clear the ceiling structure below, support the requisite live and dead loads, and accommodate three beams that would support the two broken trusses until further repairs could be effected. Shop drawings were approved mid-December and Lofting immediately began fabrication of the trusses. In the meantime, custom steel hangers to connect the shoring beams to the new and existing trusses were designed, detailed and fabricated and the LVL beams pre-positioned in the church attic. The trusses were delivered to the site 7 January 2016 and the first truss installed the next day. To minimize exposure of the interior finishes to weather, Ortega and Haverstick-Borthwick decided to remove the roof in sections using the crane on site for the new trusses. The work sequence went far better and faster than we had anticipated:

- After pre-installing "strong-backs" to the roof purlins, the carpenters passed lifting straps through holes in the roof and secured them to the panelized roof section.
- Once the crane made the straps taut, the carpenters saw-cut all four sides of the panel to be removed, cutting through metal roofing, sheathing and purlins
- When freed, the panel was lifted off the roof and deposited on the ground while the carpentry crew prepared the next panel
- After the four panels for the bay were removed, the crane lifted a new truss into place
- The carpenters braced the truss in place, installed leveling blocks on the top chord of the old trusses, Installed new purlins, and plywood sheathing.

It took less than an hour to entirely remove a bay of roofing and set the new truss in place. It took less than the remainder of the work day to reframe and install new sheathing over the entire 46' by 12` bay, and secure temporary EPDM roofing for the night. What we had initially thought might take two to three weeks to accomplish, was done in four days. After the trusses, purlins, sheathing, and temporary roofing were installed, the hangers and shoring beams were installed to support the broken trusses. All the shoring was completed by 15 January 2016 and the church ready for use – the first heavy snow storm of the winter occurred the next weekend.

- The following 5 pages (maximum) can be used to portray your project to the awards committee through photos, renderings, sketches, plans, etc…

Figure 1 -- Top chord failure at Truss No. 4

Figure 2 -- Top chord failure at Truss No. 4

Figure 3 -- Top chord failure at Truss No. 4

Figure 4 -- Roof panel, with "strongbacks" in place, prepped for removal

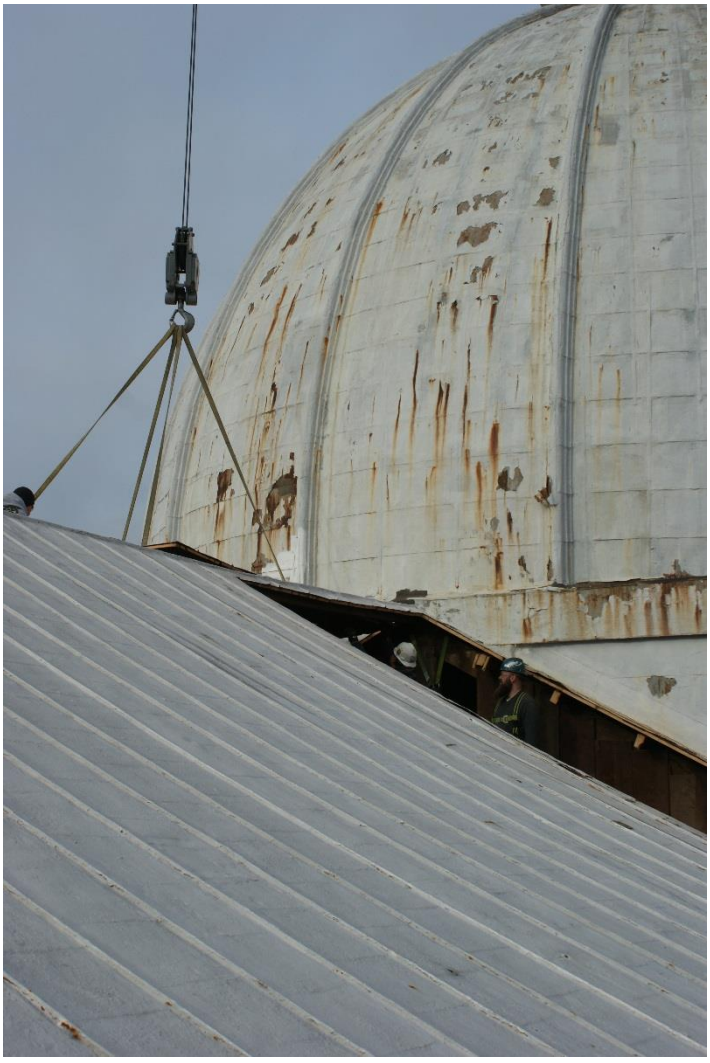


Figure 5 -- Saw cutting roof panel while supported by crane

Figure 6 -- Removal of roof panel

Figure 7 -- New trusses

Figure 8 -- Lifting new truss into place

Figure 9 -- Positioning new truss between Trusses No. 4 and 5

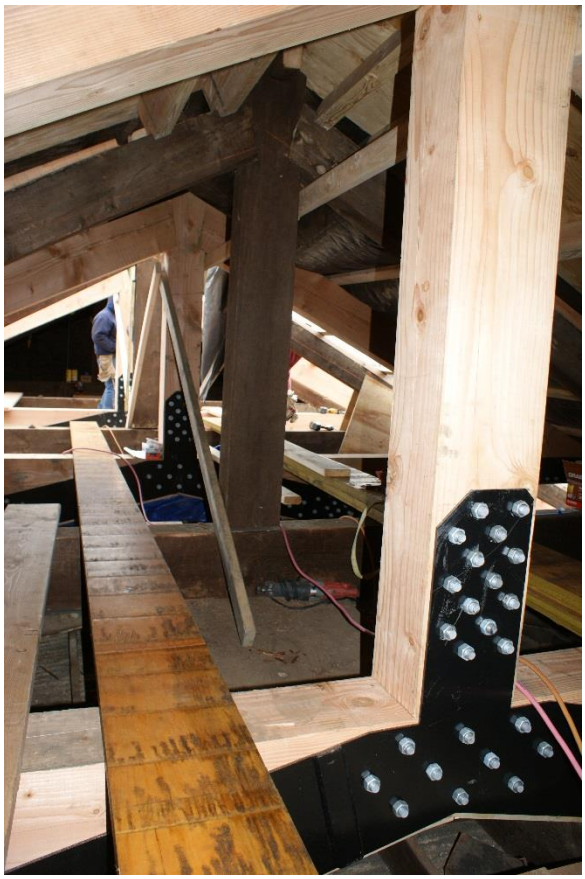
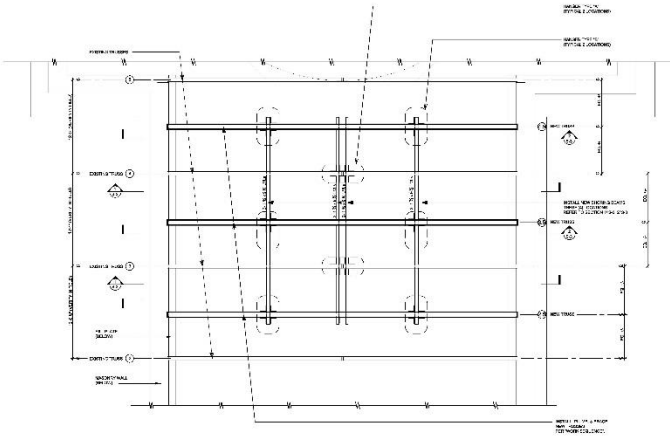


Figure 10 -- New trusses in place flanking failed trusses

Figure 11 -- Installing purlins and sheathing

Figure 12 -- Installing shoring beam to support old trusses at joint between top chord and horizontal member.

Figure 13 -- Installing shoring beam at kingposts.



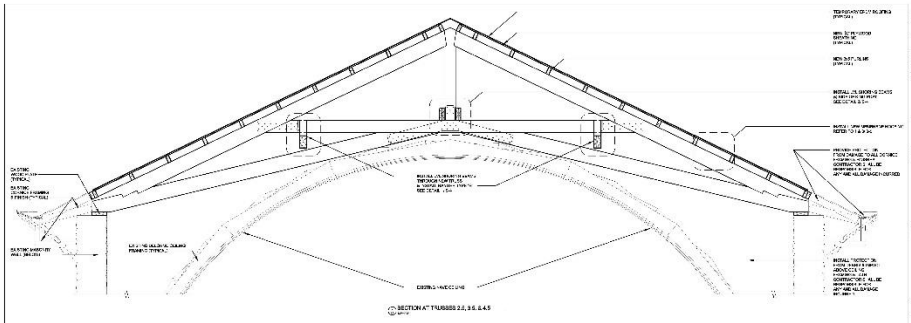
HERITAGE
DESIGN COLLABORATIVE
ARCHITECTS & ENGINEERS

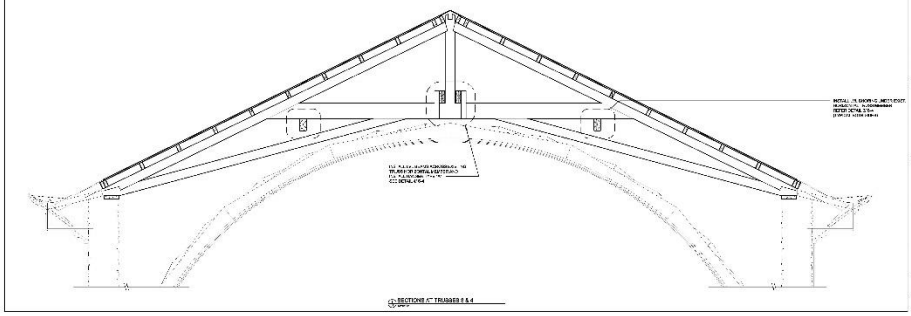
TRUSS SUPPORT FRAMING

AS NOTED | 11 / 30 / 2015

S - 1

PERMIT SET





HERITAGE
DESIGN COLLABORATIVE
ARCHITECTS & ENGINEERS

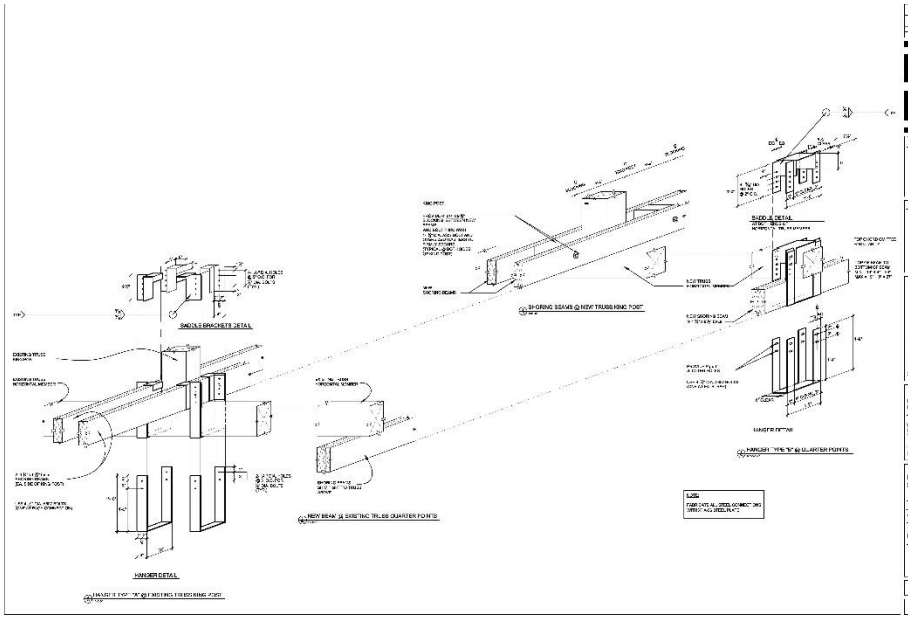
ROOF RESTORATION
PHASE 1

BUILDING SECTIONS

AS NOTED | 11 / 30 / 2015

S - 3

PERMIT SET



HERITAGE
DESIGN COLLABORATIVE
ARCHITECTS & ENGINEERS

ROOF RESTORATION
PHASE 1

DETAILS:
SHORING CONNECTIONS

AS NOTED | 11 / 30 / 2015

S - 4

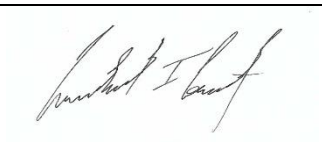
PERMIT SET

By signing, signatory agrees to the following and represents that he or she is authorized to sign for the structural design firm of record.

All entries become the property of DVASE and will not be returned. By entering, the entrant grants a royalty-free license to DVASE to use any copyrighted material submitted.

If selected as an award winner, you may be offered the opportunity to present your project at a DVASE breakfast seminar. Would you be willing to present to your colleagues? ☐ ***X YES*** ☐ ***NO***

Submitted by:

Print name: **Richard I. Ortega, PE, AIA, FAPT**	**Signature:** 	**Date:** **4/14/17**

Submitting Firm:	**Ortega Consulting**	
Mailing address:	**P. O. Box 426, Media, PA 19063**	
Telephone: **610-565-1131** **C: 610-804-6869**	**Fax:** **N/A**	**Email:** rick@ortegaconsult.com rickortega@aol.com