

Digester Facilities Improvement Project – Use of 3D Modeling to Improve Design and Construction

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Project Description

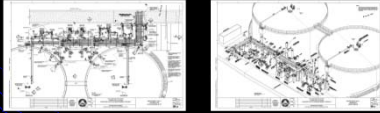
- Construction of two new concrete anaerobic digesters, including:
 - Concrete covers.
 - Mixing and heating systems.
 - Digester gas system modifications.
 - Mechanical, electrical and instrumentation modifications to the existing system.
- Construction time = 600 calendar days
- Engineer's Construction Estimate= \$10M

3D Modeling

- Two separate programs into one model
 - Structural – Autodesk Revit
 - Revit files export into AutoCAD MEP
 - Mechanical – AutoCAD MEP 3D
- No Additional Cost (Caveats)
 - Levels of detail – large diameter pipe and major structures and equipment; only major components, no electrical shown
 - Complexities
 - Existing areas vs. new areas – no 3D in existing area. Modeling existing area would be additional effort.

Interaction

- Operations and Maintenance Personnel
 - May not be accustomed to reading plans
 - Model and Isometric view helps portray elements of design (see examples)

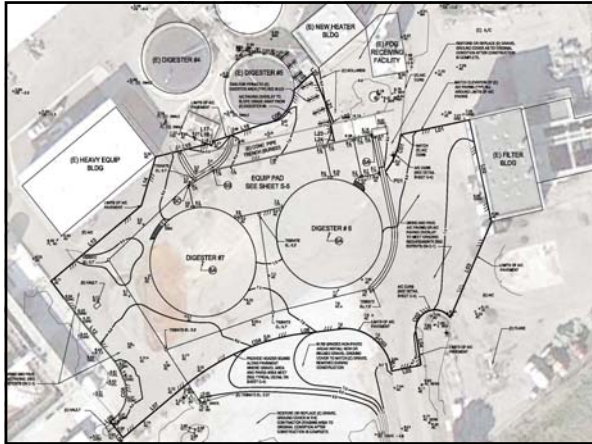


Staff Feedback through Modeling

- Added tees and cleanouts for flushing in specific locations
- Valve orientations and locations were easily identified
- Set elevation of gas piping on top of digesters for ease of maintenance

Contract

- Contractor: Mountain Cascade, Inc.
- Contract Amount: \$7,197,490
- Award Date: 2/19/13
- Notice to Proceed: 3/11/13
- Anticipated Completion: Nov. 2014





Potholing
and
Locating
Piles





Pile
Driving
Equipment



Excavation



Pile
Driving

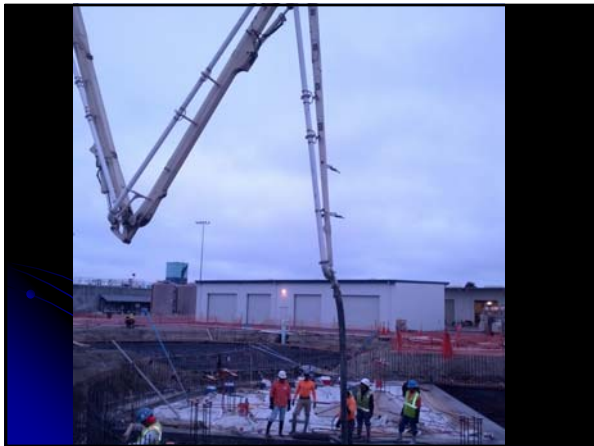












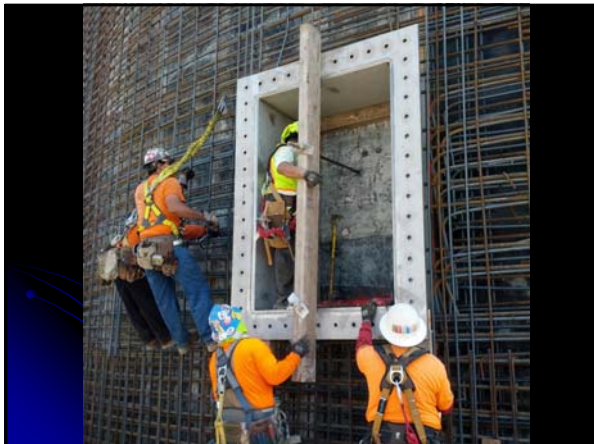




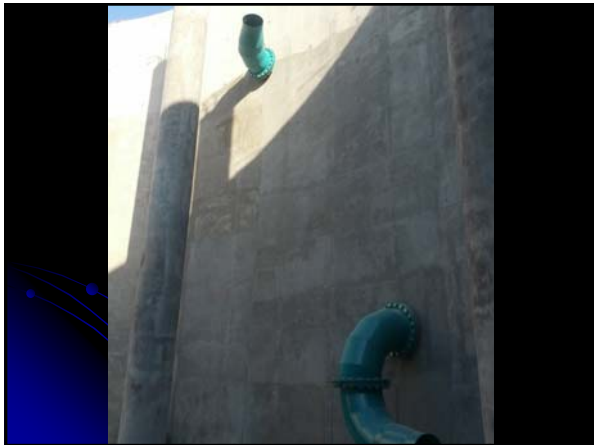






















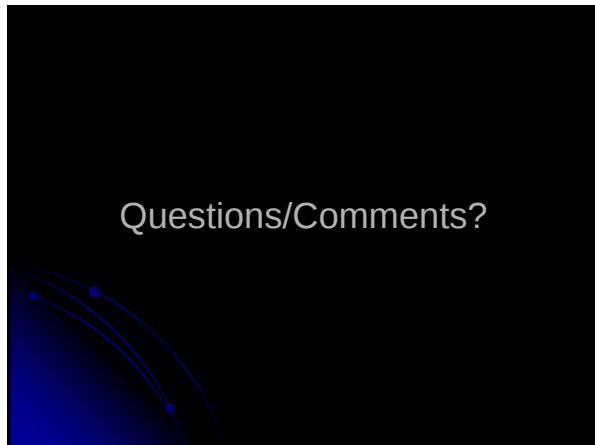
Project Timeline

Bid Date	01/29/13
Notice of Award	02/19/13
Notice to Proceed	03/11/13
Completed pile driving	06/15/13
Complete concrete slabs	07/29/13
Complete concrete	January 2014
Substantial Completion	June 2014
Startup and Final Completion	October 2014

Project Budget

Design	\$450,000
Construction	\$10,000,000
5% Anticipated Change Orders	\$500,000
Inspections	\$150,000
Construction Support	\$400,000
Salaries and Overhead	\$500,000
Total	\$12,000,000
Spent To Date	\$4,599,937
Budget FY 2011/12, 12/13, 13/14, 14/15	\$12,000,000

Construction Progress	
Expenses	\$
Salaries	\$75,600
Overhead	\$90,000
Inspections	\$42,000
Construction Support	\$178,000
Construction	\$4,173,000
Change Orders	\$37,842(.53%)
Miscellaneous	\$3,495
Total	\$4,599,937(58%)
Budget (2012-13, 13-14)	\$9,750,000



Questions/Comments?
