Cradle to Cradle BIM

little bim today
BIG BIM tomorrow
1. Owner issues addressed by bim

2. Why pre-design bim is so important

3. What Owners get from bim in real projects

4. Design & construct bim data to O&M

5. Steps for Owners approaching bim
“It is a capital mistake to theorize before one has data.”

Sherlock Holmes
"It is better to correct error while new and before it becomes inveterate by habit and custom."

Thomas Jefferson
Report to Congress, 1777
Certainty,
Certainty
& more
certainty
1. Owner issues addressed by bim
2. Why pre-design bim is so important
3. What Owners get from bim in real projects
4. Design & construct bim data to O&M
5. Steps for Owners approaching bim
Politics
They provided enough detail and data in the validation that we can now decide the best allocation of the money available.

Terry McGean, PE, City Engineer
“We got down to the details early. The early decisions resulted in significant time and money savings.”

Hal Adkins, Director of Public Works
<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
<th>Type 5</th>
<th>Type 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repository</td>
<td>Concept</td>
<td>Design Prototype</td>
<td>Construction Prototype</td>
<td>Construct</td>
<td>Manage &amp; Operate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOD 1</th>
<th>LOD 2</th>
<th>LOD 3</th>
<th>LOD 4</th>
<th>LOD 5</th>
<th>LOD 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data + GIS</td>
<td>3D Shell</td>
<td>Shell + Layer in Data</td>
<td>Visualize &amp; Analyze</td>
<td>Maintain &amp; Update</td>
<td></td>
</tr>
</tbody>
</table>
ADVANCED IMAGERY + DETAILS = CERTAINTY

TRY IDEAS IN THE MODEL... NOT IN CONCRETE.
1. Owner issues addressed by bim

2. Why pre-design bim is so important

3. What Owners get from bim in real projects

4. Design & construct bim data to O&M

5. Steps for Owners approaching bim
Critical - envision the project properly
Align concept, scope, and budget
Define success at the beginning
Validation
Align concept, scope and budget

Needs Analysis
Program Analysis
Concept Prototype
Cost Model
Design Criteria
Comparables
Pro forma
Validate Plan

Validated Concept
DECISION MAKING FACTS
INFORMATION + UNDERSTANDING = GOOD DECISIONS
WHAT DO OWNERS GET FROM BIM?

FACT BASED DECISION MAKING
CAPTURE INFORMATION AT THE BEGINNING

USE YOUR $ EFFICIENTLY FOR LIFE
### Innovation and Design Process (Credits: 5 / Possible: 0 / No: 0) 5 Points

<table>
<thead>
<tr>
<th>Credit</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Historic Reclamation</td>
</tr>
<tr>
<td>Yes</td>
<td>Chesapeake Bay Water Quality Improvement</td>
</tr>
<tr>
<td>Yes</td>
<td>Crime Prevention Through Environmental Design</td>
</tr>
<tr>
<td>Yes</td>
<td>Integrated Project Delivery Processes</td>
</tr>
<tr>
<td>Yes</td>
<td>LEED Accredited Professional</td>
</tr>
</tbody>
</table>

### Project Totals (Credits: 61 / Possible: 16 / No: 5) 85 Points

- LEED Gold: 61 Points

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**PLAN & PROVE IT’S REALLY HAPPENING**

**IS SUSTAINABILITY REAL IF YOU DO NOT ACHIEVE THE PLANNED OUTCOMES?**
Condition Index

Priorities for repairs and replacement are made based upon assessed condition index. Condition Index is based on a scale of 1 to 100, with 100 representing a new, defect-free asset or component.

- 86–100—Excellent—Routine maintenance
- 71–85—Very Good—Minor repairs needed
- 56–70—Good—Moderate repairs needed
- 41–55—Fair—Major repairs needed
- 26–40—Poor—Replacement probable
- 11–25—Very Poor—Replacement needed
- 1–10—Failed—Replacement critical

What should I post here?

Messages is the place for such things as physical layouts, dimensions, sizes, addresses, billing addresses, owners and tax ID numbers.

Posted by Finith Jernigan in Construction | Edit | Post the first comment

Maintenance planning

Over the years, the association has found itself having to recreate drawings and literally 'reinvent the wheel' for

CONSISTENT RATINGS
MAKE PROCESS LESS SUBJECTIVE
Facility condition reports

Those that live with a building see problems well before anyone else. Use this forum to send the repair team notes of issues that you run across as you live in Sea Colony. Please be sure to give us enough information so that we can find the problem or talk to you to start the process of getting it resolved.

"Escrow Analysis" sea colony trial

<table>
<thead>
<tr>
<th>C3</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<th>F</th>
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<tr>
<td>2</td>
<td>Asset</td>
<td>Location</td>
<td>Orig date</td>
<td>Last repair</td>
<td>Est life</td>
<td>Est repair date</td>
<td>Est cost</td>
<td>Escrow current</td>
<td>Escrow annual</td>
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<td>10/07/06</td>
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<td>10/07/06</td>
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<td>06/15/10</td>
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</tbody>
</table>

SUSTAIN YOUR ASSETS
DEVELOP PLANS COLLABORATIVELY
MUST build models accurately

Avoided or missed questions = PROBLEMS LATER

Clarity and simplicity
“Our supporters believe in design-build, but are concerned that things will fall-through-the-cracks. The process allows us to manage both. And, we get more than we ever expected.”

Bill Gordy, City Project Manager
1. Owner issues addressed by bim

2. Why pre-design bim is so important

3. What Owners get from bim in real projects

4. Design & construct bim data to O&M

5. Steps for Owners approaching bim
30,000 SF & $4.5 million before validation
Fire Department Headquarters

PROJECT ORGANIZATION
- 8/2: 8/15
- 2 week(s)
- R: SFD

PROJECT COMPLETE
- 5/1: 5/1
- 1 day(s)

PROJECT REVIEW
- 8/16: 8/16
- 1 week(s)
- R: DA

MOVE-IN
- 4/24: 4/30
- 1 week(s)
- R: SFD

AUTHORIZE TEAM TO PROCEED
- 8/16: 8/16
- 1 day(s)
- R: Salisbury

DESIGN/BUILD
- 1/13: 4/23
- 332 day(s)

PROJECT INITIATION TELECONFERENCE
- 8/24: 8/24
- 1 day(s)
- R: DA, CR, SFD

BIDDING PROCESS
- 11/16: 1/5
- 37 day(s)

DRAFT PROGRAM ESTIMATE
- 8/25: 8/29
- 3 day(s)

DB DOCUMENT PREPARATION
- 9/20: 11/15
- 41 day(s)

DB INITIATION (MEETING)
- 8/30: 8/30
- 1 day(s)
- R: DA, CR, SFD

PROGRAM PRESENTATION (MEETING)
- 9/19: 9/19
- 1 day(s)
- R: DA, CR, SFD

PROGRAM ESTIMATE
- 8/31: 9/16
- 13 day(s)
41,655 SF & $9.2 million after validation
Improve ability to react to opportunities
**General Information**
Project Title: Salisbury Fire Headquarters  
Run Title: run1  
Building Type: FireStation  
Floor Area: 36,254 ft²

**Estimated Energy & Cost Summary**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Energy Cost</td>
<td>$65,333</td>
</tr>
<tr>
<td>Lifecycle* Cost</td>
<td>$889,838</td>
</tr>
<tr>
<td>Annual CO₂ Emissions</td>
<td></td>
</tr>
<tr>
<td>Electric†</td>
<td>290.8 tons</td>
</tr>
<tr>
<td>Onsite Fuel</td>
<td>48.6 tons</td>
</tr>
<tr>
<td>H3 Hummer Equivalent</td>
<td>30.9 Hummers</td>
</tr>
<tr>
<td>Annual Energy</td>
<td></td>
</tr>
<tr>
<td>Electric</td>
<td>505,511 kWh</td>
</tr>
<tr>
<td>Fuel</td>
<td>8,383 Therms</td>
</tr>
<tr>
<td>Annual Peak Electric</td>
<td>143.5 kW</td>
</tr>
<tr>
<td>Lifecycle* Energy</td>
<td></td>
</tr>
<tr>
<td>Electric</td>
<td>15,165,339 kWh</td>
</tr>
<tr>
<td>Fuel</td>
<td>251,475 Therms</td>
</tr>
</tbody>
</table>

* 30-year life and 6.1% discount rate for costs. † Does not include electric transmission losses.

**Location Information**
Building: Salisbury, MD 21801  
Electric Cost: $0.108/kWh  
Fuel Cost: $1.281/Therm  
Weather: GBS_04R20_250110

**Carbon Neutral Potential**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Run</td>
<td>339.5 tons</td>
</tr>
<tr>
<td>Onsite Renewable Potential</td>
<td>-152.0 tons</td>
</tr>
<tr>
<td>Natural Ventilation Potential</td>
<td>-11.8 tons</td>
</tr>
<tr>
<td>Onsite Fuel Offset/Biofuel Use</td>
<td>-48.6 tons</td>
</tr>
</tbody>
</table>
 Net CO₂ Emissions: 127.0 tons
1. Carbon neutrality is defined here as; reducing grid electric use from the base run by a percentage equal to the portion from fossil fueled power plants, defined below, and on site fossil fuel use is offset or eliminated.

**Electric Power Plant Sources**

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Fossil</td>
<td>60%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>37%</td>
</tr>
<tr>
<td>Hydroelectric</td>
<td>2%</td>
</tr>
<tr>
<td>Renewable</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Water Usage and Cost**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>561,414 Gal/yr</td>
<td>$2,020/yr</td>
</tr>
<tr>
<td>Indoor</td>
<td>535,314 Gal/yr</td>
<td>$1,981/yr</td>
</tr>
<tr>
<td>Outdoor</td>
<td>26,100 Gal/yr</td>
<td>$39/yr</td>
</tr>
</tbody>
</table>

**Photovoltaic Potential**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Energy Savings</td>
<td>263,366 kWh</td>
</tr>
<tr>
<td>Total Installed</td>
<td></td>
</tr>
<tr>
<td>Panel Cost</td>
<td>$2,135,122</td>
</tr>
<tr>
<td>Nominal Rated</td>
<td></td>
</tr>
</tbody>
</table>
$752,000
...under budget
...on schedule
...no claims
<table>
<thead>
<tr>
<th>Salisbury Fire Department</th>
<th>Budget</th>
<th>Contracted</th>
<th>Balance</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>$7,947,858</td>
<td>$7,929,500</td>
<td></td>
<td>99.43%</td>
</tr>
<tr>
<td>FF&amp;E</td>
<td>$537,609</td>
<td>$424,080</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$6,390</td>
<td>$6,390</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Support</td>
<td>$332,000</td>
<td>$431,680</td>
<td></td>
<td>(66.44%)</td>
</tr>
<tr>
<td>Land Acquisition</td>
<td>$311,350</td>
<td>$311,350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budgeted work</td>
<td>$9,162,207</td>
<td>$9,103,000</td>
<td>$59,207</td>
<td>Savings</td>
</tr>
<tr>
<td>Contingency budget</td>
<td>$692,793</td>
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<td>$692,793</td>
<td>Unspent</td>
</tr>
<tr>
<td>After budgeted work</td>
<td>$752,000</td>
<td></td>
<td></td>
<td>7.63%</td>
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<tr>
<td>Construction Extras</td>
<td>($112,045)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off Site Extras</td>
<td>($209,675)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional FF&amp;E</td>
<td>($129,252)</td>
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<tr>
<td>Balance Remaining</td>
<td>$301,028</td>
<td></td>
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<td>3.05%</td>
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</tbody>
</table>
“Our last $1 million project was a heck of a lot more effort than this $9 million project.

It was a lot of work before...
...this was a lot easier.”

William Gordy, Deputy Fire Chief
1. Owner issues addressed by BIM

2. Why pre-design BIM is so important

3. What Owners get from BIM in real projects

4. Design & construct BIM data to O&M

5. Steps for Owners approaching BIM
“We were on track to make some really expensive mistakes.”

Terry McGean, PE, City Engineer
Facilities are business assets

Link facilities to mission

Just-in-time decisions
Manage Space, People, Furniture and Equipment

- Space Management
- Tenant Management
- Breakdown Maintenance including Cyclic activity
- Inventory Management
- Key/Access Management
- WebServer
- Maintenance HelpDesk
- Preventative Maintenance
- Resource Planning
Tenant Management

Manage
- Tenants and Contracts

Track
- Rented Areas
- Utility Charges
- Operating and cyclic expenses
- Invoices
WebServer - Web site access to database and graphics for online collaboration
HelpDesk - Web site access to submit maintenance events and track issues
Breakdown Maintenance - Record maintenance events and review logged issues
Preventive Maintenance - Review maintenance events on equipment/space by time and status
Maintenance Reports

Print Work Order

WORK ORDER

ArchifM 8 Maintenance

Work Order Number: 2003/00000004

Event (1012) J-002 - Service Air Conditioner

There is no contract specified for this workorder.

Filled by the client as:

Ordered by: Larson, Steve

Priority: Medium Priority

Description of work:

L-002 - Service Air Conditioner
T-002 - HVAC - Replace Refrigerant
Resource Planning - Review events to forecast and develop long range resource plans
Reports - Integrated Crystal Reports
Data in BIM

- Planning scenarios
- Site information/legal data
- Architectural program
- Space functions
- Area calculations
- Volume calculations
- Engineering calculations
- Specifications
- Contract documents
- Project management data
- Litigation documentation
- Shop drawings
- Procurement documents
- Progress photographs
- Systems data
- Warranty data
- Disaster Recovery Plans

- Invoices
- Purchase requests
- Cost Estimates
- Organizational data
- Personnel lists
- Seating plans
- Handicap designation
- Network diagrams
- Hazardous materials
- O&M manuals/records
- Inspection records
- 2D/3D views
- Simulations
- Continuation of ops plans
- Contingency plans
- Furniture inventory
- + + +
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Done correctly, integrated processes change how everyone looks at our world.
What to do?

1. Take off your blinders...
   *Where are you now?*

2. Plan strategically...
   *Where do you want to be?*

3. Create tactics to close the gap
Use BIG BIM little bim to guide your way
Design Atlantic

Architecture - Planning - Management
130 East Main Street, Salisbury, MD 21801

http://www.designatlantic.com
http://www.4sitesystems.com

finith@designatlantic.com

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410.430.9415 mobile
Questions?