The Midway Hotel at Conneaut Lake

Oakland Group Construction
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- Charles Raffensberger, *Project Manager*
- Joseph DeFrancesco, *Building Information Modeling*
- Corey Potetz, *Scheduling*
- Tim Sismour, *Estimating*
- Justin Delmaster, *Sustainability & Logistics*
- Lu Le, *Structural Consultation*
Presentation Overview

- Project Overview
- Community Impact
- Structural Review
- Zoning & Permitting
- Existing Utilities Overview
- Site Logistics
- Risk Analysis
- Communications Plan
- Project Budget
- Schedule Breakdown
- LEED Proposal
- Building Information Modeling
Project Scope

● Produce comprehensive construction management plan

● Function:
  ○ Owner’s Representative

● Goals:
  ○ Provide construction management expertise to produce quality end product
  ○ Manage general contractor
  ○ Appease surrounding community
  ○ Cost effective
  ○ Ensure safe work conditions
  ○ Project completion by May 30, 2017 (Memorial Day)
Project Overview

- 6 Story, 70 Room hotel on Conneaut Lake
- Structural Design:
  - Pittsburgh Steel Structures Group
- Architectural Input:
  - Oyler’s Architects
- Owner:
  - Midway Hospitality Corporation

- Original Midway Hotel:
  - Built in 1885
  - Demolished 1978
Given Design Overview

- Design provided by previous senior design group:
  - Structural steel framing
    - Connection details
  - Micropile foundations
    - Foundation pile caps
  - Reinforced concrete basemat
  - Hollow core concrete slabs
  - Cast in place concrete shafts with reinforced concrete columns
  - Parking lot design
  - Floor layout plans
Project Location

- Eastern shore of Conneaut Lake
- Located in Sadsbury Township in Crawford County, PA
Site Overview

- Residential neighborhood
- Access
  - Restricted to Midway Dr.
  - Steep terrain on northern section of property
- Balanced, uncontaminated soil conditions
  - No soil removed or brought in
- No on-site parking
The goal of the plan is to recreate an attractive Downtown Conneaut Lake, which will encourage economic development and improve the quality of life.

The Conneaut Lake Community Development Committee (CLCDC) hopes to create vibrant business activity and charm appeal that complements the beauty of the largest natural lake of Pennsylvania.
Midway Hotel Impact

- Creates a need for Midway Hotel
- New attractions will bring more guests to Conneaut Lake
- Hopes to achieve up-to-date amenities while maintaining the historical culture of the lake
Design Considerations

- Reviewed structural design calculations from PSSG
- Identified issues to be rectified prior to construction
- Explored exterior finish options and methods of connection
- Conducted preliminary parking lot design and layout
Design Considerations

- Reviewed design calculations and modified to correct errors
- Simple errors in structural design led to overdesign of steel members
- Size of some members can be reduced
- Current design essentially has built-in safety factor

**Load Calculations – Live Load Reduction**

**Girder BC1**

\[
L = L_0 \left[ 0.25 + \left( \frac{15}{A \times K_H} \right) \right]
\]

\[
L = \text{Reduced live load}
\]

\[
L_0 = \text{Code specified design live load}
\]

\[
K_H = \text{Live load element factor (table 4.2)}
\]

\[
A_T = \text{Tributary Area}
\]

\[
A_T = 435 \text{ ft}^2
\]

\[
K_H = 2.0
\]

\[
A = 2.0 \times 660 \text{ ft}^2 = 1320 \text{ ft}^2
\]

\[
L_0 = 40 \text{ psf}
\]

\[
L = 40 \left[ 0.25 + \left( \frac{15}{1320} \right) \right]
\]

\[
L = 40 \times 0.6628
\]

\[
L = 30.48 \text{ psf}
\]

\[
L = 26.51 \text{ psf}
\]

**Girder BC4**

Total \( A_T = 726 \text{ ft}^2 \)

\[
LL_{100} A_T = 176 \text{ ft}^2
\]

\[
LL_{40} A_T = 550 \text{ ft}^2
\]

\[
K_H = 2.0
\]

\[
A_{100} = 2.0 \times 176 = 352 \text{ ft}^2 < 400 \text{ ft}^2 \text{ No Reduction}
\]

\[
A_{40} = 2.0 \times 550 = 1100 \text{ ft}^2
\]

\[
L_{100} = 100 \text{ psf}
\]

\[
L_{40} = 40 \times \left[ 0.25 + \left( \frac{15}{1100} \right) \right] = 35.58 \text{ psf}
\]

\[
L_{40} = 40 \times \left[ 0.25 + \left( \frac{15}{1100} \right) \right] = 28.09 \text{ psf}
\]
Design Considerations

- Calculated value of 74.22 kips/hole should be 66.61 kips/hole
- Controlling value is minimum of all calculated values
- Error does not affect current design but implies other mistakes may be present

Bearing capacity of 7/16” angle

First check for the holes nearest to the edge of the member:

\[ R_n = 1.2L_c tF_u = 1.2 \times \left[2 - \left(\frac{0.8175}{S}\right)\right] \times \frac{7}{16} \times 58 = 48.53 \text{ Kips/Hole} \]

\[ R_n = 2.4d_b tF_u = 2.4 \times 0.75 \times \frac{7}{16} \times 58 = 45.678 \text{ Kips/Hole (Controls)} \]

Check the other holes:

\[ R_n = 1.2L_c tF_u = 1.2 \times (3 - 0.8125) \times \frac{7}{16} \times 58 = 74.32 \text{ Kips/Hole} \]

\[ R_n = 1.2L_c tF_u = 1.2 \times (3 - 0.8125) \times \frac{7}{16} \times 58 = 66.61 \text{ Kips/Hole} \]

\[ R_n = 2.4d_b tF_u = 2.4 \times 0.75 \times \frac{7}{16} \times 58 = 45.678 \text{ Kips/Hole (Controls)} \]

\[ \varnothing R_n = 0.75 \times (45.678 + 45.678) \times 5 \text{ Bolts} = 342.56 \text{ Kips} \]
Proposed Exterior Wall System

Brick veneer with steel stud backup

- Steel stud framing - 4” at 16” O.C.
  - Blanket insulation between studs
- Weatherproof cement board sheathing - ½”
- Rigid foam insulation - 1”
- Vapor retarder building wrap
- Face brick masonry - 4”x4”x8”
  - Connected by anchor bolts and masonry anchors
  - 1” cavity between brick and insulation
Parking Lot Design

- 70 parking lot
  - A national standard of one space per room
- 4 ADA compliant
  - Near main entrances, through the short route
  - Accessible spaces
    - 8’ wide with 5’ wide adjacent accessible aisle
  - Van accessible spaces
    - 11’ wide with a 5’ wide adjacent accessible aisle
    - 8’ wide with an 8’ wide accessible aisle
  - Two can share a common access aisle
Parking Lot Layout

- 90 degree parking
- One sided parking
  - 22’ for two-way drives
  - 18’ for one-way drives
- Aisle widths depend on:
  - Upon traffic flow
  - Angle of parking
  - Whether or not on both sides of parking
- Accommodate emergency and service vehicles
● Hot Mix Asphalt Pavement
  ○ Advantage
    ■ Versatility
    ■ Economic
    ■ Unaffected by ice control chemical
    ■ Traffic noise is minimized
  ○ Pavement design
    ■ Surface 1.5”
    ■ Base 3”
    ■ Aggregate 6”
Zoning & Permitting

- Spoke with Rose Mumau at Sadsbury Township office
  - Zoning Officer, Secretary, & Treasurer
- Zoning
  - Granted by Township
  - Lake Area Residential Zone
    - Hotels not permitted
    - Buildings > 35 feet tall not permitted
  - Applied to township to go before zoning hearing board
    - Proved the building will not compromise character of neighborhood
      - Parking, lighting, noise, etc.
    - Compliance with usage & setback Requirements
Zoning & Permitting (cont.)

- Compliance with Uniform Construction Code
  - Ensured by Middle Department Inspection Agency
    - Grant approval for occupancy permit
- Stormwater Management Plan Required
  - >2500 SF impervious surface
  - >5000 SF impervious surface requires engineered plan
- Bond required for Midway Drive per township request
  - 10 ton weight limit
- Off-Street loading and road restrictions considered in site logistics plan
Utilities Overview

● Contacted PA One Call
● Utility Companies:
  ○ Plans provided by:
    ■ Conneaut Lake Joint Municipality Authority – Public sewer/sanitary lines
    ■ Pennsylvania Power Company – Electric supply company
  ○ Clear, no facilities present:
    ■ Armstrong Cable Company – Local cable company
    ■ National Fuel Gas Dist RC 350 – Natural gas provider
    ■ Sadsbury Township, Crawford County – Traffic and local services provider
  ○ Field Marked:
    ■ Aqua Pennsylvania Inc. – Domestic water lines
Electric Utility Plan
Provided by Penn Power

Temporary tie-in point
Site Logistics Plan

- **Site Working Hours**
  - 7AM - 4PM Monday - Friday
  - Saturdays are not required unless Overtime is needed

- **Travel Plan & Car Parking**
  - Site does NOT have provision for parking for site staff, subcontractors, and visitors.
  - Average number of personnel on site will be 22 and parking will be provided near the site

**Parking:**
- Bill’s Midway Marina should be used for all personnel parking.
- Approximately 2,000 ft away
- GC will provide transportation (shuttle) to job site daily
Site Logistics Plan

Crane Logistics

- Steel and HVAC subcontractor responsible for sizing and operating crane
- Recommend Crawler Crane
- Max load is 3.5 ton
- Telescopic boom lift
- Lull

“Pick point”
- Lull will load and unload all material from the Southeast side of the site
Site Logistics Plan

- Established a preferred access route system for all delivery vehicles accessing site
- North will take PA - 18 and turn right onto Midway Drive
- South will take Conneaut Lake Road (322) turning left or right onto PA-18 and proceeding to take left on Midway Drive
Site Logistics Plan (Site Layout)

Temporary Utilities
Access Road Around Site
Dumpsters and Porta Johns
Materials
Lay Down Area
## Risk Analysis

<table>
<thead>
<tr>
<th>Risks</th>
<th>Probability (1-5)</th>
<th>Impact (1-5)</th>
<th>Consequence</th>
<th>Can we prevent it? (Y/N)</th>
<th>Contingency/Mitigation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken/Lost Equipment</td>
<td>4</td>
<td>3</td>
<td>12</td>
<td>Yes</td>
<td>• Have back up equipment / maintain equipment properly</td>
</tr>
<tr>
<td>Delivery Delays</td>
<td>3</td>
<td>5</td>
<td>15</td>
<td>No</td>
<td>• Have multiple suppliers</td>
</tr>
<tr>
<td>Absent Employees</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>No</td>
<td>• If needed, work overtime to make up for time lost</td>
</tr>
<tr>
<td>Inclement Weather</td>
<td>5</td>
<td>3</td>
<td>15</td>
<td>No</td>
<td>• Include weather days into schedule for activities during winter months</td>
</tr>
<tr>
<td>Poor Communication</td>
<td>3</td>
<td>4</td>
<td>12</td>
<td>Yes</td>
<td>• Follow the communication plan</td>
</tr>
<tr>
<td>Subcontractor Failure</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>No</td>
<td>• Require a performance bond</td>
</tr>
<tr>
<td>Supplier Issues</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>No</td>
<td>• Have multiple suppliers. • Pre-purchase materials and equipment</td>
</tr>
<tr>
<td>Theft of Materials</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>Yes</td>
<td>• Install Security Cameras • Hire Security Personnel if owner deems it necessary</td>
</tr>
<tr>
<td>Vandalism</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>Yes</td>
<td>• Install Security Cameras • Hire Security Personnel if owner deems it necessary</td>
</tr>
<tr>
<td>Risks</td>
<td>Probability (1-5)</td>
<td>Impact(1-5)</td>
<td>Consequence</td>
<td>Can we prevent it?(Y/N)</td>
<td>Contingency/Mitigation Plan</td>
</tr>
<tr>
<td>--------------------------------------------</td>
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<td>-------------</td>
<td>-------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Design Changes</td>
<td>4</td>
<td>3</td>
<td>12</td>
<td>No</td>
<td>• Adjust Schedule as soon as change is made and prepare accordingly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Conduct a meeting with the subcontractor it pertains to, so that everyone is on the same page.</td>
</tr>
<tr>
<td>Flooding due to Proximity to Lake</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>No</td>
<td>• Bring in pumps to pump out any water from work area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Have containment equipment onsite for spills</td>
</tr>
<tr>
<td>Lake Pollution</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>Yes</td>
<td>• Allow for extra days in the schedule for excavation activities in case of unknown obstructions.</td>
</tr>
<tr>
<td>Unknown Obstructions</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>No</td>
<td>• Create AHA’s for dangerous activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Have all employees go through a safety orientation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Conduct weekly safety meetings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Emphasize safety above all else - in meetings, with signage, and during site walk-throughs, etc...</td>
</tr>
<tr>
<td>Employee Safety</td>
<td>3</td>
<td>5</td>
<td>15</td>
<td>Yes</td>
<td>• Provide road and sewer bonds to county for Midway Drive.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Maintain a clean project site to minimize mud/dirt on roads and dust/construction debris in the air.</td>
</tr>
<tr>
<td>Damage to Access Road and Neighboring Properties</td>
<td>5</td>
<td>4</td>
<td>20</td>
<td>No</td>
<td>• Provide road and sewer bonds to county for Midway Drive.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Maintain a clean project site to minimize mud/dirt on roads and dust/construction debris in the air.</td>
</tr>
</tbody>
</table>
Risk Analysis (Cont.)

● Weather
  ○ Probability of Occurrence: 25%
  ○ Financial Impact: $250k

● Damage to Access Roads
  ○ Probability of Occurrence: 100%
  ○ Financial Impact: $50k

● Supplier Issues
  ○ Probability of Occurrence: 10%
  ○ Financial Impact: $100k

● Employee Safety
  ○ Probability of Occurrence: 10% (minor), 5% (major)
  ○ Financial Impact: $25k (minor), $1,000,000 (major)
### Communications Matrix

<table>
<thead>
<tr>
<th>Communication Type</th>
<th>Objective of Communication</th>
<th>Medium</th>
<th>Frequency</th>
<th>Audience</th>
<th>Person in Charge</th>
<th>Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kickoff Meeting</td>
<td>Introduce the project team to the project, project objectives</td>
<td>Face to Face</td>
<td>Twice</td>
<td>• Project Team • Owner • Subcontractors • Designer</td>
<td>Project Manager</td>
<td>• Agenda • Meeting Minutes</td>
</tr>
<tr>
<td>Pre-bid Meetings</td>
<td>Introduce the subcontractors to the project</td>
<td>Face to Face</td>
<td>As needed prior to bid</td>
<td>• Project Team • Subcontractors</td>
<td>Project Manager</td>
<td>• Meeting Minutes • Quotes</td>
</tr>
<tr>
<td>Scheduling Meetings</td>
<td>Review the schedule with the subs</td>
<td>Face to Face/Conference Call</td>
<td>Once Prior to bid and then as needed</td>
<td>• Project Team • Subcontractors</td>
<td>Project Manager</td>
<td>• Agenda • Meeting Minutes</td>
</tr>
<tr>
<td>Project Design Meetings</td>
<td>Discuss potential design problems and to get solutions to the problems</td>
<td>Face to Face or Email</td>
<td>As Needed</td>
<td>• Project Team • Design Team • Owner</td>
<td>Design Lead</td>
<td>• Agenda • Meeting Minutes</td>
</tr>
<tr>
<td>Progress Update Meeting</td>
<td>Determine if the project is on schedule and discuss upcoming work</td>
<td>Face to Face/Conference Call</td>
<td>Weekly</td>
<td>• Project Team • Subcontractors • Owner</td>
<td>Project Manager</td>
<td>• Agenda • Meeting Minutes</td>
</tr>
<tr>
<td>Project Status Meetings</td>
<td>Discuss the status of the project with management</td>
<td>Face to Face/Conference Call</td>
<td>Weekly</td>
<td>• Project Team • Oakland Group Construction Office Management</td>
<td>Project Manager</td>
<td>• Agenda • Meeting Minutes • Project Status Report</td>
</tr>
<tr>
<td>Community Meeting</td>
<td>Discuss the status of the project with the community and address any concerns they may have</td>
<td>Face to Face or Email</td>
<td>Bi-monthly</td>
<td>• Community Leader • Project Team • Owner</td>
<td>Project Manager</td>
<td>• Agenda • Meeting Minutes</td>
</tr>
<tr>
<td>Project Risk Assessment Meetings</td>
<td>Discuss potential dangerous activities and review safety precautions to minimize risk</td>
<td>Face to Face</td>
<td>When needed</td>
<td>• Project Team • Subcontractor to whom the activity applies</td>
<td>Project Manager &amp; Superintendent</td>
<td>• Risk mitigation plan • AHA for hazardous activity</td>
</tr>
</tbody>
</table>
Project Budget

- Estimated using RSMeans Building Construction Cost Data
  - Broken down into 30 Construction Specifications Institute (CSI) MasterFormat Divisions
  - Identified 21 Divisions relevant to the scope of this project
- Established material and labor costs for each Division
  - Total materials cost = $4,213,000
  - Total labor cost = $2,866,000
- Added Overhead and Profit to determine total building cost
- Total Building Cost = $8,141,000
  - $170.28 per square foot
# Project Budget

<table>
<thead>
<tr>
<th></th>
<th>Materials</th>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Requirements</strong></td>
<td>$691,502</td>
<td>$101,543</td>
</tr>
<tr>
<td><strong>Concrete</strong></td>
<td>$526,072</td>
<td>$403,882</td>
</tr>
<tr>
<td><strong>Masonry</strong></td>
<td>$90,786</td>
<td>$183,956</td>
</tr>
<tr>
<td><strong>Metals</strong></td>
<td>$685,510</td>
<td>$417,042</td>
</tr>
<tr>
<td><strong>Woods, Plastics, &amp; Composites</strong></td>
<td>$13,055</td>
<td>$20,495</td>
</tr>
<tr>
<td><strong>Thermal and Moisture Protection</strong></td>
<td>$104,120</td>
<td>$238,818</td>
</tr>
<tr>
<td><strong>Openings</strong></td>
<td>$307,310</td>
<td>$86,903</td>
</tr>
<tr>
<td><strong>Finishes</strong></td>
<td>$252,906</td>
<td>$445,624</td>
</tr>
<tr>
<td><strong>Specialties</strong></td>
<td>$60,911</td>
<td>$33,516</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>$72,165</td>
<td>$33,516</td>
</tr>
<tr>
<td><strong>Furnishings</strong></td>
<td>$273,280</td>
<td>$7,425</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Materials</th>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conveying Equipment</strong></td>
<td>$161,500</td>
<td>$33,094</td>
</tr>
<tr>
<td><strong>Fire Suppression</strong></td>
<td>$114,416</td>
<td>$3,368</td>
</tr>
<tr>
<td><strong>Plumbing</strong></td>
<td>$186,500</td>
<td>$186,500</td>
</tr>
<tr>
<td><strong>HVAC</strong></td>
<td>$376,500</td>
<td>$376,500</td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td>$179,500</td>
<td>$179,500</td>
</tr>
<tr>
<td><strong>Communications</strong></td>
<td>$11,088</td>
<td>$56,621</td>
</tr>
<tr>
<td><strong>Electronic Safety &amp; Security</strong></td>
<td>$29,978</td>
<td>$21,501</td>
</tr>
<tr>
<td><strong>Earthwork</strong></td>
<td>$9,450</td>
<td>$5,414</td>
</tr>
<tr>
<td><strong>Exterior Improvements</strong></td>
<td>$55,284</td>
<td>$5,867</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>$11,090</td>
<td>$7,289</td>
</tr>
</tbody>
</table>
Project Budget
Project Budget
Project Budget

- Total Building Cost only includes materials, labor, overhead, and profit

- To determine Overall Project Budget, included:
  - 10% Architectural fees
  - 2.5% CM fees
  - 7% Engineering fees
  - 0.5% Permitting fees
  - 2% Liability Insurance
  - 1.25% Performance Bond
  - 0.375% Commissioning fees
  - 7% Sales Tax
  - Workers’ Compensation
  - Testing and Inspecting Services
  - 10% Contingency

- Overall Project Budget = $11,809,000
## Schedule Overview

**Project Start:** Feb 8, 2016  
**Project Completion:** May 1, 2017

![Midway Hotel Milestone Schedule](image)

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM NTP</td>
<td>09-Aug-15</td>
<td>03-Aug-15</td>
</tr>
<tr>
<td>Establish Project Budget</td>
<td>00-Nov-15</td>
<td>03-Aug-15</td>
</tr>
<tr>
<td>Select GC</td>
<td>18-Dec-16</td>
<td></td>
</tr>
<tr>
<td>GC NTP</td>
<td>09-Feb-18</td>
<td></td>
</tr>
<tr>
<td>Foundation Complete</td>
<td>03-May-18</td>
<td></td>
</tr>
<tr>
<td>Utility Ties</td>
<td>15-Aug-16</td>
<td></td>
</tr>
<tr>
<td>Steel Erection Complete</td>
<td>09-Sep-16</td>
<td></td>
</tr>
<tr>
<td>Complete Building Dry-In</td>
<td>18-Jan-17</td>
<td></td>
</tr>
<tr>
<td>Finishes Complete</td>
<td>09-Mar-17</td>
<td></td>
</tr>
<tr>
<td>Substantial Completion</td>
<td>24-Apr-17</td>
<td></td>
</tr>
<tr>
<td>Certificate of Occupancy</td>
<td>01-May-17</td>
<td></td>
</tr>
<tr>
<td>Final Completion</td>
<td>01-May-17</td>
<td></td>
</tr>
</tbody>
</table>

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**Classic Schedule Layout**

- Establish Project Budget
- Select GC
- GC NTP
- Foundation Complete
- Utility Ties
- Steel Erection Complete
- Complete Building Dry-In
- Finishes Complete
- Substantial Completion
- Certificate of Occupancy
- Final Completion
Schedule Overview (Cont.)

- Months with greatest snowfall
  - Jan - 21”
  - Feb - 16”

- Average Temperature:
  - Jan - 25 degrees
  - Feb - 27 degrees
Schedule Overview (Cont.)

Total Number of Activities: 319

Flooring System: Option 1 (Hollow Core) was selected to accelerate construction
Schedule Overview (Cont.)

- Peak Activity: October 2016
- Peak Number of Workers: 50
- Total Number of Manhours: 48,000
- Peak Cost Occurs: September 2016
- Peak Cost Occurs before the peak activity
- Cumulative Cost of materials and labor: $8.15 million
Each rating system groups requirements that address the unique needs of building and project types on their path towards LEED certification. Once a project team chooses a rating system, they’ll use the appropriate credits to guide design and operational decisions.
This applies to buildings that are being newly constructed or going through major renovation.

- New Construction
- Core & Shell
- Schools
- Retail
- **Hospitality**
- Data centers
- Warehouses & Distribution Centers
- Healthcare
LEED Certification

Location and Transportation
Sustainable Sites
Water Efficiency
Energy and Atmosphere
Materials and Resources
Indoor Environment Quality
Innovation
Regional Priority
Location and Transportation

- Most points were scored in Surrounding Density and Diverse Uses.
- The site is surrounded by an existing residential area with a density of at least 7 persons/acre.
- In the project scope, one of the objectives is to renovate the dock structure which is within ½ mile of the hotel’s main entrance.
Sustainable Sites

- Points were scored on Heat Island Reduction
- OG Construction decided to go with a High Reflective roof instead of the original Vegetated Green Roof.
Water Efficiency

• Indoor Water Use Reduction gained most points in this category
• WaterSense labeled toilets, urinal, lavatory faucets and showerheads
• Energy Star washing machines, dishwashers, and food waste disposers
Energy and Atmosphere

- Optimizing Energy Performance
- In Green Building Studio the hotel design achieved a 10% improvement from original design
Materials and Resources

• Construction and Demolition Waste Management
• OG Construction plans to recycle and salvage nonhazardous construction demolition materials.
• The project hopes to divert 50% of the total construction and demolition material.
Indoor Environment Quality

- Most points were awarded in Quality Views category
- Midway Hotel offers many different views to the outdoors. There are great views of the lake from almost every room in the hotel.
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**Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110**
LEED Certified

Total Points : 49

(Maybe) Points : 13

Midway Hotel - LEED Certified
How LEED Benefits the Owner

- Oakland Group Strongly encourages developers and owners to strive for LEED certification
- Up front costs may be more but yearly savings in operating cost can easily outweigh over extended periods of time
- Utilize WaterSense and Energy Star appliances reduced water use by 20%
- Green Building Studio also provided a 10% improvement in energy performance

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Total Savings $108,763.20
Building Information Modeling (BIM)

- Not in original scope, but something we wanted to incorporate
- 3D analytical model based on design specifications
- Advantage of BIM
  - Each building element has information associated with it
BIM: How it was used

- Model constructed in Revit
- Revit schedules gave accurate material takeoffs
  - Element quantities be sorted and summed
  - Schedules update in real-time while modeling
  - Mainly used for beams in our situation
    - Can be used for any element within model
BIM: How it was used (cont.)

- Energy simulations via Green Building Studio
  - Based on model properties
    - Square footage
    - Building use
    - Construction materials (thermal properties)
    - Exact site coordinates for accurate yearly weather data
  - More HVAC design needed, but a good place to start
3D Renderings

Allows for quick comparison of different alternatives
3D Renderings (cont.)
4D Simulation: Navisworks Manage

- 4D animation of construction sequence based on project schedule
- Great visualization, powerful sales tool
- Opportunity to see visual progression of construction, can show flawed logic
- Ability to compare actual vs. planned progress
Final Deliverables

- Design Analysis
- Utilities Overview
- Site Logistics Plan
- Permitting & Zoning
- Cost Estimate
- Health & Safety Plan
- Schedule
- Quality Management Plan
- Risk & Communications Plan
- LEED Analysis
- Building Information Model
Acknowledgements

• Dr. John Oyler
• Professor John Sebastian
• Professor Mark Dietrick
• Rose Mumau
Questions?