An Introduction to Bentley Utilities Designer

Mike Horsfall – Technical Manager GeoSpatial Sales
What is Bentley Utilities Designer?

Bentley Utilities Designer is:

- A multi-Utilities desktop GIS
- Built on Bentley Map technology
- Optimized for design workflows
- Designed to improve operations and maintenance workflows
- Targets Electric, Gas and Water/Wastewater utilities
Bentley Utilities Designer

- Designed for documentation & facility management
- Supports features placement, editing, and viewing
- Directional network trace and highlight
- Offers generalized customization architecture for tailoring solutions
- Logs historical feature transaction information
- Validates feature data against configurable business rules
- Simple service delivery
So what is Bentley Utilities Designer

• **Components**
  - Drawing tool – Bentley Utilities Designer
  - Manage Work Orders & Costing Engine – WorkFlow Manager
  - Scheduling Engine – Job Scheduler
Some Common Terms...

• Work Request
  – A request to provide new service or upgrade existing infrastructure

• Design
  – A graphical or non-graphical representation of facility installations, changes, or removals to provide new service or improve existing infrastructure

• Compatible Unit
  – Materials and labor required to install, change or remove infrastructure

• Job Defaults
  – Rule of thumb design characteristics
Basic Data Flow
Bentley Utilities Designer V8i

**Bentley Utilities Designer**

- Electric, Gas, Water, and Wastewater Data Models
- Role based Portals, Metrics, & Reporting
- Discipline specific Tools
- Cost Estimate Designs
- Manage Materials, Labor, and CUs
- IEC CIM NASSCO MACP/PACP
- Multiple & Phased Design Support
- Conduit Management, Network Profiles
- Job Defaults & Automatic CU Assignment
- On the fly CU Rules
- Business Rules Validation
- Network Modeling, Trace Analysis, & Export to Analysis
- Wastewater Survey data import
- Drag-N-Drop and Ad Hoc Layout
- Batch Processing and Live Data Exchange
- Bentley Map functionality
  - Spatial Data Streaming
  - Advanced Interoperability
  - Cadastral Mapping Configuration
  - Export Thematic Map Symbology
  - Advanced Map Finishing
  - Oracle Spatial - Short transaction - Long Transaction
  - CAD tools
  - 2D Analysis/Make Decisions
  - Mark-up/View/Edit DGN/XFM
  - Create Maps/Reports
  - SQL Server Spatial - Short transaction
  - Point Cloud Viewing
  - Survey Data Integration/Surface
  - Assemble/Integrate
  - View Rasters
  - Feature Modeling
  - GPS
  - View WMS/WFS
- Bentley Utilities Workflow Manager
  - Manage Work Order Status and States
  - Synchronize with ERP/WMS
  - User Role Capabilities
  - Design Mark up and Approval

Design & Cost Estimate
Extensions, Renewals, & Maintenance Plans
Document and Manage As-built Asset Information
Query, Analyze, Visualize, and Report
Manage Jobs and Workflows
Electric Industry Model
## Electric Industry Model

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 36 | CELL | UG-TRANSFORMER | 1 |
| 37 | CELL | UG-TRANSMITTER | 1 |
| 38 | CELL | UG-TRANSMITTER | 1 |
| 39 | CELL | UG-TRANSMITTER | 1 |
| 40 | CELL | UG-TRANSMITTER | 1 |
| 41 | CELL | UG-TRANSMITTER | 1 |
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| 63 | CELL | UG-TRANSMITTER | 1 |
| 64 | CELL | UG-TRANSMITTER | 1 |
| 65 | CELL | UG-TRANSMITTER | 1 |
Model Administrator

- Supports Use of Visual Modeling Tools
- Allows Bulk Loading of Configuration Data
- Extends Capabilities of Geospatial Administrator
- Supports and Manages Incremental Model Changes
Network Model

- Uses XFM feature instances and properties to support all XFM persistence workflows
- Provides multi-network support
- Networks can optionally be created based on features in user-defined fences
- Supports attached dgn files
- Support for upstream, downstream and all connected traces
- Stop condition specification
Unique Capabilities

• Inference Assisted Placement
  • Understands and manages relevant relationships
  • Attaches conductors and devices to physical structures based on proximity
  • Connects conductors and devices to electrical supply points with user interaction
  • Runs business rules
  • Other tasks
Unique Capabilities

• Smart Editors
  – Standard attribute view, entry and update
  – View, highlight and go to
    • Electrically connected features
    • Structurally attached features
    • Dependent child features
Bentley Utilities Designer

- Inference Engine, logical connections
- Network tracing
Bentley Utilities Designer

- Drag and Drop placement
- Business rules for placement and connectivity
Bentley Utilities Designer

- Custom Costs
- Template designs
New Profiles Tools

- Requires elevation attributes*
- Works with any feature although currently only configured with Wastewater
- Select start and stop locations
  - Trace finds and defines path
- Configurable & Customizable
Job Scheduler

• Integration with Work Management Systems

• Configurable Workflows
Job Scheduler

- Automatic Compatible Unit assignment
- Feature Editing
Quantity & Costing

• Based on features: poles, conductors, Xfmrs
• Point and linear features
• Material items
• Labor types (internal / external / others)
• Install / Remove / Abandon
• Custom costs – non warehouse items
• Integration with WMS (work management systems)
What is a quantity

- Measurement of a feature / task
  - Excavation
  - Backfill
  - Concrete
  - Wall
  - Window
  - Pole
  - Transformer
  - Conductor
  - Conduit
What is a cost

- Material and labor
  - Install a pole
  - Remove a pole
  - Remove a conductor
  - Abandon a conduit

- Unknowns
  - Custom costs
  - Not warehouse items
  - Rule of thumb
What is a compatible unit (CU)

- **Materials**
  - Poles
  - Butt wrap
  - Bolts

- **Time required**
  - Install
  - Remove
  - Abandon
  - In-house/Contractor – Labor Type
  - Energized/De-Energized – Work Type

- **Macro Unit**
  - More than one compatible unit
CU composition
CU composition

**Compatible Unit Properties**

<table>
<thead>
<tr>
<th>General</th>
<th>Installation</th>
<th>Removal</th>
<th>Transfer</th>
<th>Abandon</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID: CB2241U</td>
<td>Name: CONDUIT DUCT BANK 2X2.4I</td>
<td>Tuner: Public</td>
<td>Hourly Labor Rate: $34.00</td>
<td></td>
</tr>
<tr>
<td>Labor Type: InHouse Electric</td>
<td>Work Type: Energized</td>
<td>Scrap Value: $0.00</td>
<td>Salvage Value: $0.00</td>
<td></td>
</tr>
<tr>
<td>Fixed Labor Cost</td>
<td>Retired Date:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creator: Enterprise User</td>
<td>Created: 1/3/2009</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- OK
- Cancel
- More...
- Help
Custom Cost Properties

Name: Backhoe JD 740 1Hr
Cost: $245.00
Type: Public

Category & Type
Type: 
Category: 

Description
Rental of Backhoe with Operator per hour

Owner: Enterprise User
Modified: 1/9/2009
Creator: Enterprise User
Created: 1/9/2009

OK Cancel More... Help
## Design Order Report

<table>
<thead>
<tr>
<th>STATUS</th>
<th>UNIT</th>
<th>ID</th>
<th>Usage Description</th>
<th>QTV</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>CU</td>
<td>26022</td>
<td>25KVA 4.883Y x 7.64/3.2Y - 120/240 CONV</td>
<td>1.00</td>
</tr>
<tr>
<td>I</td>
<td>CU</td>
<td>PW453P</td>
<td>POLE WOOD 45 FT CL3 FINE</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**P/S:** P2

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</tr>
</tbody>
</table>
## Estimated Summary: BOM - Major Materials Only

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Code</th>
<th>UOM</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>406.10</td>
<td>140008</td>
<td>FT</td>
<td>WIRE ACSR BARE 2 1/0 STR (SPARATE)</td>
</tr>
<tr>
<td>406.10</td>
<td>18438</td>
<td>FT</td>
<td>WIRE ACSR BARE 2 7/1 STR (SPARATE)</td>
</tr>
<tr>
<td>9.00</td>
<td>18437</td>
<td>EA</td>
<td>POLE UTILITY 45 FT CLASS 3 PINR</td>
</tr>
<tr>
<td>3.00</td>
<td>26022</td>
<td>EA</td>
<td>25 48/3.3Y x 7.6/13.2Y 120/240 CONV</td>
</tr>
</tbody>
</table>
### Plant Account No (368,369,370)

<table>
<thead>
<tr>
<th>UNIT DESCRIPTION</th>
<th>UNIT TYPE</th>
<th>QUANTITY</th>
<th>COST</th>
<th>MANHOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 SKVA 4.8/8.3Y x 7.6/13.2Y - 120/240 CONV</td>
<td>CU</td>
<td>3.00</td>
<td>$1,828.50</td>
<td>11.25</td>
</tr>
</tbody>
</table>

**TOTAL INSTALL**

<p>| | | | | |</p>
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>#2 ACSR 7/1 STR</td>
<td>CU</td>
<td>406.10</td>
<td>$207.12</td>
<td>0.06</td>
</tr>
<tr>
<td>1.0 ACSR</td>
<td>CU</td>
<td>406.10</td>
<td>$207.12</td>
<td>0.06</td>
</tr>
<tr>
<td>POLE WOOD 45 FT CL3 PINE</td>
<td>CU</td>
<td>9.00</td>
<td>$4,347.00</td>
<td>54.00</td>
</tr>
</tbody>
</table>

**TOTAL INSTALL**

<p>| | | | | |</p>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$4,761.24</td>
<td>54.12</td>
</tr>
</tbody>
</table>
Integration with ProjectWise

- Dgn file resides in PW
- Managed environment, security/control
- Design attributes shown in PW
- All other project documents in one place
- 2-tier and 3-tier with Oracle Spatial
- 2-tier with SQL Server Spatial
What makes it different — tool perspective

• Drawing tool
  – Based on Bentley Map
  – Custom code for:
    • relationships...connectivity – built in
    • Hooks – allows flexibility
  – Key-ins “Activate Method Pole|Place”
  – Construction Drawings, cut sheets, dimensioning
  – GPS input
  – WMS/WFS and GIS interoperability
Questions