

Hawai‘i Energy and Environmental Technologies (HEET) Initiative

**Office of Naval Research
Grant Award Number N0014-10-1-0310**

TASK 4 ALTERNATIVE ENERGY SYSTEMS 4.5 Energy Test Platforms: Crissy Field Center Wind Power Study: Turbine Installation Site Preparation and Footings

**Prepared by:
Golden Gate National Parks Conservancy**

**Prepared for:
University of Hawai‘i at Mānoa, Hawai‘i Natural Energy Institute**

March 2013



HNEI

Hawai‘i Natural Energy Institute

University of Hawai‘i at Mānoa



Deliverable 3

Turbine Installation: Site Preparation and Footings

Crissy Field Center Wind Power Study

HNEI Subcontract, Prime Award No. N00014-10-1-0310

Background

Per the terms of the project contract between the Golden Gate National Parks Conservancy and the Hawaii Natural Energy Institute, dated October 14, 2011, and as outlined in the Statement of Work, the Golden Gate National Parks Conservancy (Parks Conservancy) will plan, permit, install and operate up to five wind energy systems at the Crissy Field Center (CFC), an existing modular test platform manufactured by Project Frog. The Parks Conservancy will develop a Data Acquisition System (DAS) that will record wind speed, wind direction, and power generation for each wind energy system. Data from the DAS shall be made available to HNEI sufficient for industry standard analysis.

Performance of the turbines on the site will be monitored for approximately five years, with full access by HNEI to monitoring equipment and data. Project FROG will assist the Conservancy with integrating the wind energy data into a monitoring system that will track overall building performance – the system will also include a simple dashboard interface for use by the Center’s education programs.

Deliverable 3 Turbine Installation: Site Preparation and Footings

The Deliverables and Payment Schedule in the Contract Statement of Work stipulates that Report 3 show “...documented evidence of progress being made in the installation of the wind turbines; documentation to include photos and certification by subrecipients Contractor.”

1. Footings: Site Layout and Excavation



Electrical Conduit Layout



North Turbine Footing Layout



Excavation Start: South Footing



Excavation Start: South Footing



Excavation Start: South Footing



Footing Excavation



Footing Excavation



Footing Excavation

2. Excavation and Installation of Distribution Conduit



Main Electrical Conduit Trench



Pre-Installed Conduit Run to Building



Pre-Installed Electrical Conduit Run to Building



Connection: Facility to Turbine Electrical Conduit



Main Conduit Distribution to Turbines



Electrical Junction at Building Interior



Electrical Junction at Building Interior



Electrical Conduit At Mechanical Closet

3. Steel Reinforcement, Concrete



Rebar on Site



Rebar Installation Start



Tower Cage Rebar Prepared



Cages Tied to Bases



Rebar Placement



First Concrete Pour Complete



Second Concrete Pour Forms Pepered



Windspire Footing Encased in Sonotube



Second Pour



Completed Footing with Disconnect/Brake Switches



Typical Conduit Distribution to Turbines



Detection Tape at Conduit Trench: Ready for Backfill



Backfill in Progress



Backfill at Footings, by 6" Lift

4. Inspection Report and Final Affidavit for Concrete, Reinforcing Steel



1/31/2013

Golden Gate National Parks Conservancy (E)
Tom Odgers
Building 37 Fort Mason
San Francisco, CA 94123

RE: Exterior Electrical Charging Station Juice
Bar at Crissy Field
1199 East Beach Street
San Francisco, CA 94129

CEL#: 1025642

FINAL REPORT FOR SPECIAL INSPECTION
AND MATERIALS TESTING SERVICES
(Effective Through 01/17/12)

In accordance with Section 1701, 1703, 1704 of the 2010 San Francisco Building Code, Consolidated Engineering Laboratories has provided the requested special inspection and testing on the subject project as listed below:

1. Concrete placement and testing.
2. Reinforcing steel placement.
3. Earthwork – compaction testing.

These inspections were performed by personnel under the general supervision of a Registered Civil Engineer in the State of California. Details of our work on this project are contained in our testing and inspection reports, issued during the course of construction.

Based solely upon the inspections and tests performed and upon our substantiating reports, it is our professional judgment that the inspected work was performed substantially in conformance with the approved plans and specifications, approvals by the Engineer of Record and the applicable workmanship provisions of the San Francisco Building Code.

Special inspection and materials testing is the observation of construction for general conformance with the approved design drawings and specifications. It should not be relied upon by others as acceptance or as a guarantee of work, nor should it in any manner relieve any contractor, or any other party, from their obligations and responsibilities under either the construction contract or generally accepted industry custom/practice.



CONSOLIDATED ENGINEERING
L A B O R A T O R I E S

We appreciate the opportunity of working with you. If you have any questions or require additional information, please feel free to contact us at your convenience.

REVIEWING ENGINEER: GREG LeROY, R.C.E.

CC:

Golden Gate National Parks Conservancy (E)



All reports are submitted as the confidential property of clients. Publication of statements, conclusions, or extracts is reserved pending our written approval.



CONSOLIDATED ENGINEERING
LABORATORIES

1/31/2013

Golden Gate National Parks Conservancy (E)
Tom Odgers
Building 37 Fort Mason
San Francisco, CA 94123

RE:	Exterior Electrical Charging Station Juice Bar at Crissy Field 1199 East Beach Street San Francisco, CA 94129	Inspection Date:	01/10-11/12
		Location:	Jobsite
		Inspector:	E. Bobrovitsky
		Report #:	001

CEL#: 1025642

REINFORCING / CONCRETE INSPECTION REPORT

On the above dates, our representatives inspected the referenced project.

Please refer to the attached reports for details and locations of our testing and/or inspection services for the above noted dates.

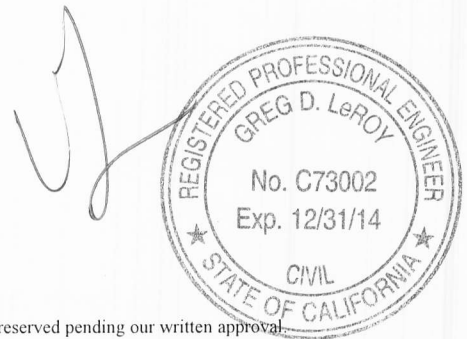
Work inspected was in compliance with approved plans and specifications.

REVIEWING ENGINEER: GREG LeROY, R.C.E.

CC:
Golden Gate National Parks Conservancy (E)

Enclosures (2)

All reports are submitted as the confidential property of our clients. Publication of statements, conclusions, or extracts is reserved pending our written approval.



CONCRETE, PRECAST AND REINFORCING

Page 1 of 1

DSA FILE #	
DSA APPL #	
LEA #	
OSHPO #	
PERMIT/APPL #	
Testing/Inspection Date(s)	01/10/12

Project Name	Exterior Electrical Charging station	
LEB Number	1025642 Jord Bar at Crissy Field	
Project Location	1199 Beach st. S.F.	
Contractor		
Inspected on	August	Company Name
Inspected where placement at	& see below	

Drawing No. _____ Detail No. _____ Other: _____

Inspected placement of: ☐ Anchor bolts ☐ Hold-downs ☐ Tie-downs Inspected: ☐ Cast-in-place ☐ Precast Operations

☐ Adjusted loads for correct mix and proper slump. ☐ Fresh concrete properties report left with IOR

Inspected placing and vibrating of ☐ cubic yards of concrete Inspected placing of ☐ cubic feet of grout

Performed ☐ slump ☐ air entrainment ☐ Unit weight tests

Cast ☐ set(s) of ☐ cylinders ☐ grout cubes Cast ☐ set(s) of shrinkage beams

Concrete Mix Number: ☐ Slumps in tolerance? ☐ Yes ☐ No ☐ Returned to plant for duration

Work inspected was: ☒ Completed ☐ In Progress ☐ Pending Approval

WIP Punchlist dated: ☐ Non-compliance report dated: ☐

☐ was left with contractor ☐ Items were reinspected and: ☐ accepted ☐ See attached ☐ remain in progress

Issues/Problems? ☐ Yes ☒ No (Describe below) Notified: ☐

Notes/Comments: ☐

Rebar	Concrete	Placement Type (slab, wall, footing)	Structure Bldg./Level	Location (Grid Lines)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Footings		For wind turbines in front of Crissy Field Center (5 total)
<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>			

The Work: ☒ WAS ☐ WAS NOT INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ☐ DSA ☐ OSHPO ☒ CITY APPROVED DOCUMENTS

The Work Inspected: ☒ MET ☐ DID NOT MEET THE REQUIREMENTS OF THE ☐ DSA ☐ OSHPO ☒ CITY APPROVED DOCUMENTS

Material Sampling: ☐ WAS ☐ WAS NOT ☐ N/A PERFORMED IN ACCORDANCE WITH THE ☐ DSA ☐ OSHPO ☐ CITY APPROVED DOCUMENTS


CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector: Edward Bohm

Date: 01/10/12

Print Name/Title: EDWARD BOHROVITSKY / Special Inspector

CERTIFICATION#: 5065086



 CONSOLIDATED ENGINEERING
LABORATORIES

CONCRETE, PRECAST AND REINFORCING

Page ____ of ____

DSA FILE#	
DSA APPL#	
LEA#	
OSHDP#	
PERMIT/APPL#	

Project Name:	Exterior Electrical Charging Station		Testing/Inspection Date(s):	01/11/12
CEL Project#:	1025642		Juice Bar at Crissy Field	
Project Location:	1199 Beach St. S.F.			
Contractor:				
Reported to:	August	Company Name:		
Inspected rebar placement at:	see below			

Drawing No.: _____ Detail No.: _____ Other: _____

Inspected placement of: ☐ Anchor bolts ☐ Hold-downs ☐ Tie-downs ☒ Inspected: ☒ Cast-in-place ☐ Precast Operations
☒ Monitored loads for correct mix and proper slump. ☐ Fresh concrete properties report left with IOR
☒ Inspected placing and vibrating of 20 cubic yards of concrete ☐ Inspected placing of cubic feet of grout
☒ Performed 1 slump ☐ air entrainment ☐ Unit weight tests
☒ Cast 1 set(s) of ☒ cylinders ☐ grout cubes Cast set(s) of shrinkage beams
☒ Concrete Mix Number: 6012 Slumps in tolerance? ☒ Yes ☐ No ☐ Returned to plant for duration
 Work Inspected was: ☒ Completed ☐ In Progress ☐ Pending Approval
 WIP Punchlist dated: Non-compliance report dated:
☐ was left with contractor ☐ Items were reinspected and: ☐ accepted ☐ See attached ☐ remain in progress
 Issues/Problems? ☐ Yes ☒ No (Describe below) Notified:

Notes/

Comments:

Rebar	Concrete	Placement Type (slab, wall, footing)	Structure Bldg./Level	Location (Grid Lines)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Footings		For wind turbines in front of
<input type="checkbox"/>	<input type="checkbox"/>			Crissy Field Center (5 total)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Footings		For charging station (same area)

 The Work: ☒ WAS ☐ WAS NOT INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ☐ DSA ☐ OSHPD ☒ CITY APPROVED DOCUMENTS

 The Work Inspected: ☒ MET ☐ DID NOT MEET THE REQUIREMENTS OF THE ☐ DSA ☐ OSHPD ☒ CITY APPROVED DOCUMENTS

 Material Sampling: ☒ WAS ☐ WAS NOT ☐ N/A PERFORMED IN ACCORDANCE WITH THE ☐ DSA ☐ OSHPD ☒ CITY APPROVED DOCUMENTS

 CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector:

Edward Bobrovitsky

Date: 01/11/12

Print Name/Title:

EDWARD BOBROVITSKY / Special Inspector

CERTIFICATION#:

5065086